The Corporation of the
City of Kitchener

# GROWING TOGETHER EAST

## Noise Analysis Study

## Phase 2: Noise Analysis Study Report

March 2025

25175.01

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March 25, 2025 **Reference Number:** 25175 – Kitchener Growing Together East

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**RE: Phase 2: Noise Analysis Study Report**
**Kitchener Growing Together East**
**City of Kitchener**

Dear Mr. Clark:

LEA Consulting Ltd. is pleased to present the findings of this Noise Analysis Study Report for the Growing Together East Protected Major Transit Station Areas (PMTSAs) in the City of Kitchener.

To ensure land use compatibility from a noise perspective, based on modelling results, the report recommends two types of Holding Provisions for certain parcels of lands within the Block Line, Fairway and Sportsworld PMTSAs. The intent of the Holding Provisions is to require the preparation of Noise Feasibility and/or Noise Impact Studies, to confirm meeting MECP sound level limits can be achieved for all noise sensitive uses introduced in the PMTSAs.

Should you have any questions regarding this Noise Analysis Study, please do not hesitate to contact us.

Yours truly,

**LEA CONSULTING LTD.**

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## Revision History

| Rev. No. | Description | Author | Reviewed By | Date |
|---|---|---|---|---|
| 1 | Initial Draft | Ian Dinsmore & Keanna Tacay-Clarke | Felipe Vernaza & Daniel Eduardo Adarve Villanueva | February 18, 2025 |
| 2 | Final | Ian Dinsmore & Keanna Tacay-Clarke | Felipe Vernaza & Daniel Eduardo Adarve Villanueva | March 24, 2025 |
| | | | | |

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# 1 INTRODUCTION

The City of Kitchener initiated the Growing Together project to introduce new Strategic Growth Area (SGA) land uses and apply them to Kitchener's ten (10) Protected Major Transit Station Areas (PMTSAs). Kitchener City Council approved Official Plan Amendments and Zoning By-law Amendments related to the first phase, Growing Together West, on March 18, 2024. The initial phase covered seven (7) PMTSAs.

LEA Consulting Ltd. (LEA) has been retained by the City of Kitchener to undertake a transportation and noise Analysis Study as part of the final phase, Growing Together East, to support the implementation of an updated planning framework for the three (3) remaining PMTSAs – Block Line, Fairway, and Sportsworld, which have been defined by the Regional Official Plan and centred around existing and planned ION LRT stations. The PMTSA boundaries contain lands within a five hundred (500) to eight hundred (800) metre radius of each existing or planned ION LRT station. A description and illustration of the study areas are provided below and in **Figure 1**.

- **Block Line PMTSA**: Centered around the existing Block Line ION station along Courtland Avenue East, bounded by Highway 8 to the north, an existing freight rail corridor to the south, Homer Watson Boulevard to the west, and Vanier Drive to the east.
- **Fairway PMTSA**: Centered around the existing Fairway ION station along Fairway Road South, bounded by Traynor Avenue to the north, the freight rail corridor to the south, Courtland Avenue East/Manitou Drive to the west, and Highway 8 to the east.
- **Sportsworld PMTSA**: Centered around the planned Sportsworld ION station along King Street East, bounded by Folleys Lane to the north, Pioneer Tower Road to the south, Wagon Street to the west, and Highway 8 to the east.

The main goal of the noise analysis is to model future 2041 sound levels in order to assess the land use compatibility from a noise perspective between the proposed PMTSA SGA uses and nearby lands.

# 2 PHASE 1 MEMORANDUM SUMMARY

By way of background, LEA has completed the Kitchener Growing Together East - Phase 1 Background and Methodology Memorandum, which precedes this Phase 2 Report.

The Phase 1 Memo outlined in detail the study areas for the three (3) Protected Major Transit Station Areas PMTSAs of Fairway, Block Line, and Sportsworld – outlining all existing and year 2041 future sound sources, including roads, freight rail lines, the ION LRT and Stage 2 rapid transit, and any stationary noise sources from the surrounding industry/commercial uses and rail yards. It also includes a basis for the selection of the noise-sensitive receivers and the locations/results of the noise monitoring campaign conducted by LEA personnel.

In addition, the Phase 1 memo presented the applicable sound level limits for this assessment and the noise modelling methodologies utilized in this Phase 2 Noise Analysis Study Report. Three (3) different industry-standard methods of prediction were selected for different types of noise sources:

- The ISO 9613-2 for stationary noise sources;
- The US Federal Transit Administration (FTA) General Method for railway noise sources; and
- The US Federal Highway Administration Traffic Noise Model 2.5 (TNM 2.5) algorithm for roadway noise sources.

The CadnaA noise modelling software was selected because it incorporates the above methods of prediction, can calculate receiver-specific sound levels, and can generate noise contours.

# 3 UPDATED SENSITIVE RECEIVERS

The Phase 1 Memo outlines a total of twelve (12) noise-sensitive receivers for Block Line, thirteen (13) noise-sensitive receivers for Fairway and ten (10) noise-sensitive receivers for Sportsworld. These were selected to represent noise-sensitive uses within the proposed land uses of Strategic Growth Areas A, B, and C, across the three (3) PMTSAs.

In order to identify the worst-case locations and elevations for future noise-sensitive receivers, a low-resolution noise contour was calculated for each PMTSA. The intent was to avoid shielding due to existing / future buildings and structures and to maximize exposure to all major noise sources, including roadways, railways, rail yards, and nearby industrial/commercial sites.

On this basis, the previously identified noise-sensitive receivers were moved slightly to accurately report worst-case sound levels at these locations.

Please refer to **Figure 5** and **Figure 6** for the updated noise receivers' locations.

# 4 MODELLING INPUTS

As noted, existing and future sound levels were modelled using the CadnaA noise propagation software (version 2020), which incorporates the ISO 9613-2 methodology for stationary noise sources, the *"FTA General Method"* for railway noise sources, and the "*US Federal Highway Administration Traffic Noise Model"* (TNM) algorithm for roadway noise sources.

In order to fully understand how noise will change between existing and future (year 2041) conditions and to assess land use compatibility from a noise perspective, the following scenarios were evaluated:

- Overall Existing Conditions
- Overall Future Year 2041 Conditions
- Future Year 2041 Conditions (Transportation Noise Only)
- Future Year 2041 Conditions (Stationary Noise Only)

Year 2041 transportation and stationary sound levels were isolated since different sound level limits apply to transportation and stationary noise. For further details regarding the applicable limits, please refer to **Section 7** of the Phase 1 Memorandum prepared for this Project.

The following sections detail the modelling inputs used in this noise modelling assessment.

## 4.1 TRANSPORTATION NOISE MODELLING INPUTS

As noted, road noise emissions were simulated using the Traffic Noise Model (TNM) Version 2.5 algorithm, which is approved by the MTO for noise assessments. TNM is a widely accepted tool in transportation engineering for analyzing traffic noise impacts and designing mitigation measures for roadway projects.

### 4.1.1 Road Network Inputs

Available traffic data for the study roadways were obtained from the Region of Waterloo and Ontario Traffic Inc. Furthermore, on November 21, 2024, LEA conducted additional turning movement count surveys, as counts were not available for all study intersections/corridors.

The worst-case scenario for Average Daily Traffic (ADT) was either sourced directly or calculated from the received datasets. When available, traffic counts were used to determine medium and heavy truck percentages. Otherwise, an 8/13 split for heavy trucks and a 5/13 split for medium trucks/buses were assumed, consistent with the MTO *"Environmental Guide for Noise"* (hereafter referred to as the MTO Guide). Traffic volumes were divided into daytime (07:00 to 23:00) and nighttime (23:00 to 07:00) periods, with a day/night split of 90/10. Speeds align with the posted speed limits for the roadways.

For Highway 8, traffic data from MTO's iCorridor platform was utilized. This tool provides access to information such as ADT and Average Daily Truck Traffic (ADTT). Consistent with the MTO Guide, a 15/20 split for heavy trucks and a 5/20 split for medium trucks/buses was assumed, along with a day/night traffic volume split of 67/33. A posted speed limit of 100 km/h was used for Highway 8.

Future ADTs were obtained from the VISUM modelling undertaken for the transportation assessment of this study. To develop the ADT volumes for the 2041 horizon, population and employment forecasts reflecting the given land use scenarios were input into the model, and daily link volumes were extracted from the assigned network and aggregated to produce the ADT values for key road segments. Future roadways were assumed to have a speed limit of 50 km/h.

The resulting road traffic noise inputs utilized in the noise models are in **Table 1** and **Table 2**. Detailed traffic data can be found in **Appendix B.**

Table 1: Summary of Existing Traffic Data Inputs

| Corridor | Vehicle Volumes (1hr) | | Percentage of Heavy Trucks | | Percentage of Medium Trucks/Buses | | Posted Speed Limit |
|---|---|---|---|---|---|---|---|
| | Daytime | Nighttime | Daytime | Nighttime | Daytime | Nighttime | |
| **Block Line PMTSA** | | | | | | | |
| Courtland Avenue East | 1,307 | 290 | 3.5% | 0.4% | 1.7% | 0.2% | 60 km/h |
| Block Line | 759 | 169 | 3.4% | 0.4% | 1.1% | 0.1% | 50 km/h |
| Homer Watson Boulevard | 2,088 | 464 | 3.2% | 0.4% | 2.2% | 0.2% | 50 km/h |
| Lennox Lewis Way | 259 | 58 | 3.6% | 0.4% | 1.8% | 0.2% | 30 km/h |
| Hayward Avenue | 71 | 16 | 3.9% | 0.4% | 1.9% | 0.2% | 40 km/h |
| Fallowfield Drive | 271 | 60 | 0.8% | 0.1% | 0.5% | 0.1% | 40 km/h |
| **Fairway PMTSA** | | | | | | | |
| Highway 8 | 5,546 | 5463 | 3.5% | 1.7% | 1.2% | 0.6% | 60 km/h |
| Highway 8 Ramps | 602 | 134 | 2.9% | 0.3% | 1.4% | 0.2% | 60 km/h |
| Manitou Drive | 759 | 169 | 3.4% | 0.4% | 1.1% | 0.1% | 60 km/h |
| Fairway Road South | 1,822 | 405 | 4.6% | 0.5% | 2.1% | 0.2% | 60 km/h |
| Wilson Avenue | 706 | 156 | 0.5% | 0.4% | 2.2% | 0.2% | 40 km/h |
| Kingsway Drive | 436 | 97 | 1.3% | 0.1% | 1.9% | 0.2% | 40 km/h |
| Greenfield Avenue | 80 | 18 | 2.3% | 0.3% | 1.5% | 0.2% | 40 km/h |
| **Sportsworld PMTSA** | | | | | | | |
| Highway 8 | 4,173 | 4111 | 3.9% | 1.9% | 1.3% | 0.6% | 100 km/h |
| King Street East | 2,205 | 490 | 6.1% | 0.7% | 1.4% | 0.2% | 60 km/h |
| Sportsworld Drive/ Maple Grove Drive | 1,463 | 325 | 10.3% | 1.1% | 2.0% | 0.2% | 50 km/h |

| Corridor | Vehicle Volumes (1hr) | | Percentage of Heavy Trucks | | Percentage of Medium Trucks/Buses | | Posted Speed Limit |
|---|---|---|---|---|---|---|---|
| | Daytime | Nighttime | Daytime | Nighttime | Daytime | Nighttime | |
| Pioneer Tower Road | 98 | 22 | 0.7% | 0.1% | 0.8% | 0.1% | 40 km/h |
| Gateway Park Drive/ Heldmann Road | 473 | 105 | 6.2% | 0.7% | 1.1% | 0.1% | 40 km/h |
| Sportsworld Crossing Road | 168 | 37 | 22.1% | 2.5% | 8.7% | 1.0% | 20 km/h |
| Highway 8 SB Ramps | 382 | 85 | 1.6% | 0.2% | 7.7% | 0.9% | 60 km/h |
| Highway 8 NB Ramps | 721 | 160 | 0.4% | 0.6% | 0.4% | 0.6% | 60 km/h |

Table 2: Summary of Future (2041) Traffic Data Inputs

| Corridor | AADT | Vehicle Volumes (1hr) | | Percentage of Heavy Trucks | | Percentage of Medium Trucks/Buses | | Posted Speed Limit |
|---|---|---|---|---|---|---|---|---|
| | | Daytime | Nighttime | Daytime | Nighttime | Daytime | Nighttime | |
| **Block Line PMTSA** | | | | | | | | |
| Courtland Avenue East (Segment 1) | 24,304 | 1,367 | 304 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Courtland Avenue East (Segment 2) | 19,150 | 1,977 | 239 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Courtland Avenue East (Segment 3) | 23,856 | 1,342 | 298 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Block Line | 17,160 | 965 | 215 | 1.9% | 1.9% | 1.2% | 1.2% | 50 km/h |
| Homer Watson Boulevard | 28,312 | 1,593 | 354 | 1.9% | 1.9% | 1.2% | 1.2% | 50 km/h |
| Lennox Lewis Way | 3,801 | 214 | 48 | 1.9% | 1.9% | 1.2% | 1.2% | 30 km/h |
| Hayward Avenue | 5,460 | 307 | 68 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| Fallowfield Drive | 4,682 | 263 | 59 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| **Fairway PMTSA** | | | | | | | | |
| Highway 8 | 50,696 | 2,123 | 2091 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Highway 8 Ramps | 12,116 | 682 | 151 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Manitou Drive | 9,824 | 553 | 123 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Fairway Road South (Segment 2) | 13,414 | 755 | 168 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Fairway Road South (Segment 1) | 29,834 | 1,678 | 373 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Wilson Avenue (Segment 1) | 5,650 | 318 | 71 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| Wilson Avenue (Segment 2) | 20,740 | 1,167 | 259 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| Kingsway Drive | 8,422 | 474 | 105 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| Greenfield Avenue | 7,748 | 436 | 97 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| **Sportsworld PMTSA** | | | | | | | | |
| Highway 8 | 28,200 | 1,181 | 1163 | 1.9% | 1.9% | 1.2% | 1.2% | 100 km/h |
| King Street East (Segment 1) | 36,842 | 2,072 | 461 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| King Street East (Segment 2) | 49,288 | 2,772 | 616 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| King Street East (Segment 3) | 60,990 | 3,431 | 762 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Sportsworld Drive/Maple Grove Drive (Segment 1) | 18,502 | 1,041 | 231 | 3.1% | 3.1% | 1.9% | 1.9% | 50 km/h |
| Sportsworld Drive/Maple Grove Drive (Segment 2) | 26,238 | 1,476 | 328 | 3.1% | 3.1% | 1.9% | 1.9% | 50 km/h |
| Pioneer Tower Road | 1,662 | 93 | 21 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |

| Corridor | AADT | Vehicle Volumes (1hr) | | Percentage of Heavy Trucks | | Percentage of Medium Trucks/Buses | | Posted Speed Limit |
|---|---|---|---|---|---|---|---|---|
| | | Daytime | Nighttime | Daytime | Nighttime | Daytime | Nighttime | |
| Gateway Park Drive/Heldmann Road (Segment 1) | 3,684 | 207 | 46 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| Gateway Park Drive/Heldmann Road (Segment 2) | 8,680 | 488 | 109 | 1.9% | 1.9% | 1.2% | 1.2% | 40 km/h |
| Sportsworld Crossing Road | 5,518 | 310 | 69 | 1.9% | 1.9% | 1.2% | 1.2% | 20 km/h |
| Highway 8 SB Ramps | 11,162 | 628 | 140 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |
| Highway 8 NB Ramps | 10,722 | 603 | 134 | 1.9% | 1.9% | 1.2% | 1.2% | 60 km/h |

### 4.1.2 Future Road Network Geometry

The future road network was obtained from the VISUM model completed for this project. See **Figure 2**, **Figure 3** and **Figure 4** for future road network conditions. See **Appendix G** for complete future road network and the predicted Average Daily Traffic (ADT). The following roadways were added to the existing road network:

- Local Road A (Block Line) runs parallel to Courtland Avenue East, from Hayward Avenue (mid-block) to the intersection of Courtland Avenue and Hillmount Street, to the northeast of the nearby rail yard;
- Laneway A and B (Fairway) parallel to Fairway Road South on the north, extending from the existing Manitou Drive and intersecting with Wilson Avenue; and
- Minor Collector A (Fairway) runs parallel to Fairway Road South from Manitou Drive to Wilson Avenue.

Based on the results of the VISUM model, some proposed future roadways had traffic volumes low enough to be deemed acoustically insignificant and, therefore, were not included as part of the model. These include proposed future local roads and laneways, such as Local Road A (Sportsworld) extending from Sportsworld Crossing Road connecting with Deer Ridge Drive to the west of King Street East, which has a predicted 2041 ADT of 4,358 – noise generated from this road will be overpowered by nearby King Street East and Sportsworld Crossing Road.

### 4.1.3 ION LRT Inputs

Information relating to the ION LRT was provided by Grand River Transit and the Regional Municipality of Waterloo. The existing ION LRT alignment was obtained from OpenStreetMap.

Stage 2 of the ION LRT was assumed to be completed by the year 2041, with a stop at the Sportsworld PMTSA. The alignment of the future Stage 2 ION LRT through Sportsworld was extracted from the supporting documentation for the ION LRT Stage 2. See **Appendix C** for the proposed alignment as per the Stage 2 ION: Light Rail Transit from Kitchener to Cambridge Environmental Project Report (2021). For the purposes of this study, LRT was assumed to be the preferred technology for Stage 2 ION.

**Appendix D** shows the ION LRT speed curves provided by Grand River Transit and the Regional Municipality of Waterloo. For a conservative approach, the speed of the LRT was modelled using the maximum train speed of 40 km/h shown in the provided speed curves. The exceptions are at:

- Stations - where trains were assumed to be stationary; and
- Immediately upstream and downstream of the stations, where the trains were modelled using speeds of 30 km/h.

The number of trains per day was determined from the ION scheduled train departure and arrival times at Fairway Station. Trains run every ten (10) minutes in both directions for most of the day, with slightly reduced headways during the nighttime periods. The number of trains in each direction is outlined below in **Table 3**.

Table 3: ION LRT Volumes – Based on ION Schedule at Fairway Terminus Station

| Time | ION Northbound | ION Southbound |
|---|---|---|
| Daytime (7:00-23:00) | 87 | 82 |
| Nighttime (23:00-7:00) | 8 | 11 |

The existing ION LRT volumes were utilized for the 2041 expansion to Sportsworld while applying the above-noted travel speed assumptions. As such, the volumes in **Table 3** also represent the number of trains modelled to/from Sportsworld Station and further continuing to Cambridge.

Sound Exposure Levels (SELs) were referenced from the FTA's various transit vehicles to match the ION LRT rolling stock.

### 4.1.4 Freight Train Inputs

Information related to the freight lines and rail yards was provided by Canadian National (CN), and camera footage was collected by LEA personnel. CN owns the rail line that runs between Homer Watson Boulevard and Courtland Avenue. CN and Canadian Pacific Kansas City (CPKC) share the rail yard located between Courtland Avenue East and Peter Hallman Ball Park. CPKC owns the rail line running along the south of Fairway Road South and to the north of Highway 8, including the rail yard located northwest of Highway 8 and Maple Grove Road/Sportsworld Drive.

CPKC declined to provide train count data for the purposes of this study. To account for this data gap, LEA personnel collected video at the rail yards within Block Line and Sportsworld. Video footage spanned a total of ten (10) days, and the maximum number of trains in one day was used to model the freight lines and rail yards.

The maximum train pass-bys at the railyards located in Block Line between Courtland Avenue East and the Peter Hallman Ball Park and Sportsworld to the northwest of Highway 8 and Maple Grove Road/Sportsworld Drive are outlined below in **Table 4**. These numbers are utilized for the rail yards as well as the freight lines that run through the PMTSAs.

Table 4: Maximum Number of Train Pass-Bys at Railyards

| Time | Block Line – Rail Yard | Sportsworld – Rail Yard |
|---|---|---|
| Daytime (7:00-23:00) | 6 | 22 |
| Nighttime (23:00-7:00) | 4 | 12 |

The data provided by CN includes a maximum train speed of eight (8) km/h. This speed was utilized for all freight lines. Freight trains were modelled using the FTA's emissions for diesel-electric locomotives and rail car cars. Note that the ION LRT was conservatively modelled using the FTA's rail car emissions, which is consistent with this methodology.

## 4.2 STATIONARY NOISE MODELLING INPUTS

Noise generated by Heating, Ventilation, and Air Conditioning Rooftop Unit (HVAC RTU) systems from existing buildings in the study area, along with machinery and truck operations within the industrial and employment zones in the vicinity, may adversely impact future noise-sensitive spaces. Consequently, stationary noise was modelled to evaluate these potential impacts. Sound levels were modelled for the worst-case daytime (07:00 to 19:00), evening (19:00 to 23:00), and nighttime (23:00 to 07:00) hours.

### 4.2.1 Heating, Ventilation and Air Conditioning

Reference sound power data related to the HVACs mounted on rooftops of existing buildings within the study area were obtained from the manufacturer or through measurements during LEA site visits. Since the exact model numbers of the existing RTUs within the study area could not be determined, reference data were selected based on the number of observed fans. For example, an RTU with two (2) fans was modelled as a 10-ton unit, while an RTU with four (4) fans was modelled as a 20-ton unit.

For the purposes of the noise assessment, conservatively, the duty cycles for all the rooftop mechanical equipment related to the existing buildings were assumed to be a hundred (100) per cent during daytime and evening hours and fifty (50) per cent during nighttime hours. The sound data inputs for HVAC RTUs used in this assessment are presented in **Table 5**.

Table 5: HVAC RTUs Octave Band Sound Power Data

| Description | Octave Band Linear Sound Power Level (dB) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | Overall Sound Power Level (dBA) |
| HVAC RTU 5 Tons | 90 | 82 | 79 | 76 | 70 | 66 | 63 | 81 |
| HVAC RTU 7.5 Tons | 82 | 80 | 76 | 74 | 69 | 64 | 58 | 79 |
| HVAC RTU 10 Tons | 92 | 88 | 87 | 83 | 78 | 72 | 67 | 88 |
| HVAC RTU 15 Tons | 96 | 93 | 90 | 89 | 84 | 77 | 71 | 93 |
| HVAC RTU 20 Tons | 88 | 80 | 78 | 77 | 74 | 72 | 68 | 82 |
| HVAC RTU 30 Tons | 90 | 88 | 86 | 82 | 80 | 77 | 73 | 88 |
| HVAC RTU 35 Tons | 106 | 101 | 90 | 86 | 82 | 78 | 73 | 96 |
| 55 Ton Chiller | 93 | 93 | 89 | 86 | 81 | 76 | 71 | 91 |
| Cooling Tower | 85 | 84 | 80 | 77 | 75 | 73 | 69 | 83 |

Consistent with modern construction, it is assumed that the mechanical equipment related to future development will be housed within a mechanical penthouse or room. As a result, it is assumed that the planned developments within the PMTSAs will not introduce significant stationary noise sources that could affect nearby noise-sensitive areas or themselves.

### 4.2.2 Truck/Machinery Activity Noise

Reference sound power data for trucks within the study area were obtained through measurements during LEA site visits. Sound power data for machinery were sourced from the BSI Standards Publication: *"Code of Practice for Noise and Vibration Control on Construction and Open Sites"* (2014). It was assumed that trucks and machinery would operate in steady-state idling conditions. For trucks and machinery moving in-situ (i.e. not within external roads), a speed of 10 km/h was assumed. Additionally, source heights were considered

based on typical truck exhaust systems and machinery component heights. The sound data inputs for trucks and machinery used in this assessment are presented in **Table 6**.

Table 6: Truck/Machine Activity Octave Band Sound Power Data

| Description | Height (m) | Octave Band Linear Sound Power Level (dB) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | Overall Sound Power Level (dBA) |
| Forklift | 1.5 | 110 | 99 | 101 | 97 | 95 | 94 | 86 | 104 |
| Crane | 2.0 | 104 | 99 | 91 | 92 | 91 | 84 | 78 | 98 |
| Crane (Idling) | 2.0 | 94 | 83 | 84 | 84 | 81 | 73 | 64 | 88 |
| Articulated Truck | 2.0 | 100 | 101 | 106 | 110 | 110 | 106 | 95 | 115 |
| Articulated Truck (Idling) | 2.0 | 82 | 82 | 86 | 91 | 90 | 94 | 90 | 98 |

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, was used to estimate the number of truck trips for sites within the industrial zone of the Fairway PTMSA. The truck activity was then modelled accordingly. ITE truck trips and truck activity inputs are summarized in **Table 7**.

Table 7: Truck Volumes

| Location | GFA ($ft^2$) | Description | ITE Two-Way Truck Trips | | Modelled | | |
|---|---|---|---|---|---|---|---|
| | | | AM Peak | PM Peak | Day[1] | Evening[2] | Night[3] |
| 160 Webster Road | 15,000 | ITE LUC 150 - Warehousing | 0 | 0 | 1 | 1 | 0 |
| 40 Webster Road | 25,650 | ITE LUC 150 - Warehousing | 1 | 1 | 1 | 1 | 0 |
| 1 Chandaria Place and 50 Goodrich Drive | 637,880 | ITE LUC 140 - Manufacturing | 19 | 19 | 10 | 5 | 0 |

1. As ITE accounts for two-way trips (inbound and outbound), the truck volume was divided into two in the model.
2. As facilities are not expected to be open for the whole evening period, half of the truck volumes are assumed.
3. As facilities are not expected to be open for the night period, no truck volumes were modelled.

### 4.2.3 Rail Yards

Rail yards were modelled as an area source with reference SEL obtained from the Federal Transit Administration's (FTA) *"Transit Noise and Vibration Impact Assessment Manual"* Table 4-13 *"Yards and Shops"*, which shows an SEL of 118 dBA for a large rail yard with twenty (20) train movements per hour.

This SEL was adjusted based on the observed maximum number of trains per hour, which was two (2) trains per hour for the Sportsworld rail yard and one (1) train per hour for the Block Line rail yard. A summary of our observations is attached in **Appendix E.** The following FTA Manual equation was utilized to adjust the Rail Yard SEL to levels based on actual observations:

$$10\log\left(\frac{N}{20}\right)$$

Where N is the average number of observed trains.

The resulting sound power input to model the rail yards was 104 dBA for the Sportsworld rail yard and 101 dBA for the Block Line rail yard. This input is considered conservative: the FTA reference data for *"Yards and Shops"* includes noise from train maintenance activities and related building's mechanical noise, while the rail yards at the Block PMTSA and in the vicinity of the Sportsworld PMTSA do not have train maintenance facilities that could emit noise.

## 4.3 OTHER MODELLING INPUTS

### 4.3.1 Future Building Geometry and Heights

Future building heights and locations were determined based on the Staff Draft Land Use Map in **Appendix A.** Lands within the PMTSAs were designated *"Strategic Growth Areas"* (SGAs) A, B and C. The Proposed Official Plan Amendment states that within SGA-A, no building will exceed eight (8) storeys in height; within SGA-B, no building will exceed twenty-eight (28) storeys; and within SGA-C, there are no maximum building heights. Given that there is no maximum building height for SGA-C, building heights of twenty-six (26) storeys were assumed; taller buildings would result in a less conservative noise assessment due to building noise shielding. For SGA-B, the median height between SGA-A and SGB-C was assumed. The modelled building heights are as follows:

- SGA-A: 8 storeys;
- SGA-B: 17 storeys; and
- SGA-C: 26 storeys.

Future building geometries were based on current Kitchener planning applications, where applicable. All current development applications were included in the model. On SGA-A, B, and C lands with no current development applications, assumptions were made to mimic future builds based on experience reviewing the current development applications.

### 4.3.2 Terrain Elevation

Terrain elevation data for this study was sourced from Natural Resources Canada's *"Canadian Elevation Data"* (CED), available through the *"Canadian Geospatial Data Infrastructure"* (CGDI) platform. This dataset provides detailed topographic information, which is crucial for accurately modelling sound propagation. By incorporating this elevation data, the study ensures that variations in terrain are appropriately accounted for, thereby improving the accuracy and reliability of the noise level predictions.

### 4.3.3 Ground Absorption

The model incorporated ground absorption coefficients as recommended by CNOSSOS-EU guidelines (p. 86). The ground absorption coefficient, a key parameter influencing sound attenuation, was set to 0.1 to represent reflective hard surfaces such as concrete, asphalt, sidewalks and other hard surfaces. For grassy and vegetated areas, a coefficient of 0.7 was applied to account for the greater sound absorption of softer, natural terrain.

# 5 EXISTING MODELLING SCENARIO RESULTS

The existing modelled sound pressure levels for each noise-sensitive receiver are presented in **Table 8**. These sound levels include the combined contribution of stationary and transportation noise sources. This integrated assessment captures the overall existing acoustic environment, offering key insights for understanding current noise exposure levels.

Table 8: Overall Existing Sound Levels

| Receptor | Receptor Height (m) | Overall Daytime Leq - 1hr (dBA) | Overall Nighttime Leq - 1hr (dBA) |
|---|---|---|---|
| **Block Line PMTSA** | | | |
| R01 | 6.0 | 54 | 51 |
| R02 | 6.0 | 57 | 53 |
| R03 | 6.0 | 63 | 57 |

| Receptor | Receptor Height (m) | Overall Daytime Leq - 1hr (dBA) | Overall Nighttime Leq - 1hr (dBA) |
|---|---|---|---|
| R04 | 6.0 | 58 | 55 |
| R05 | 6.0 | 62 | 60 |
| R06 | 6.0 | 55 | 51 |
| R07 | 6.0 | 53 | 50 |
| R08 | 6.0 | 50 | 49 |
| R09 | 6.0 | 52 | 52 |
| R10 | 6.0 | 58 | 55 |
| R11 | 6.0 | 57 | 57 |
| R12 | 6.0 | 61 | 55 |
| **Fairway PMTSA** | | | |
| R13 | 6.0 | 63 | 65 |
| R14 | 6.0 | 56 | 51 |
| R15 | 6.0 | 58 | 51 |
| R16 | 6.0 | 61 | 54 |
| R17 | 6.0 | 58 | 53 |
| R18 | 6.0 | 58 | 52 |
| R19 | 6.0 | 53 | 48 |
| R20 | 6.0 | 46 | 40 |
| R21 | 6.0 | 48 | 42 |
| R22 | 6.0 | 66 | 66 |
| R23 | 6.0 | 66 | 66 |
| R24 | 6.0 | 64 | 61 |
| R25 | 6.0 | 59 | 54 |
| **Sportsworld PMTSA** | | | |
| R01 | 6.0 | 64 | 64 |
| R02 | 6.0 | 55 | 55 |
| R03 | 6.0 | 66 | 66 |
| R04 | 6.0 | 60 | 55 |
| R05 | 6.0 | 60 | 58 |
| R06 | 6.0 | 46 | 40 |
| R07 | 6.0 | 61 | 55 |
| R08 | 6.0 | 59 | 58 |
| R09 | 6.0 | 63 | 63 |
| R10 | 6.0 | 64 | 63 |

**Figure 5** and **Figure 6** graphically show the overall existing daytime sound level condition for the Block Line/Fairway and Sportsworld PMTSAs, respectively. The contours were calculated based on a worst-case elevation of six (6) metres.

# 6 YEAR 2041 MODELLING SCENARIO RESULTS

## 6.1 YEAR 2041 SOUND LEVELS

Year 2041 modelled sound pressure levels for each noise-sensitive receiver are presented in **Table 9**. The sound power level results for the 2041 future horizon incorporate anticipated changes in the area, such as new developments, traffic pattern shifts, new roadways, and the extension of the ION LRT (Stage 2 ION LRT).

These factors contribute to a modified acoustic environment, reflecting the planned changes to the study area.

Table 9: Overall Predicted Future (2041) Sound Levels

| Receptor | Receptor Height (m) | Overall Daytime Leq - 1hr (dBA) | Overall Nighttime Leq - 1hr (dBA) |
|---|---|---|---|
| **Block Line and Fairway PMTSA** | | | |
| R01 | 6.0 | 53 | 50 |
| R02 | 6.0 | 62 | 57 |
| R03 | 6.0 | 61 | 59 |
| R04 | 6.0 | 61 | 56 |
| R05 | 6.0 | 62 | 61 |
| R06 | 6.0 | 62 | 57 |
| R07 | 6.0 | 52 | 50 |
| R08 | 6.0 | 49 | 48 |
| R09 | 6.0 | 53 | 53 |
| R10 | 6.0 | 57 | 52 |
| R11 | 6.0 | 57 | 57 |
| R12 | 6.0 | 61 | 55 |
| **Fairway PMTSA** | | | |
| R13 | 6.0 | 59 | 52 |
| R14 | 6.0 | 59 | 57 |
| R15 | 6.0 | 63 | 55 |
| R16 | 6.0 | 59 | 52 |
| R17 | 6.0 | 62 | 60 |
| R18 | 6.0 | 55 | 49 |
| R19 | 6.0 | 52 | 46 |
| R20 | 6.0 | 52 | 45 |
| R21 | 6.0 | 53 | 47 |
| R22 | 6.0 | 64 | 64 |
| R23 | 6.0 | 62 | 62 |
| R24 | 6.0 | 63 | 59 |
| R25 | 6.0 | 57 | 51 |
| **Sportsworld PMTSA** | | | |
| R01 | 6.0 | 64 | 64 |
| R02 | 6.0 | 56 | 53 |
| R03 | 6.0 | 68 | 68 |
| R04 | 6.0 | 58 | 52 |
| R05 | 6.0 | 65 | 59 |
| R06 | 6.0 | 53 | 47 |
| R07 | 6.0 | 64 | 58 |
| R08 | 6.0 | 65 | 58 |
| R09 | 6.0 | 65 | 65 |
| R10 | 6.0 | 63 | 63 |

**Figure 7** and **Figure 8** graphically show the overall future year 2041 daytime sound level condition for the Block Line/Fairway and Sportsworld PMTSAs, respectively. The contours were calculated based on a worst-case elevation of six (6) metres. Sample stationary noise calculations are available in **Appendix H**.

## 6.2 EXISTING AND YEAR 2041 SOUND LEVEL COMPARISON

**Table 10** presents a comparison between existing and future year 2041 sound levels. This comparison highlights the potential shifts in the acoustic environment and serves as a key tool for evaluating the impact of the changes and assessing the need for noise management measures moving forward.

Table 10: Overall Sound Level Comparison

| Receptor | Existing Overall Daytime Leq - 1hr (dBA) | Future Overall Daytime Leq - 1hr (dBA) | Change in Overall Daytime Leq (dBA) | Existing Overall Nighttime Leq - 1hr (dBA) | Future Overall Nighttime Leq - 1hr (dBA) | Change in Overall Nighttime Leq (dBA) |
|---|---|---|---|---|---|---|
| **Block Line PMTSA** | | | | | | |
| R01 | 54 | 53 | -1 | 51 | 50 | -1 |
| R02 | 57 | 62 | +5 | 53 | 57 | +4 |
| R03 | 63 | 61 | -2 | 57 | 59 | +2 |
| R04 | 58 | 61 | +3 | 55 | 56 | +1 |
| R05 | 62 | 62 | 0 | 60 | 61 | +1 |
| R06 | 55 | 62 | +7 | 51 | 57 | +6 |
| R07 | 53 | 52 | -1 | 50 | 50 | 0 |
| R08 | 50 | 49 | -1 | 49 | 48 | -1 |
| R09 | 52 | 53 | +1 | 52 | 53 | +1 |
| R10 | 58 | 57 | -1 | 55 | 52 | -3 |
| R11 | 57 | 57 | 0 | 57 | 57 | 0 |
| R12 | 61 | 61 | 0 | 55 | 55 | 0 |
| **Avg** | **57** | **58** | **1** | **54** | **55** | **1** |
| **Fairway PMTSA** | | | | | | |
| R13 | 63 | 59 | -4 | 65 | 52 | -13 |
| R14 | 56 | 59 | +3 | 51 | 57 | +6 |
| R15 | 58 | 63 | +5 | 51 | 55 | +4 |
| R16 | 61 | 59 | -2 | 54 | 52 | -2 |
| R17 | 58 | 62 | +4 | 53 | 60 | +7 |
| R18 | 58 | 55 | -3 | 52 | 49 | -3 |
| R19 | 53 | 52 | -1 | 48 | 46 | -2 |
| R20 | 46 | 52 | +6 | 40 | 45 | +5 |
| R21 | 48 | 53 | +5 | 42 | 47 | +5 |
| R22 | 66 | 64 | -2 | 66 | 64 | -2 |
| R23 | 66 | 62 | -4 | 66 | 62 | -4 |
| R24 | 64 | 63 | -1 | 61 | 59 | -2 |
| R25 | 59 | 57 | -2 | 54 | 51 | -3 |
| **Avg** | **58** | **58** | **0** | **54** | **54** | **0** |
| **Sportsworld PMTSA** | | | | | | |
| R01 | 64 | 64 | 0 | 64 | 64 | 0 |
| R02 | 55 | 56 | +1 | 55 | 53 | -2 |
| R03 | 66 | 68 | +2 | 66 | 68 | +2 |
| R04 | 60 | 58 | -2 | 55 | 52 | -3 |
| R05 | 60 | 65 | +5 | 58 | 59 | +1 |
| R06 | 46 | 53 | +7 | 40 | 47 | +7 |
| R07 | 61 | 64 | +3 | 55 | 58 | +3 |
| R08 | 59 | 65 | +6 | 58 | 58 | 0 |

| Receptor | Existing Overall Daytime Leq - 1hr (dBA) | Future Overall Daytime Leq - 1hr (dBA) | Change in Overall Daytime Leq (dBA) | Existing Overall Nighttime Leq - 1hr (dBA) | Future Overall Nighttime Leq - 1hr (dBA) | Change in Overall Nighttime Leq (dBA) |
|---|---|---|---|---|---|---|
| R09 | 63 | 65 | +2 | 63 | 65 | +2 |
| R10 | 64 | 63 | -1 | 63 | 63 | 0 |
| **Avg** | **60** | **62** | **2** | **58** | **59** | **1** |

The average noise levels indicate minimal change between existing conditions and 2041 future conditions. This is primarily due to the removal of commercial HVAC rooftop units in favour of residential/mixed-use developments with mechanical penthouses, as well as traffic mode shifts resulting from the LRT extension.

For the Block Line PMTSA, there is an overall average increase in noise levels of one (1) dBA during both daytime and nighttime between existing and future conditions. For the Fairway PMTSA, there is no overall average change in noise levels between existing and future conditions. For the Sportsworld PMTSA, an overall average increase of two (2) dBA and one (1) dBA during the daytime and nighttime, respectively, is expected between the existing and future conditions.

For reference, the average human ear cannot distinguish changes in sound level that are less than three (3) decibels.

There are some instances where significant changes in sound levels were predicted. Examples include R02 and R06 in the Block Line PMTSA, which significantly increases between horizons. This is likely due to the increase of traffic along Courtland Avenue East in the 2041 horizon, along with the relocation of the receiver closer to the roadway to avoid shielding. Similarly, R15, R20, and R21 are other receivers within the Fairway PMTSA that were also relocated closer to roadways to avoid shielding. R06 and R08 for the Sportsworld PMTSA were also relocated closer to the roadway under future conditions to avoid shielding from residential buildings.

# 7 LAND USE COMPATIBILITY ASSESSMENT

Year 2041 sound levels were compared against daytime limits from NPC-300 to determine land use compatibility between the proposed uses at the three (3) PMTSA. As noted previously, NPC-300 has different limits for transportation and stationary noise. Therefore, future year 2041 transportation and stationary noise levels were isolated from the overall future levels presented in **Table 10**. The future year 2041 transportation and stationary sound levels were evaluated as follows:

- **Transportation noise:** Using an 8x8m grid, the plane of window daytime noise limit of 65 dBA was subtracted from modelled year 2041 transportation noise levels to show where exceedances occur graphically. The daytime 65 dBA limit for transportation was selected because, as per MECP, any exceedances above this limit may require upgraded building components from minimum Ontario Building Code (OBC) requirements, including windows, exterior walls and doors.
- **Stationary noise:** Using an 8x8m grid, the plane of window daytime exclusion limit of 50 dBA for a Class 1 area was subtracted from modelled year 2041 stationary noise levels to show where exceedances occur graphically. Any exceedances above the daytime exclusion limit of 50 dBA may require mitigation through noise barriers; however, the use of upgraded building components is not allowed as per the NPC-300 requirements.

**Figure 9** presents the predicted year 2041 transportation sound levels for the Block Line and Fairway PMTSAs. **Figure 10** presents any exceedances of the 65 dBA daytime transportation noise limit. As illustrated in **Figure 10**, few exceedances due to transportation noise are predicted to occur within the Block Line and Fairway PMTSAs. The exceptions are locations along Highway 8 to the north of Fairway Mall and between Courtland Avenue East and the rail yard within Block Line.

**Figure 11** presents the predicted year 2041 stationary sound levels for the Block Line and Fairway PMTSAs. **Figure 12** presents any exceedances of the Class 1 area stationary noise exclusion limit (50 dBA). Based on **Figure 12**, significant stationary noise exceedances are expected to occur along the southern limit of the Fairway PMTSA due to the nearby employment lands directly to the south.

**Figure 13** presents the predicted year 2041 transportation sound levels for the Sportsworld PMTSA. **Figure 14** presents any exceedances of the 65 dBA daytime transportation noise limit. As illustrated in **Figure 14**, few exceedances due to transportation noise are predicted to occur within the Sportsworld PMTSA. The exceptions are locations along Highway 8 facing Highway 8 and the on/off ramps to Highway 8.

**Figure 15** presents the predicted year 2041 stationary sound levels for the Sportsworld PMTSA. **Figure 16** presents any exceedances of the Class 1 area stationary noise exclusion limit (50 dBA). Based on **Figure 16**, there are no exceedances due to stationary noise predicted to occur within the Sportsworld PMTSA that will impact noise-sensitive lands.

# 8 D-6 GUIDELINES ASSESSMENT

The City of Kitchener must follow the Ontario guideline D-6 Compatibility between Industrial Facilities, which is outlined below. The goal of these guidelines is to minimize the encroachment of industrial land uses on sensitive land uses and vice versa.

> *"The guideline applies to all types of proposed, committed and/or existing industrial land uses which have the potential to produce point source and/or fugitive air emissions such as noise, vibration, odour, dust and others, either through normal operations, procedures, maintenance or storage activities, and/or from associated traffic/transportation.*
>
> *This guideline also considers ground borne vibration, but does not deal with other emissions into the soil or ground and surface water. These other matters are addressed through the Environmental Protection Act (EP Act), in particular Regulation 346 and Regulation 347, the Ontario Water Resources Act (OWR Act) in general, and the Municipal Industrial Strategy for Abatement (MISA)."*

The D-6 Compatibility Guidelines reference minimum separation distances between sensitive uses and industry, as follows:

- Class I Industrial Facility: 20 metres minimum separation distance
- Class II Industrial Facility: 70 metres minimum separation distance
- Class III Industrial Facility: 300 metres minimum separation distance

The Employment Lands located to the North of Highway 8, in the vicinity of the Sportsworld PMTSA, are considered Class III Industrial Facilities as per the D-6 Guidelines. The Ministry stipulates a minimum separation distance of 300 metres between such Class III facilities and sensitive uses. The above-noted industries are located at least 400 metres from any future sensitive uses introduced in the Sportsworld PMTSA, and therefore meet the requirements of the *"D-6 Compatibility between Industrial Facilities"* guidelines.

The Employment Lands Located south of the Fairway PMTSA and southeast of the Block Line PMTSA are considered Class I and Class II Industrial Facilities. The minimum separation distances of 20 and 70 metres cannot be achieved for the proposed mixed-uses along the southern limit of the Fairway PMTSA and the southeast limit of the Block Line PMTSA. Please refer to **Figure 17** and **Figure 18**.

In cases where it may not be possible to achieve these minimum separation distances, the following requirements must be met for the Ministry or delegated authority to consider urban redevelopment within these minimum separation distances:

- Proposals must be in accordance with official plan policy or a formal planning approval process. The boundaries of the redevelopment, infilling or mixed-use area must be clearly defined by the planning authority.
- The zoning use must be specific, or planning considerations must be based on the *"worst case scenario"* based on the most impactful permitted uses in the industrial zoning by-law.
- A feasibility analysis must be undertaken. For noise, the feasibility analysis shall be based on the Ministry Publication NPC-300. Please note that the D-6 Guidelines reference Publication LU-131, which has been superseded by NPC-300.
- Public consultation is encouraged with all land owners within the influence area or potential influence area of the industrial facility/facilities.

# 9 CONCLUSIONS AND RECOMMENDATIONS

Based on this noise modelling assessment, the following conclusions and recommendations are drawn:

1. To ensure acoustical feasibility and to ensure MECP limits are met within any newly introduced noise-sensitive uses, two types of Holding Provisions are recommended within the Block Line and Fairway PMTSAs. This are graphically depicted with a red or yellow "H" in **Figure 17, Figure 18 and Figure 19.**
2. The proposed wording for the red Holding Provisions is as follows:

   *"To ensure there are no land use conflicts between the proposed sensitive land uses and/or nearby existing industrial/employment land/rail yard uses, the "H" shall not be deleted until the owner agrees to complete a Noise Feasibility Study compliant with MECP's NPC-300 guidelines and to the satisfaction of the City and/or Region, as early as possible during the land use planning process to demonstrate acoustical feasibility. Furthermore, the "H" shall not be deleted until the owner agrees to complete a detailed Noise Impact Study compliant with MECP's NPC-300 guidelines and to the satisfaction of the City and/or Region, which updates the Noise Feasibility Study based on the final Site Plan, to recommend appropriate noise attenuation measures to ensure MECP sound level limits are not exceeded. Furthermore, the "H" shall not be deleted until the owner agrees to implement all noise attenuation measures as recommended through the final detailed Noise Impact Study report, as acceptable to the City and/or Region"*
3. The proposed wording for the yellow Holding Provisions is as follows:

   *"To ensure there are no land use conflicts between the proposed sensitive land uses and arterial roads, rail lines, rail yards, and/or existing industrial/employment land uses, the "H" shall not be deleted until the owner agrees to complete a Noise Impact Study compliant with MECP's NPC-300 guidelines at the Site Plan Approval Stage, and implement all noise attenuation measures as recommended through the final Noise Impact Study reports, as acceptable to the City and/or Region.""*

4. These Holding Provisions are recommended because, based on Year 2041 stationary noise modelling, MECP stationary noise limits will be exceeded at some locations. This is shown in **Figure 12.** As per the MECP, the mitigation of stationary noise exceedances can only be achieved using noise barriers, increased separation between noise sources and sensitive uses, or through the design of the building itself (e.g. avoiding sensitive uses facing stationary noise, designing the building such that it shields its sensitive uses from noise). The Ministry does not allow the use of upgraded building components such as upgraded windows, exterior walls or doors to mitigate stationary sound levels. As such, there is the potential for new sensitive uses to directly overlook nearby stationary noise sources, rendering acoustic mitigation challenging or not feasible.

5. Furthermore, as discussed in **Section 8**, it may not be possible to meet the D-6 Guidelines minimum separation distances for the proposed uses near the industries located south of the Fairway PMTSA and southeast of the Block Line PMTSA. However, urban development can take place within these minimum separation distances, provided that a feasibility noise assessment be undertaken based on NPC-300 Guidelines, in addition to the other requirements listed in **Section 8**.

6. It is recommended that properties with red Holding Provisions, as shown in **Figure 17** and **Figure 18**, be designated as *"Class 4"* areas by the Planning Authority. As per the MECP, in situations where new sensitive uses are introduced near lawfully operating stationary noise sources, noise-sensitive sites can be designated as a *"Class 4"* area by the land use planning authority. The advantage of designating an area as *"Class 4"* is a 10 dB increase in stationary sound level limit over the Class 1 area, rendering stationary noise mitigation more feasible. However, residents may experience increased sound levels when compared to sensitive uses in *"Class 1"* areas. Please note that the Vierra Village Development was designated as a *"Class 4"* area due to its proximity to the rail yard (a stationary noise source) and its introduction of new noise-sensitive uses.

7. Please note that as per the MECP, if a noise-sensitive use is designated as *"Class 4"* by the planning authority, *"an appropriate noise impact assessment should be conducted for the land use planning authority as early as possible in the land use planning process that verifies that the applicable sound level limits will be met"*. This is consistent with our proposed Holding Provisions requiring Noise Feasibility Studies as early as possible.

8. For properties with red Holding Provisions, as shown in **Figure 17** and **Figure 18**, it is recommended that non-sensitive uses be considered to provide noise shielding. For example, office buildings could be built along the southern limit of the Fairway PMTSA to mitigate stationary noise emanating from the industries and employment lands to the south.

9. It is recommended that Noise Impact Studies be required as part of the development process for the noise-sensitive uses shown with the yellow *"H"* label, as shown in **Figure 17**, **Figure 18**, and **Figure 19**. Acoustical feasibility is not an issue at these properties; however, noise exceedances may occur at these locations, which would necessitate a Noise Impact Study to design appropriate mitigation measures.

10. Similarly, it is recommended that a Noise Impact Study be required as part of the redevelopment of the Fairway Shopping Park Mall, as it may introduce new noise sources in the area that could impact nearby noise-sensitive uses.

11. The Employment Lands located to the North of Highway 8, in the vicinity of the Sportsworld PMTSA, are considered Class III Industrial Facilities as per the MECP *"D-6 Compatibility between Industrial*

*Facilities"* guidelines. The Ministry stipulates a minimum separation distance of 300 metres between such Class III facilities and sensitive uses. The above-noted industries are located at least 400 metres from any future sensitive uses introduced in the Sportsworld PMTSA and, therefore, meet the requirements of the *"D-6 Compatibility between Industrial Facilities"* guidelines.

12. Furthermore, Highway 8 is a major transportation noise source that dominates ambient levels at the sensitive receivers facing the above-noted industries. As per the MECP, the higher of the worst-case ambient sound levels or the MECP exclusion limits apply when evaluating stationary sound levels. **Table 6** from the Phase 1 report, Monitoring Location 2, which is representative of these worst-case receivers, shows average ambient sound levels of 67 and 63 dBA during the daytime and nighttime, respectively. Although these ambient levels do not represent the worst-case ambient hours (i.e. quietest daytime, evening and nighttime hours), they are indicative that the applicable limits at these sensitive receivers will be well above the 50 and 45 dBA exclusion limits from the MECP for a *"Class 1"* area. As such, these proposed sensitive uses are not expected to be constrained due to noise from the industries across Highway 8, given the higher-than-usual sound level limits and large distances from these industries.
13. This is consistent with the Provincial Planning Statement, which states that planning authorities must protect the viability of major facilities by ensuring that adjacent sensitive land uses are only allowed if adverse effects are minimized and mitigated. As per the Provincial Planning Statement, within 300 metres of employment areas, development should avoid or minimize and mitigate impacts on the long-term economic viability of employment uses, following provincial guidelines (i.e. MECP NPC-300 for noise).

# 10 REFERENCES

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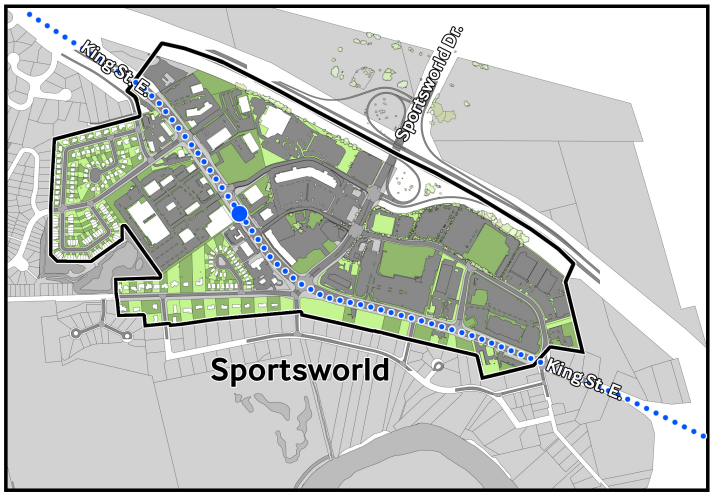
**Growing Together East**

N

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| LEA Consulting Ltd. | Project ID: 25175<br>Scale: NTS<br>Drawn by: ID<br>Reviewed by: DEA/FV<br>Date: March 24, 2025<br>Revision: 3 | **Project Name**<br>Kitchener Growing Together East Noise Assessment<br>**Figure Title**<br>Growing Together East Study Area |

**Figure 1**

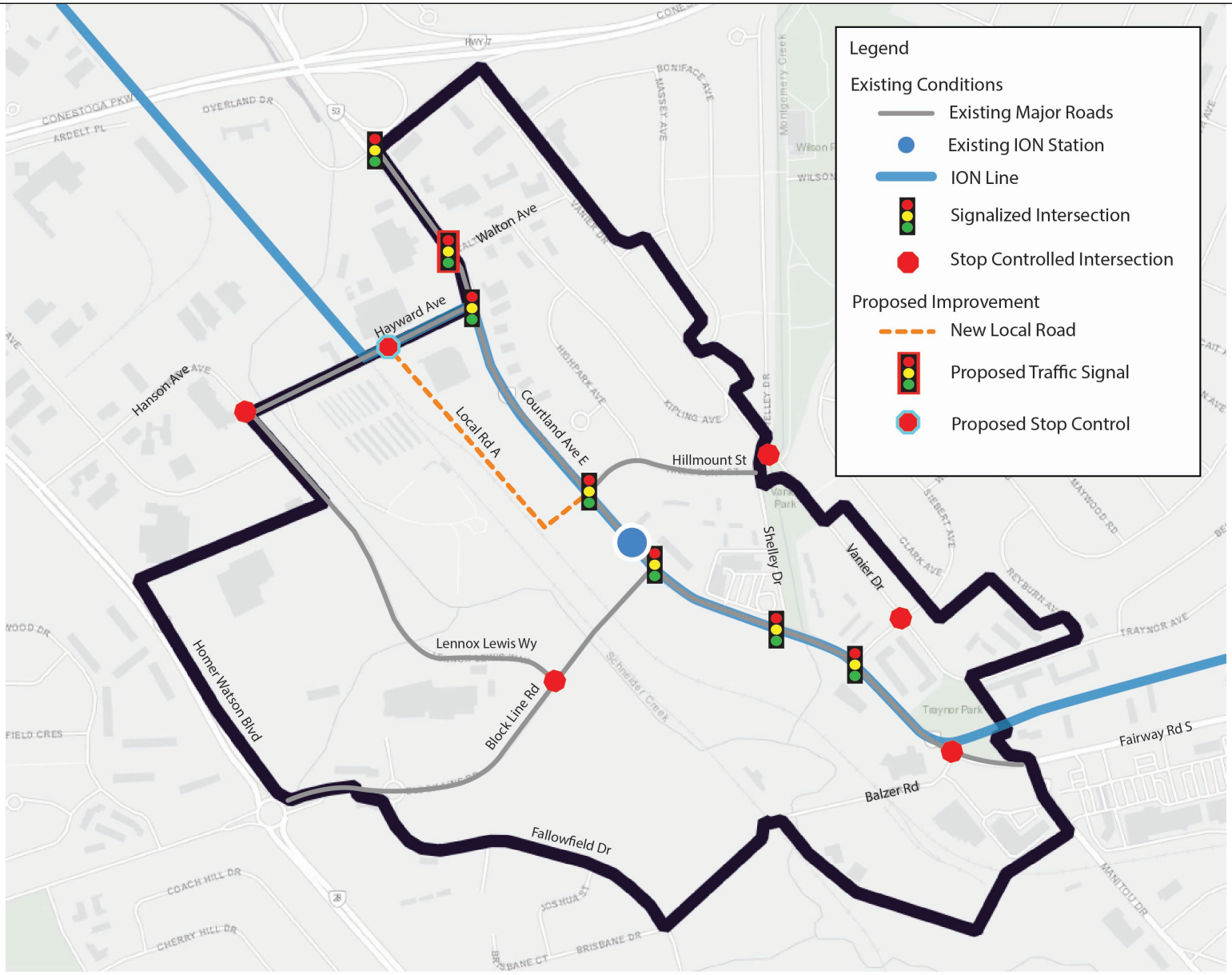


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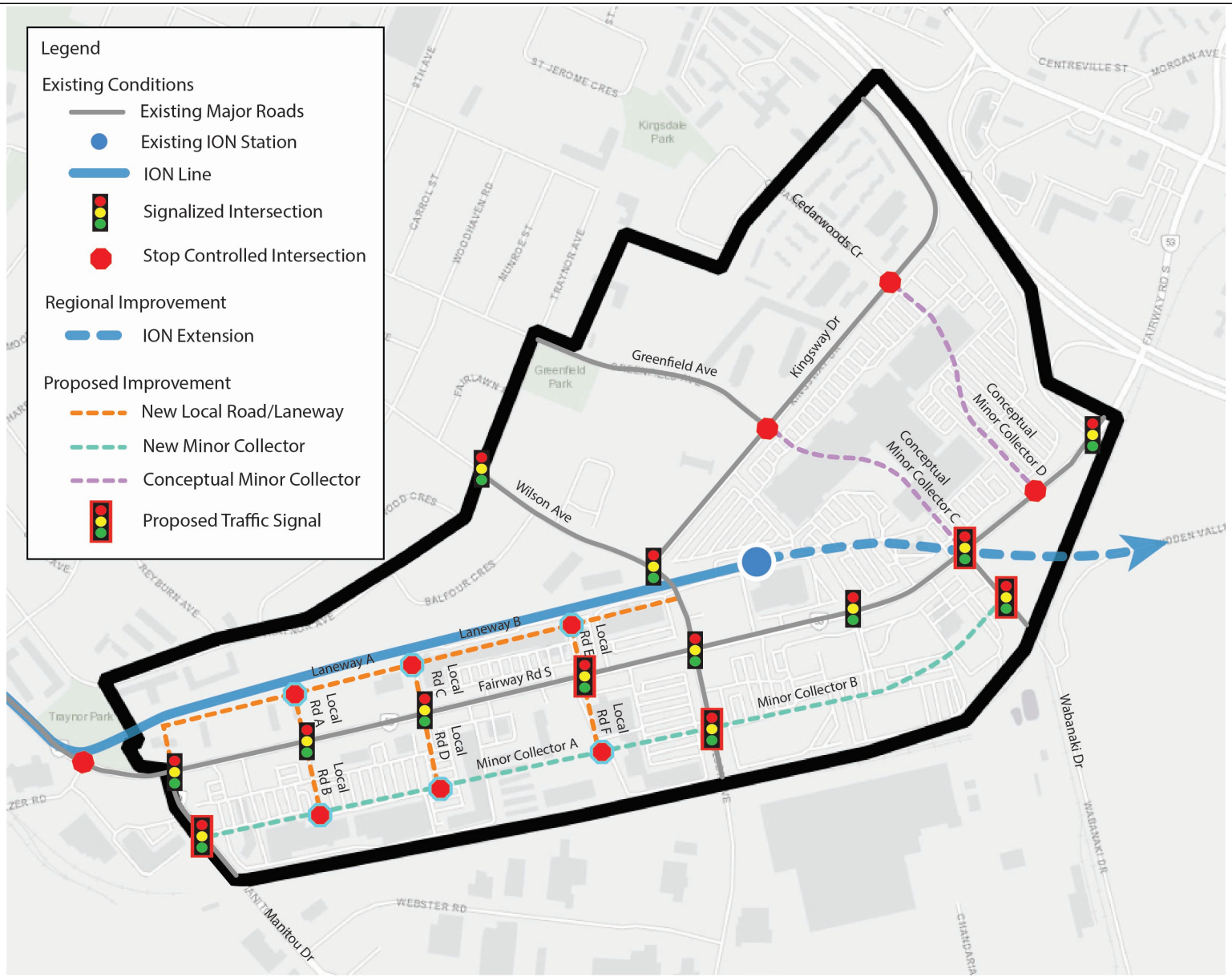
**Figure 2**

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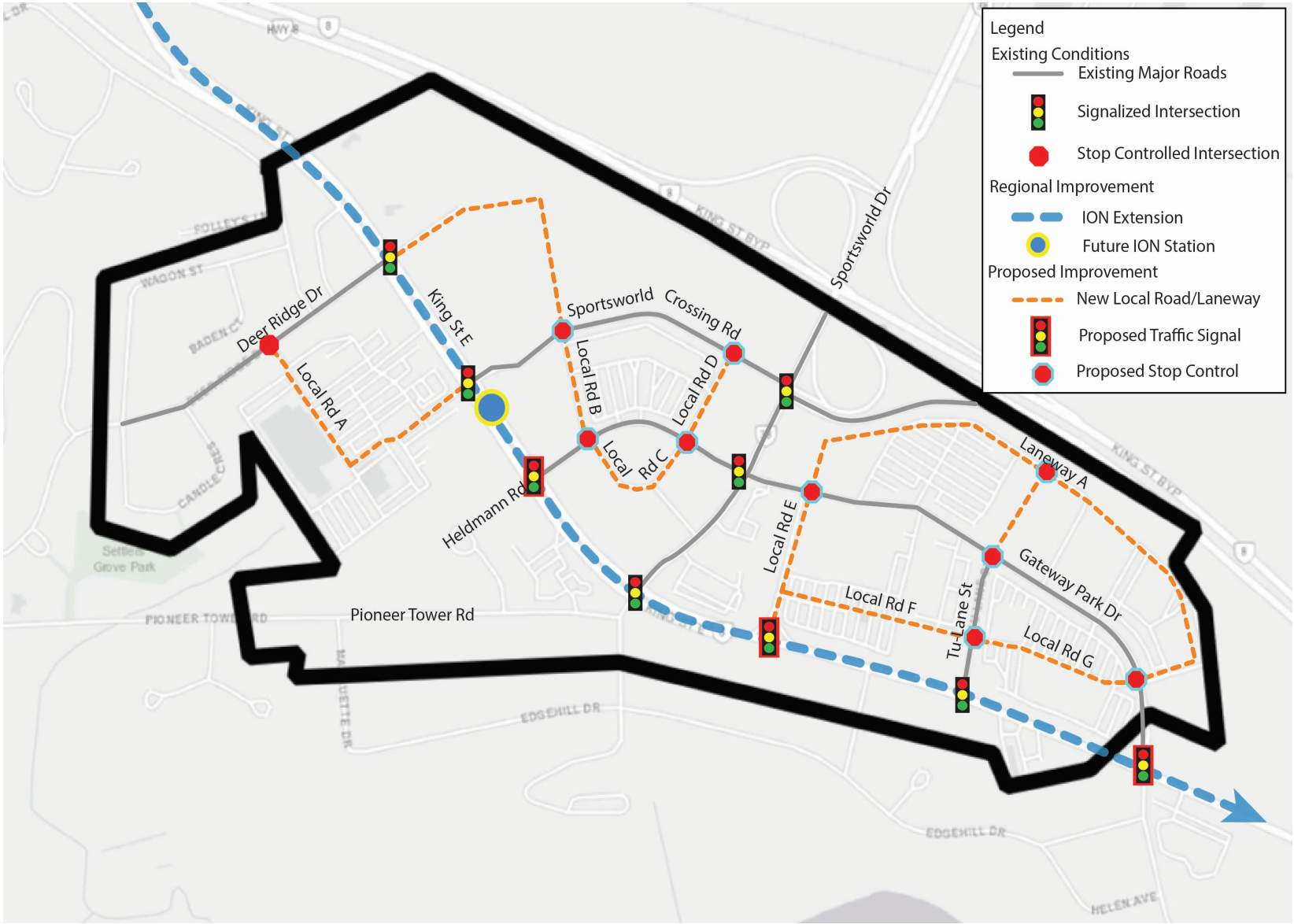
**Project Name**

Kitchener Growing Together East Noise Assessment

**Figure Title**

Future Road Network - Fairway

**Figure 3**

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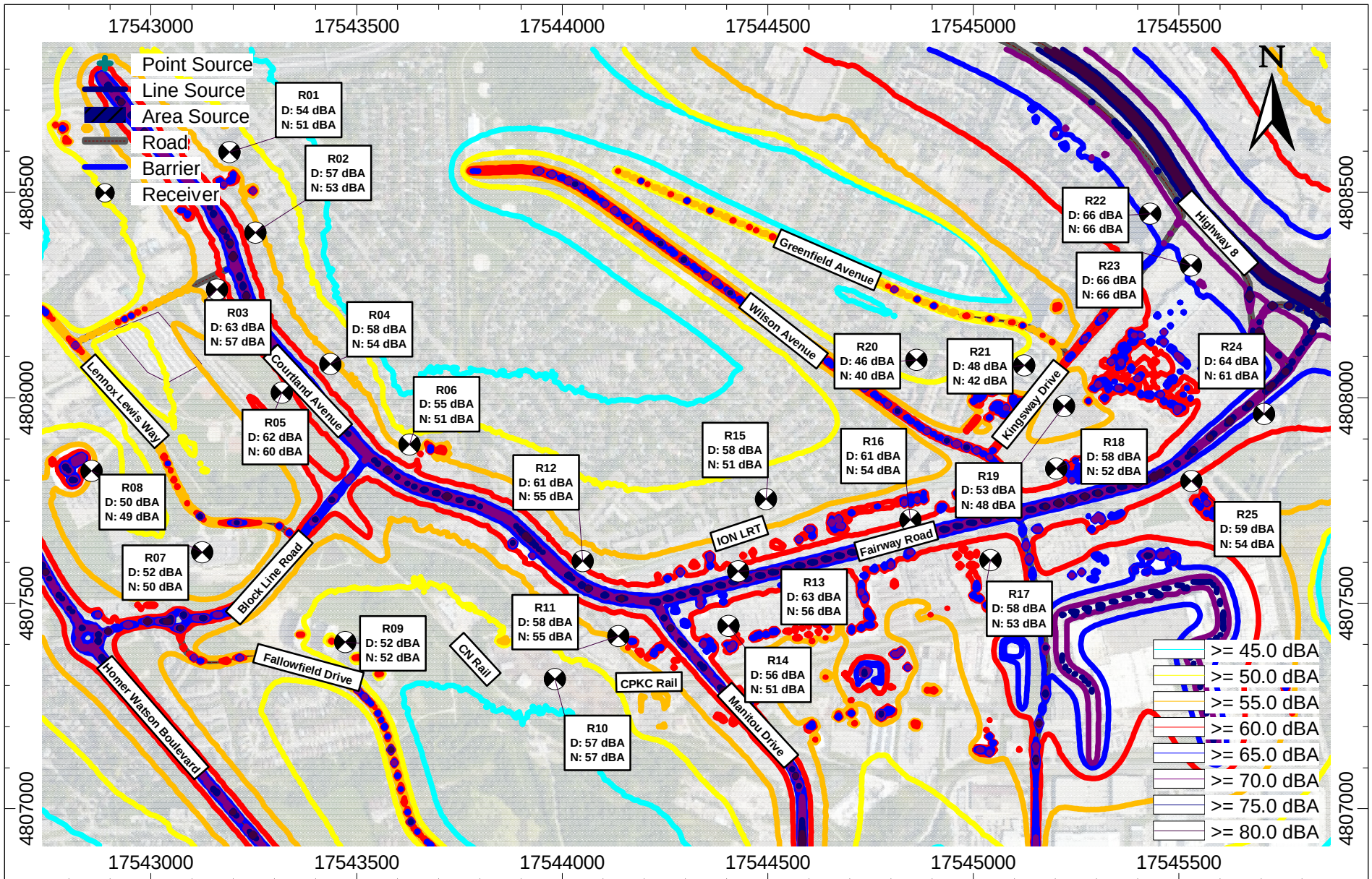


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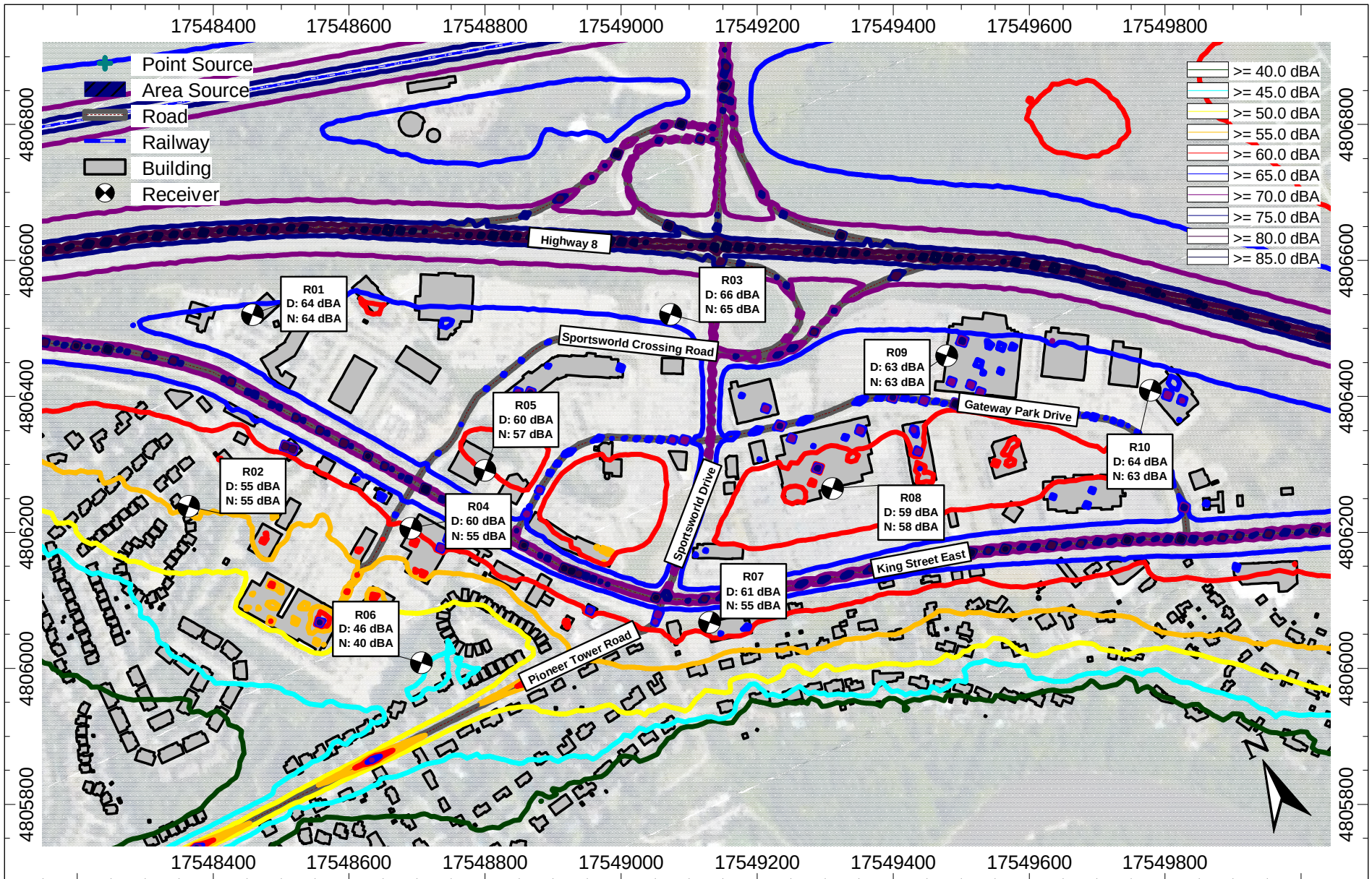
**Project Name**

Kitchener Growing Together East Noise Assessment - Block Line and Fairway

**Figure Title**

Block Line and Fairway Existing Conditions Noise Contours
Daytime (7:00 – 23:00)

**Figure 5**

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Date: February 18, 2025
Revision: 3

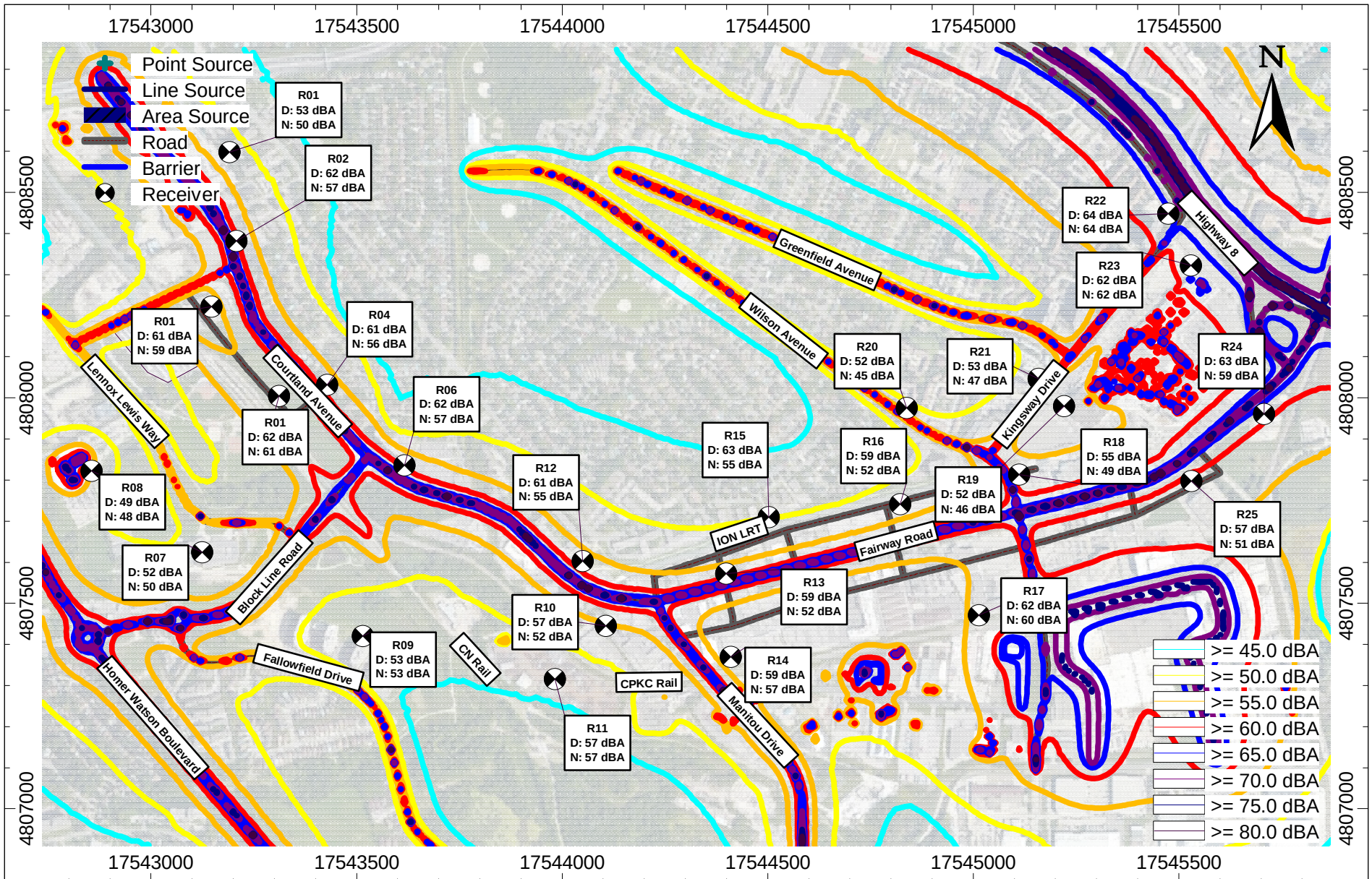
**Project Name**

Kitchener Growing Together East Noise Assessment - Sportsworld

**Figure Title**

Sportsworld Existing Conditions Noise Contours
Daytime (7:00 - 23:00)

**Figure 6**

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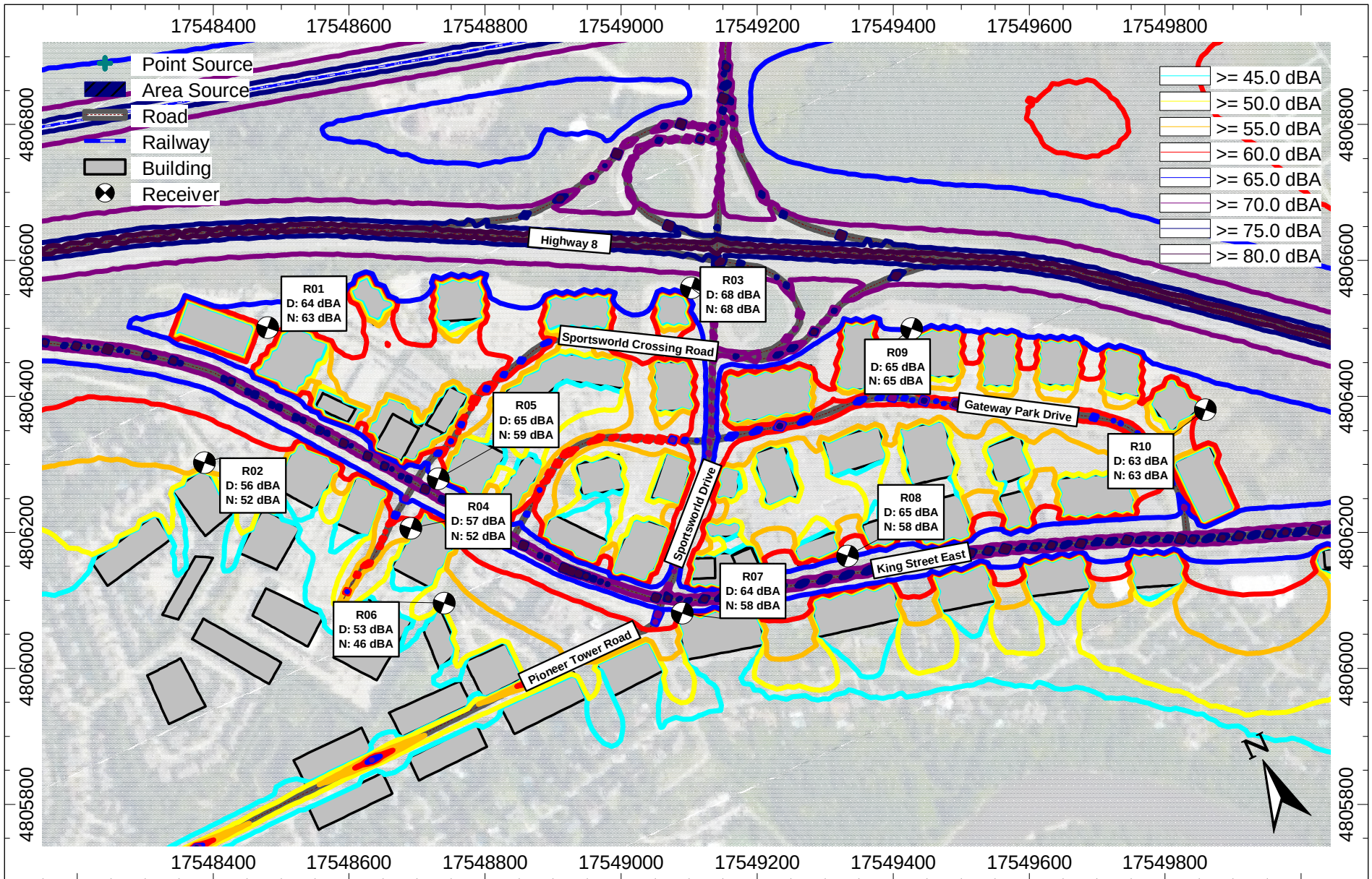
**Project Name**

Kitchener Growing Together East Noise Assessment - Block Line and Fairway

**Figure Title**

Block Line and Fairway Future Conditions Noise Contours
Daytime (7:00 – 23:00)

**Figure 7**

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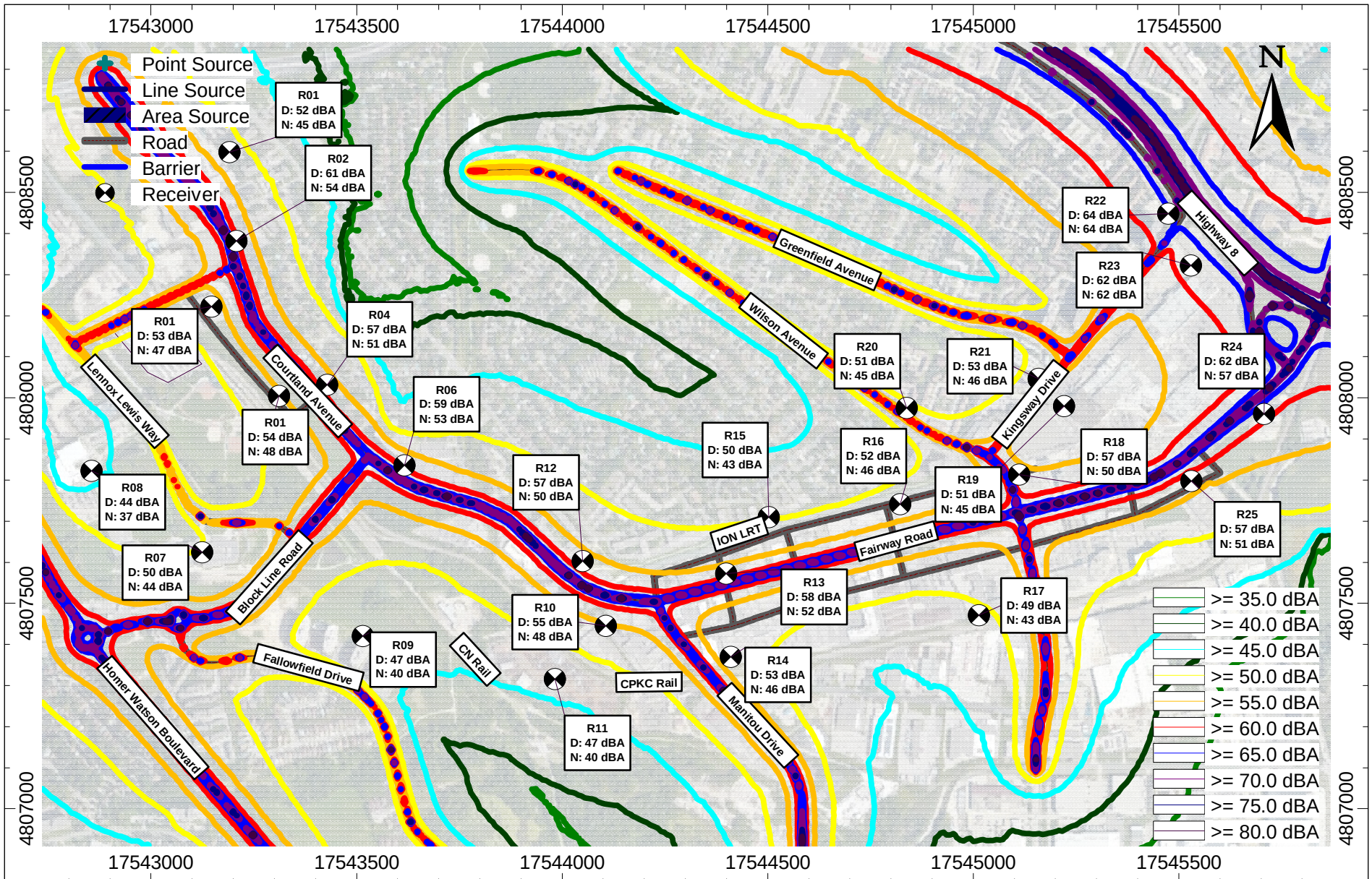
**Project Name**

Kitchener Growing Together East Noise Assessment - Sportsworld

**Figure Title**

Sportsworld Future Conditions Noise Contours
Daytime (7:00 - 23:00)

**Figure 8**

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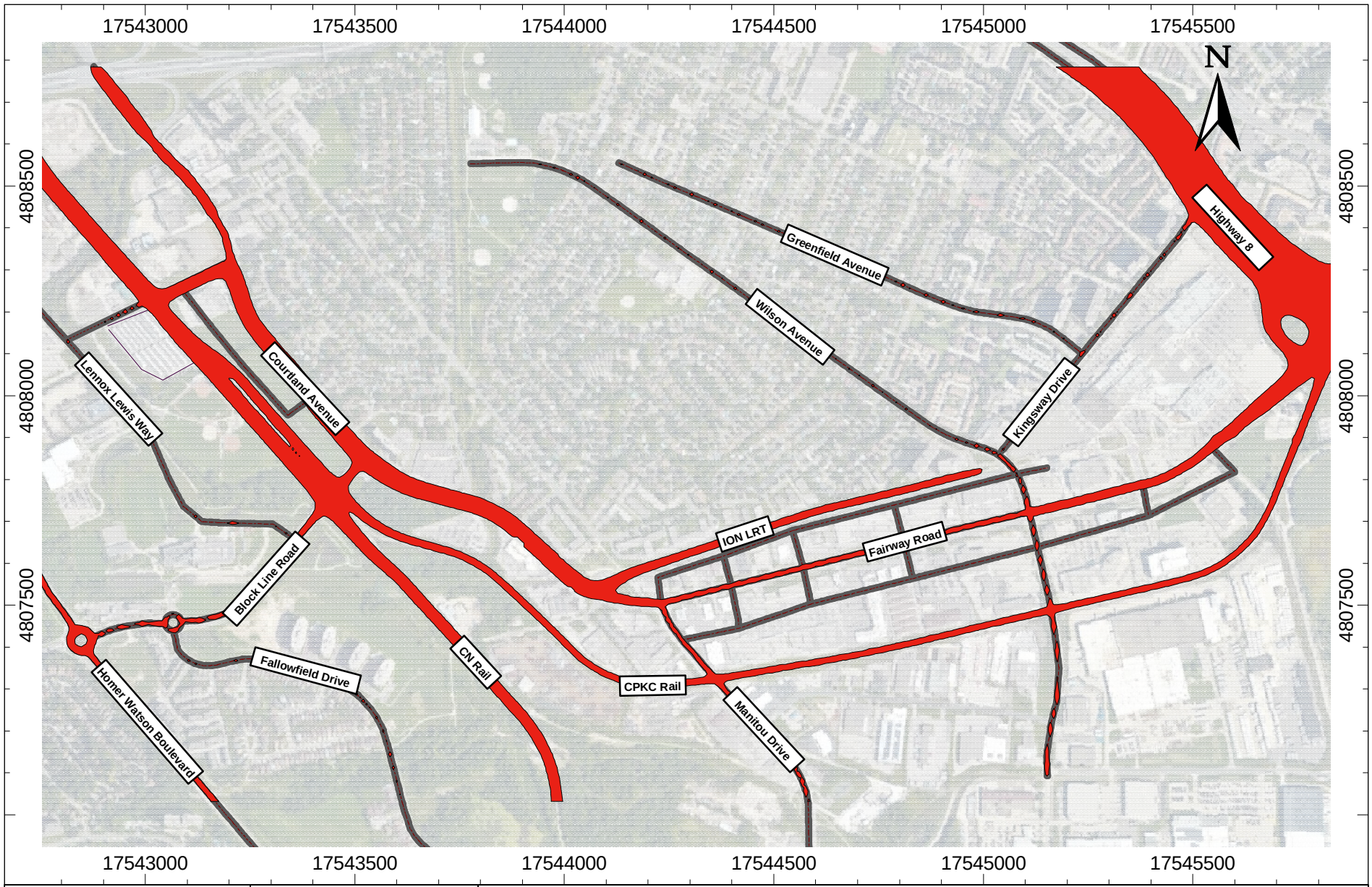
**Project Name**

Kitchener Growing Together East Noise Assessment - Block Line and Fairway

**Figure Title**

Block Line and Fairway Future Transportation Noise Contours
Daytime (7:00 – 23:00)

**Figure 9**

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| Date: February 18, 2025 | |
| Revision: 2 | |

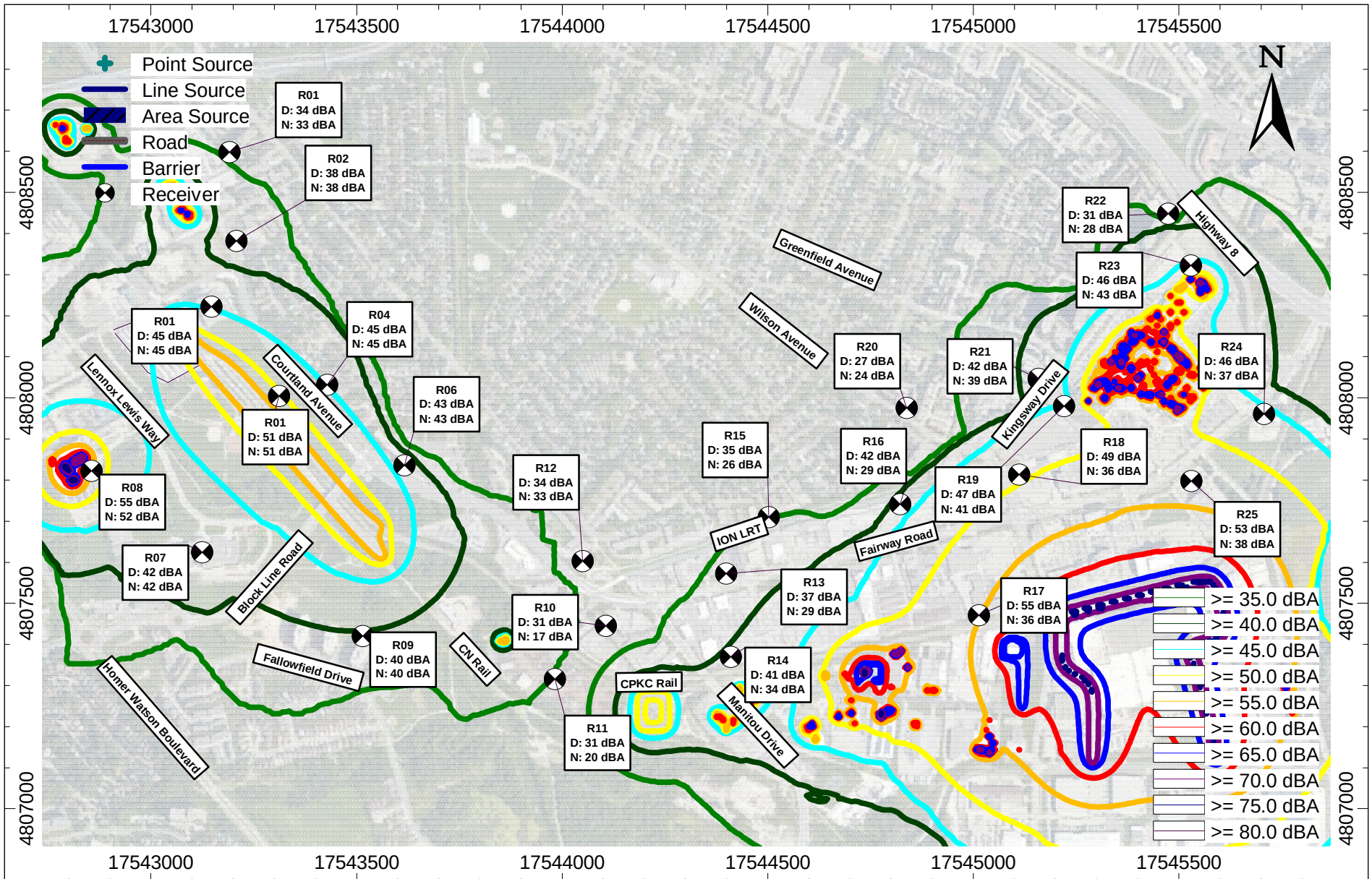
**Project Name**

Kitchener Growing Together East Noise Assessment - Block Line and Fairway

**Figure Title**

Block Line and Fairway Future Transportation Noise Exceedance Contours
Daytime (7:00 – 23:00)

# Figure 10

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Revision: 2

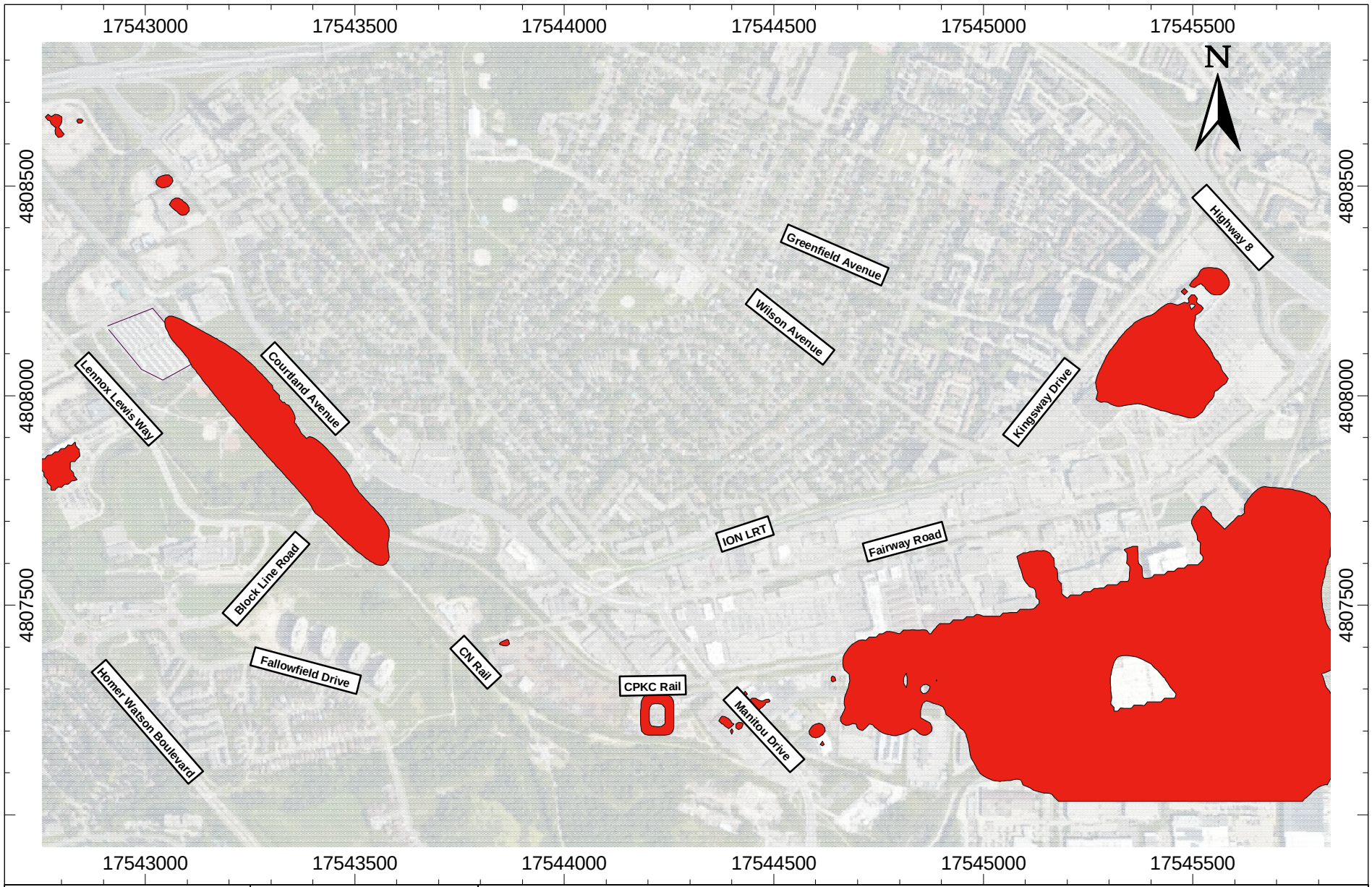
**Project Name**

Kitchener Growing Together East Noise Assessment - Block Line and Fairway

**Figure Title**

Block Line and Fairway Future Stationary Noise Contours
Daytime (7:00 – 23:00)

**Figure 11**

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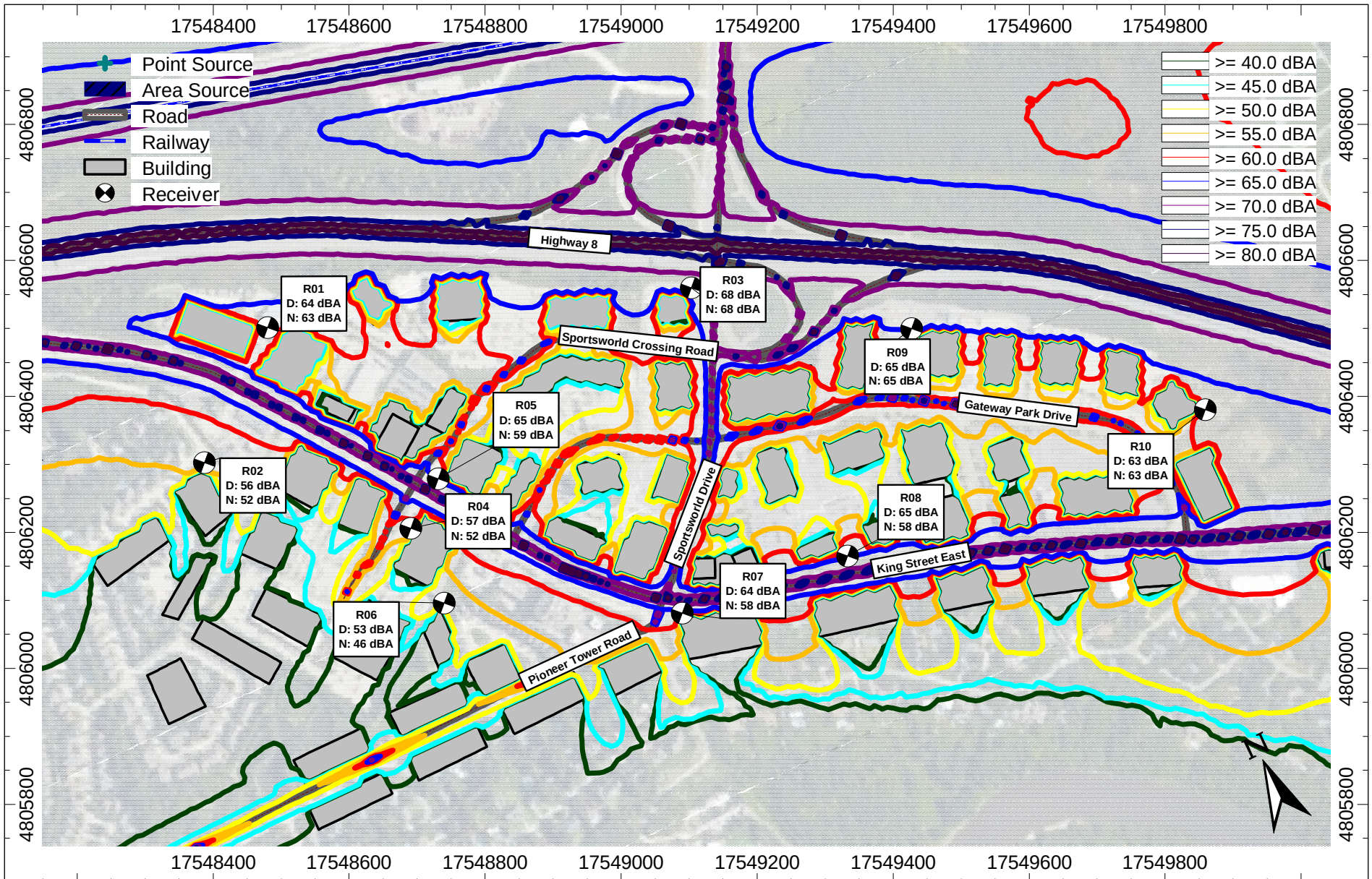
**Project Name**

Kitchener Growing Together East Noise Assessment - Block Line and Fairway

**Figure Title**

Block Line and Fairway Future Stationary Noise Exceedance Contours
Daytime (7:00 – 23:00)

**Figure 12**

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**Project Name**

Kitchener Growing Together East Noise Assessment - Sportsworld

**Figure Title**

Sportsworld Future Transportation Noise Contours
Daytime (7:00 - 23:00)

**Figure 13**


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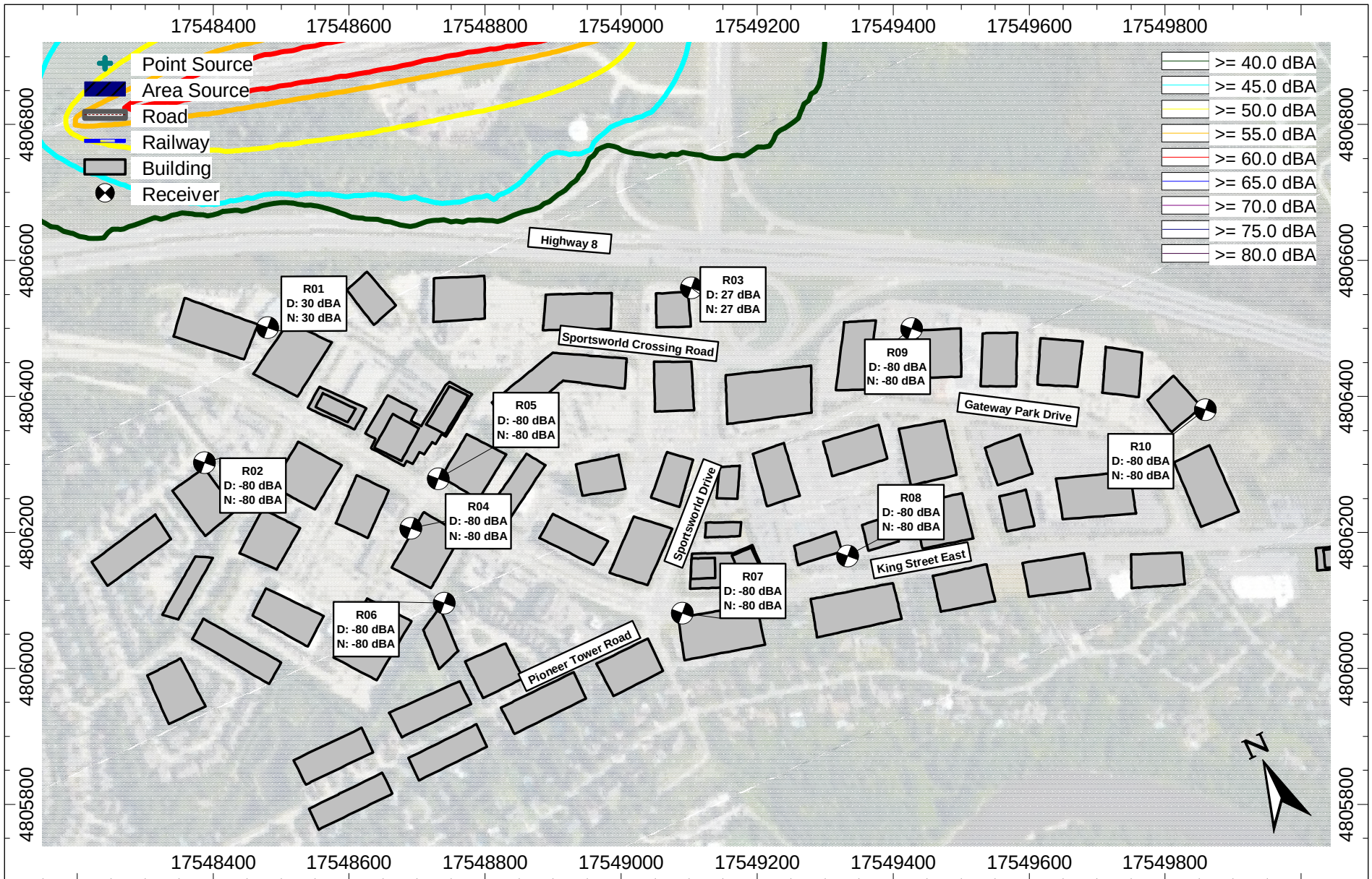
**Project Name**

Kitchener Growing Together East Noise Assessment - Sportsworld

**Figure Title**

Sportsworld Future Transportation Noise Exceedance Contours
Daytime (7:00 - 23:00)

**Figure 14**

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Revision: 3

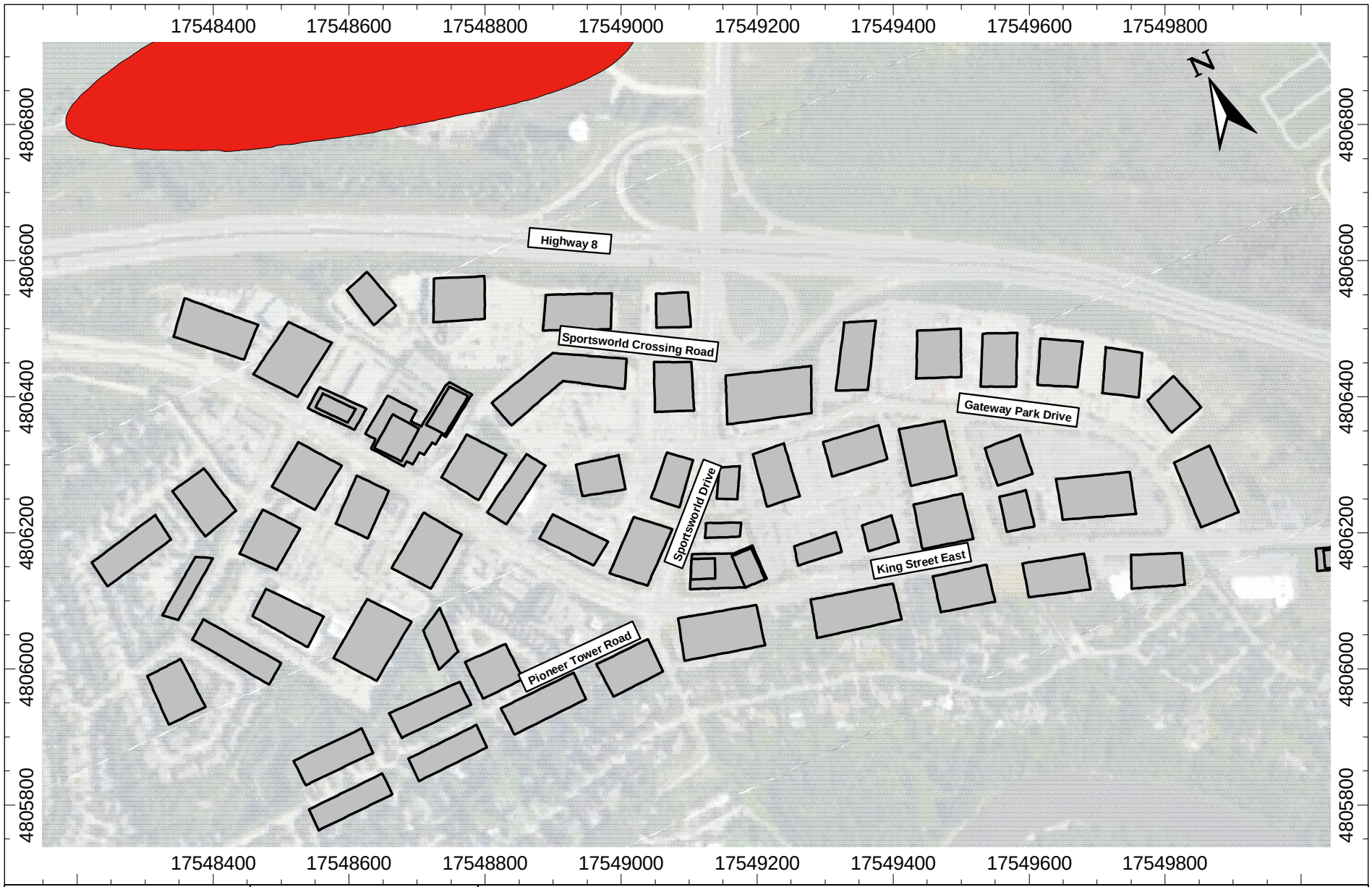
**Project Name**

Kitchener Growing Together East Noise Assessment - Sportsworld

**Figure Title**

Sportsworld Future Stationary Noise Contours
Daytime (7:00 - 23:00)

**Figure 15**

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**Project Name**

Kitchener Growing Together East Noise Assessment - Sportsworld

**Figure Title**

Sportsworld Future Stationary Noise Exceedance Contours
Daytime (7:00 - 23:00)

**Figure 16**

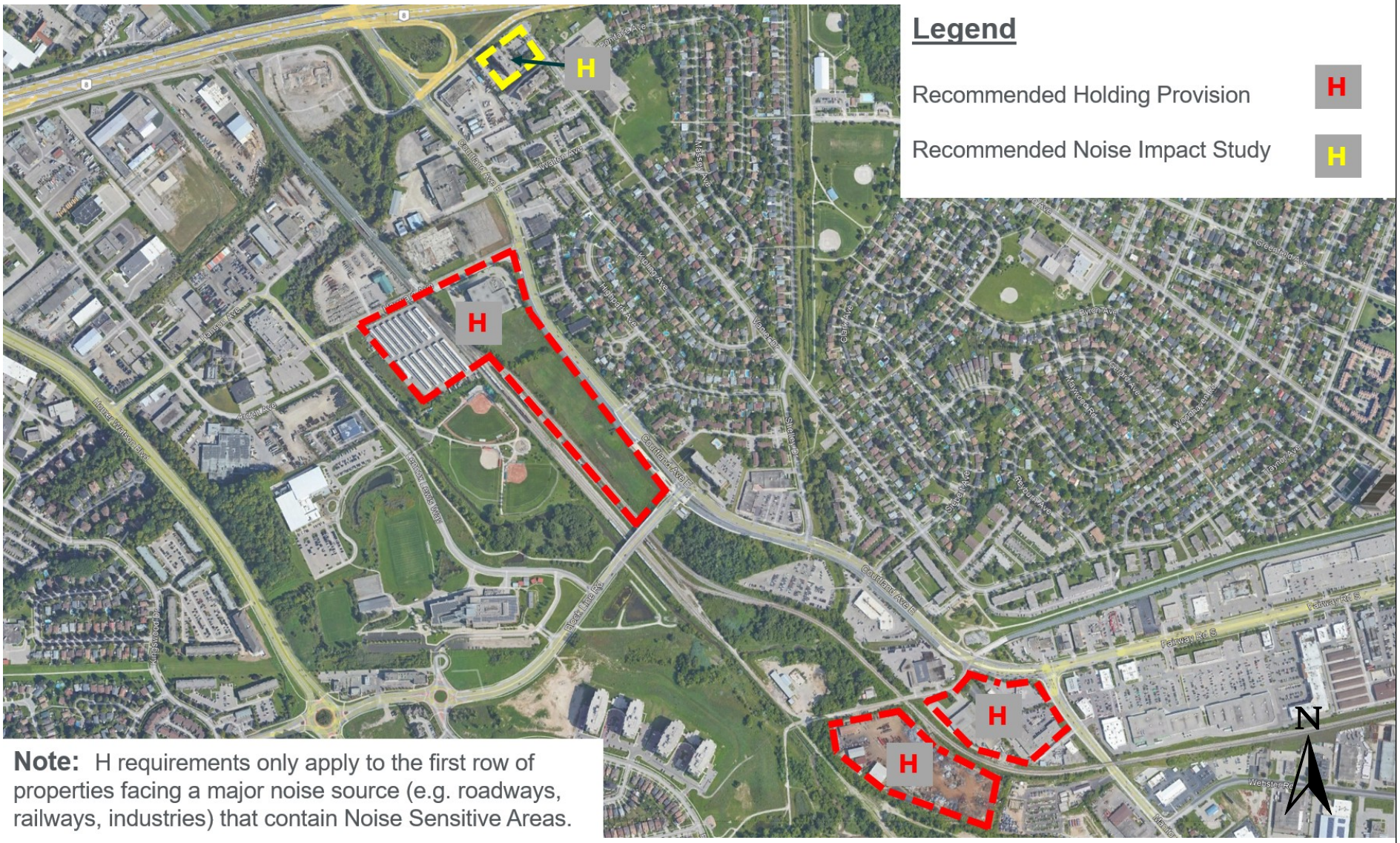


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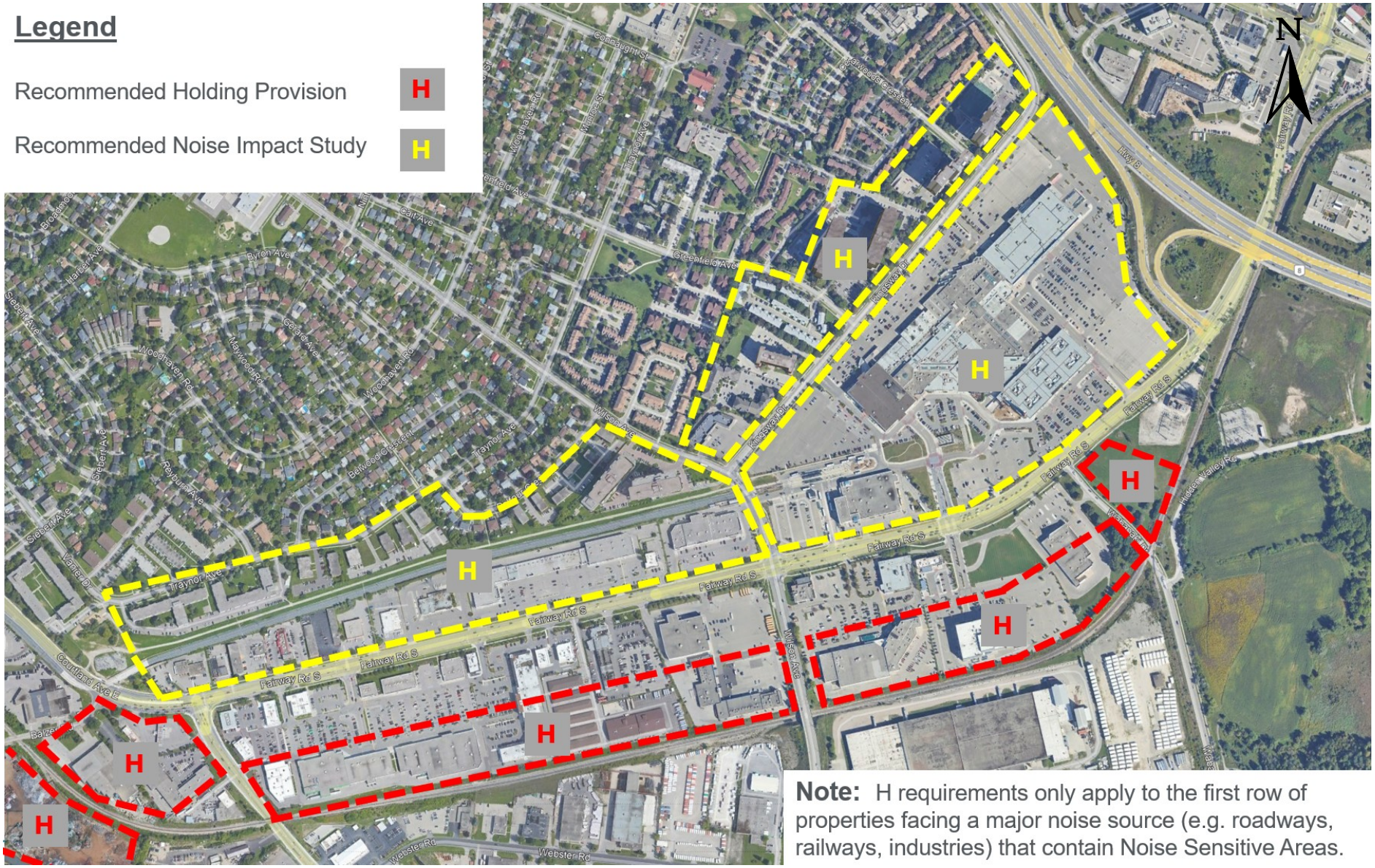
**Figure 17**

## Legend

Recommended Holding Provision **H**

Recommended Noise Impact Study **H**




**Note:** H requirements only apply to the first row of properties facing a major noise source (e.g. roadways, railways, industries) that contain Noise Sensitive Areas.

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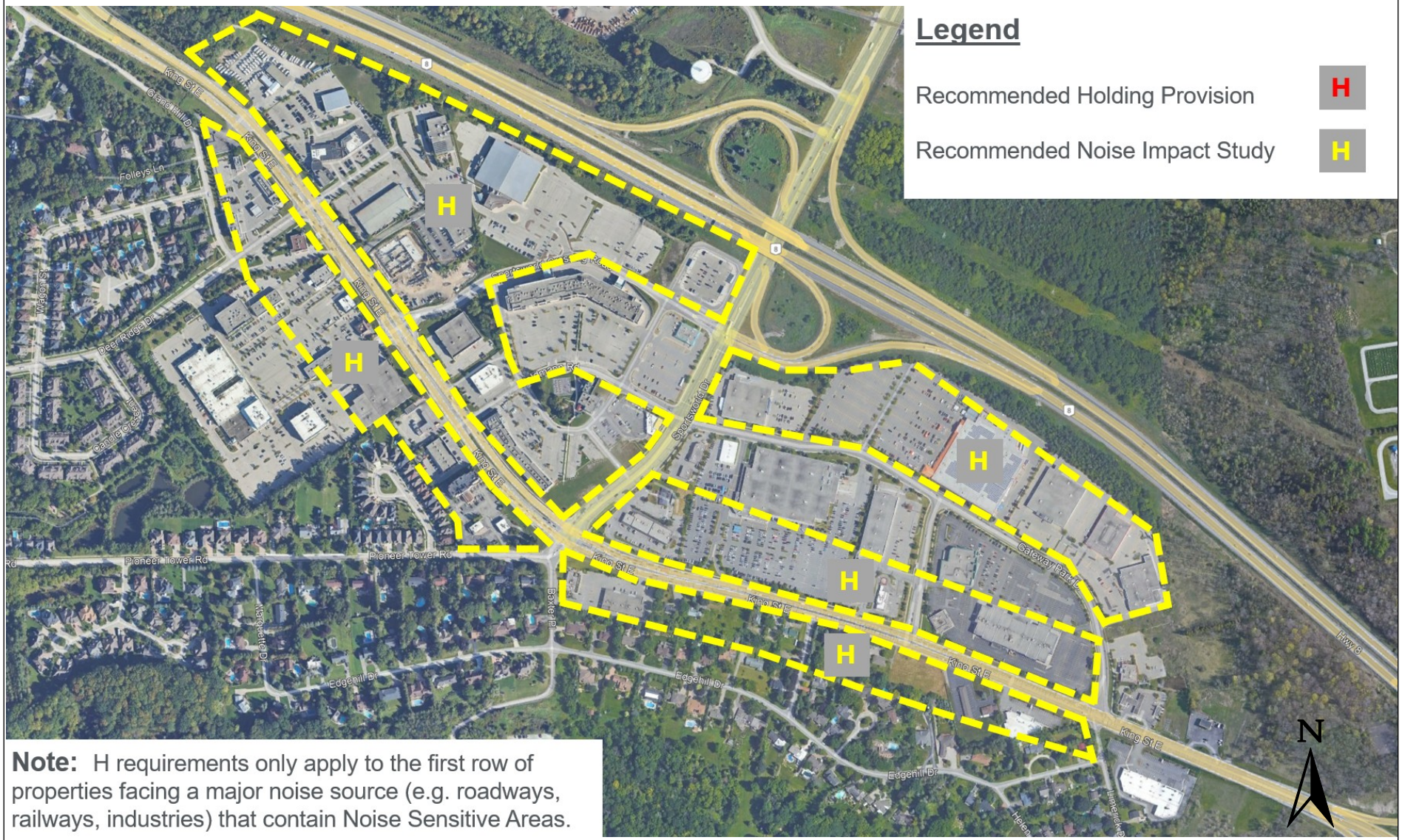
**Project Name**

Kitchener Growing Together East Noise Assessment

**Figure Title**

Recommended Holding Provisions and Noise Impact Studies - Fairway

**Figure 18**




**Note:** H requirements only apply to the first row of properties facing a major noise source (e.g. roadways, railways, industries) that contain Noise Sensitive Areas.

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Revision: 3

**Project Name**
Kitchener Growing Together East Noise Assessment

**Figure Title**
Recommended Holding Provisions and Noise Impact Studies - Sportsworld

**Figure 19**

The Corporation of the
City of Kitchener

# GROWING TOGETHER EAST

## Noise Analysis Study

## Phase 1: Background & Methodology Memo

January 2025
25175

# Disclaimer

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## APPENDICES

APPENDIX A DRAFT LAND USE MAPS
APPENDIX B SOUND LEVEL MONITORING DATA

# 1 INTRODUCTION

The City of Kitchener initiated the Growing Together project to introduce new Strategic Growth Area (SGA) land uses and apply them to Kitchener's ten (10) Protected Major Transit Station Areas (PMTSAs). Kitchener City Council approved Official Plan Amendments and Zoning By-law Amendments related to the first phase, Growing Together West, on March 18, 2024. The initial phase covered seven (7) PMTSAs.

LEA Consulting Ltd. (LEA) has been retained by the City of Kitchener to undertake a Transportation and Noise Analysis Study as part of the final phase, Growing Together East, to support the implementation of an updated planning framework for the three (3) remaining PMTSAs – Block Line, Fairway, and Sportsworld, which have been defined by the Region of Waterloo and centered around existing and planned ION LRT stations.

The purpose of this Noise Analysis Study is to review existing conditions and model the future noise emissions for a 2041 horizon year, with the intent to assess the compatibility of the proposed land use plans. Recommendations from the study aim to inform policy and zoning updates and guide the implementation of the land use plan as it relates to noise mitigation infrastructure improvements to meet future demand.

This Noise Analysis Study is divided into two Phases. This report documents Phase 1, which consists of reviewing existing noise conditions, identifying noise-sensitive receivers, establishing existing sound level conditions through sound level monitoring, developing noise analysis methodologies, proposing sound level criteria, and documenting any assumptions needed to carry forward the Study.

Phase 2 will consist of completing the sound level modelling analyses, proposing land-use compatibility recommendations, and identifying potential noise mitigation measures that will be necessary for the development of the Block Line, Fairway and Sportsworld PMTSAs, based on Phase 1 findings.

## 1.1 STUDY AREA

The Growing Together East study area consists of the Block Line, Fairway, and Sportsworld PMTSAs. The PMTSA boundaries contain lands within a 500-800m radius of each existing or planned ION LRT station:

- Block Line PMTSA is centered around the existing Block Line ION station along Courtland Avenue E, and bounded by Highway 8 to the north, an existing freight rail corridor to the south, Homer Watson Boulevard to the west, and Vanier Drive to the east.
- Fairway PMTSA is centered around the existing Fairway ION station along Fairway Road S, and bounded by Traynor Avenue to the north, the freight rail corridor to the south, Courtland Avenue E/Manitou Drive to the west, and Highway 8 to the east.
- Sportsworld PMTSA is centered around the planned Sportsworld ION station along King Street E, and bounded by Folleys Lane to the north, Pioneer Tower Road to the south, Wagon Street to the west, and Highway 8 to the east.

The Block Line, Fairway, and Sportsworld PMTSA's are illustrated in Figure 1.

## 1.2 KITCHENER GROWING TOGETHER (2024)

The Growing Together project updates Kitchener's planning framework for ten (10) MTSAs by revising land use policies and zoning regulations. The purpose of the Growing Together project is to better plan for growth within MTSAs and gives an opportunity for the City to modernize the existing land use framework. The project completes the work begun by Growing Together West for Kitchener's PMTSAs, and responds to provincial directions and implements the updated Regional Official Plan, while addressing new and emerging city priorities. Kitchener's PMTSAs, which are delineated in the Regional Official Plan, are subject to policies at both the provincial and regional levels. The Growing Together project aims to implement this direction through the preparation of a land use framework and supporting guidance such as transportation and noise policies to support the successful development of complete communities.

### 1.2.1 Kitchener Growing Together West (2024)

The Growing Together West project focused on the land use and zoning framework for seven (7) of Kitchener's ten (10) MTSAs, which included the Urban Growth Centre and Downtown Kitchener. The seven (7) MTSAs included:

1. Grand River Hospital
2. Central Station Innovation District
3. Victoria Park & Kitchener City Hall
4. Frederick & Queen
5. Kitchener Market
6. Borden
7. Mill

Throughout 2023, the City hosted a series of interactive workshops to collect feedback from the community. This included using 3D printed models to visualize the City's potential landscape and built form. On March 19, 2024, Kitchener City Council unanimously approved the Growing Together West plan which included Official Plan Amendments and Zoning By-law Amendments to introduce new Strategic Growth Areas (SGA) lands uses. On June 19, 2024, Regional Council approved the Growing Together Official Plan Amendments. At the time of preparing this report, the Growing Together West project is complete. At the time of preparing this report, the Growing Together West project is complete, and the Official Plan Amendment is in effect; however, the Zoning By-law Amendment remains under appeal.

# 2 PROJECT AREA DESCRIPTION

The Growing Together East study area consists of the remaining three (3) PMTSAs of Kitchener – Block Line, Fairway, and Sportsworld which have been established and defined by the Regional Official Plan and centered around the ION transit stations in the region. The PMTSA boundaries are based on a density target of 160 people and jobs per hectare and the assessment of each PMTSA focuses on the lands within a 500 to 800m radius of the stations.

The Block Line, Fairway, and Sportsworld PMTSA's are illustrated in Figure 1.

## 2.1 BLOCK LINE PMTSA

This PMTSA is centered around the Block Line ION station along Courtland Avenue East, and is bounded by Walton Avenue to the north, Balzer Greenway Natural Area to the south, Homer Watson Boulevard to the west, and Vanier Drive to the east.

Within these bounds are land uses that are noise-sensitive, including residential and institutional uses. Residential dwellings are located east of Courtland Avenue East, south of Block Line Road (in proximity of Fallowfield Drive), and west of Homer Watson Boulevard. These include single-family homes as well as mid- and high-rise apartment buildings. To the southwest of the Block Line ION station is St. Mary's High School, which is considered an institutional noise-sensitive land use.

## 2.2 FAIRWAY PMTSA

The Fairway PMTSA is centered around Fairway Road South and the Fairway ION LRT station. It is bounded by Traynor Avenue to the north, the railway corridor to the south, Courtland Avenue East/Manitou Drive to the west, and Highway 8 to the east.

This PMTSA features various noise-sensitive uses. These include residential dwellings to the immediate north of the ION LRT tracks and Kingsway Drive. These noise-sensitive uses include single-family homes and mid- and high-rise apartment buildings.

## 2.3 SPORTSWORLD PMTSA

The Sportsworld PMTSA is centered around the future Sportsworld ION station which is proposed to be located along King Street East. This PMTSA is bounded by Folleys Lane to the north, Pioneer Tower Road to the south, Wagon Street to the west, and Highway 8 to the east.

The Sportsworld PMTSA features various noise-sensitive land uses, including residential and hotel uses (Holiday Inn Express & Suites Kitchener Southeast and Embassy Motel). All residential uses consist of single-family homes and can be found west and south of King Street East.

# 3 EXISTING AND FUTURE SOUND SOURCES

This section identifies all major existing and future sound level sources within each PMTSA which will be carried out to the modelling phase (Phase 2) of this Study.

## 3.1 FAIRWAY PMTSA

The major existing noise sources in the Block Line PMTSA were identified based on aerial photography and a site visit.

Several major transportation noise sources were identified, which include:

- The ION LRT train traffic;
- ION LRT Block Line station (train idling, acceleration and deceleration);
- Canadian National and Canadian Pacific freight train traffic along the tracks west of Courtland Avenue East;
- The CP freight train yard located directly east of the Peter Hallman Ball Yard;

- Courtland Avenue East vehicular traffic;
- Highway 8 vehicular traffic;
- Block Line Road vehicular traffic;
- Homer Watson Boulevard vehicular traffic;
- Lennox Lewis Way vehicular traffic;
- Hayward Avenue vehicular traffic;
- Vanier Drive vehicular traffic;
- Manitou Drive vehicular traffic;
- Fallowfield Drive vehicular traffic;

Note that the existing freight lines are shared by Canadian Pacific (CP) and Canadian National (CN). Based on information provided by CN, CN trains do not utilize the rail yard; only CP trains do.

In terms of stationary noise sources, there are several commercial/industrial buildings located within the study area, which feature Heating, Ventilation and Air Conditioning (HVAC) Rooftop Units (RTUs) and in-site truck activity.

Significantly, to the southeast of the study area, there are various commercial buildings that emit noise, and two (2) industrial buildings that fabricate metals, Allsteel Fabrication and Triple M Metal LP Kitchener. All acoustically significant noise sources from these uses will be modelled, including all HVAC RTUs, cooling towers, emergency generators, and truck activity.

## 3.2 FAIRWAY PMTSA

The major existing noise sources in the Fairway PMTSA were identified based on aerial photography and a site visit.

Several major transportation noise sources were identified, which include:

- The ION LRT train traffic;
- ION LRT Fairway station (bus activity, train idling, acceleration and deceleration);
- Freight train traffic along the tracks south of the PMTSA;
- Courtland Avenue East vehicular traffic;
- Fairway Road South vehicular traffic;
- Wilson Avenue vehicular traffic;
- Highway 8 vehicular traffic;
- Kingsway Drive vehicular traffic;
- Greenfield Avenue vehicular traffic;
- Manitou Drive vehicular traffic;

Note that the planned expansion of the Kitchener ION LRT will introduce future noise sources that need to be considered when completed.

In terms of stationary noise sources, most of the Fairway PMTSA south of the ION LRT tracks consists of commercial-use buildings. Major sources associated with these buildings include HVAC RTUs and truck activity, which will be modelled.

The CF Fairview Park shopping mall is a major noise source in the area. All HVAC RTUs, cooling towers, truck activity and emergency generators associated with the mall will be modelled as stationary noise sources. It is acknowledged that the existing setup of the mall will change by year 2041. Future modelling scenarios will

account for these changes. Tonnage requirements will be estimated to determine future HVAC RTUs for noise modelling purposes.

Also note that based on the preferred Draft Land Use maps (see Appendix A) provided by the City, most uses along Fairway Road south are anticipated to be redeveloped into higher density mixed-uses. The noise modelling of future scenarios will account for land-uses changes and thereby the change in the local soundscape due to the redevelopment of the PMTSA.

## 3.3 SPORTSWORLD PMTSA

The major existing noise sources in the Sportsworld PMTSA were identified based on aerial photography and a site visit.

Several major transportation noise sources were identified, which include:

- Highway 8 (including on/off ramps) vehicular traffic;
- King Street East vehicular traffic;
- Sportsworld Drive vehicular traffic;
- Maple Grove Drive vehicular traffic;
- Pioneer Tower Road vehicular traffic;
- Gateway Park Drive vehicular traffic;
- Heldmann Road vehicular traffic;
- Sportsworld Crossing Road vehicular traffic;
- Freight train traffic along the tracks north of Highway 8;
- The freight yard located west of the rail crossing at Maple Grove Drive;
- The planned expansion of the Kitchener ION LRT line and Sportsworld station.

In terms of stationary noise sources, most of the Sportsworld PMTSA is made up big-box store commercial buildings. All HVAC RTUs, cooling towers, and emergency generators associated to these buildings will be modelled as stationary noise sources.

Also note that based on the Draft Land Use maps provided by the City, most uses within this PMTSA are anticipated to be redeveloped into higher density mixed-uses. The noise modelling of future scenarios will account for these land-uses changes and thereby the change in the local soundscape due to the redevelopment of the PMTSA.

North of Highway 8 and the freight train tracks there are major employment centres, including an Amazon warehouse, Russell Metals Ontario, and Dare Food. Although these uses are more than 450 metres away from future Sportsworld PMTSAs noise-sensitive uses, they will be modelled to ensure land-use compatibility and identify any potential constraints.

# 4 NOISE SENSITIVE RECEIVERS AND MONITORING LOCATIONS

## 4.1 BASIS OF SELECTION

Noise-sensitive receivers were selected for modelling purposes based on the Draft Preferred Land Uses (Appendix A) and existing aerial photography within the Block Line, Fairway and Sportsworld. The noise-sensitive receivers were selected such that:

- They are exposed to major existing and future noise sources within each PMTSA.
- They represent various existing and future noise-sensitive land uses, including residential, commercial (e.g. hotels or commercial buildings with habitable rooms or sleeping facilities) and institutional land uses.
- They represent a multitude of building heights (density).
- The noise monitoring locations allow us to secure the sound level instruments to minimize the risk of instrument tampering, vandalization or theft while capturing major noise sources within the PMTSAs.

On this basis, the following noise-sensitive receivers and noise monitoring locations were selected for each PMTSA and presented to the City for review and approval.

## 4.2 BLOCK LINE PMTSA RECEIVERS AND MONITORING LOCATIONS

A total of twelve (12) noise-sensitive receivers were selected to represent noise-sensitive uses within the Strategic Growth Areas A, B and C and institutional land uses in the Block Line PMTSA.

The selected noise-sensitive receivers have exposure to all major noise sources within or near the PMTSA, including Highway 8, Courtland Avenue, Hayward Avenue, Block Line Road, Lennox Lewis Way, Vanier Drive, Manitou Drive, Fallowfield Drive, Homer Watson Boulevard, ION LRT and Block Line Station, freight train pass-bys and the nearby rail yard, and industry noise (southeast of the PMTSA along Manitou Drive). Please refer to Figure 2 for the proposed noise receivers' locations.

A total of three (3) noise monitoring locations were selected. These are summarized in Table 1 below and are also shown in Figure 2.

Table 1: Block Line PMTSA Monitoring Locations

| Monitoring Location Number | Address/Location |
|---|---|
| Monitoring Location (Block) – 1 | On light pole facing the backyard at 18 Parkhill Court |
| Monitoring Location (Block) – 2 | On light pole by Lennox Lewis Way and Activia Sportsplex Access |
| Monitoring Location (Block) – 3 | On light pole by Siebert Avenue and Courtland Avenue East |

## 4.3 FAIRWAY PMTSA RECEIVERS AND MONITORING LOCATIONS

A total of thirteen (13) noise-sensitive receivers were selected to represent noise-sensitive uses within the Strategic Growth Areas A, B and C land uses in the Fairway PMTSA.

The selected noise-sensitive receivers have exposure to all major noise sources within or near the PMTSA, including Highway 8, Fairway Road South, Wilson Avenue, Kingsway Drive, Greenfield Avenue, Manitou Drive, the ION LRT and Fairway Station, freight train pass-by noise, and existing commercial/industrial sites. Please refer to Figure 2 for the proposed noise receivers' locations.

A total of three (3) noise monitoring locations were selected. These are summarized in Table 2 below and are also shown in Figure 2.

Table 2: Fairway PMTSA Monitoring Locations

| Monitoring Location Number | Address/Location |
|---|---|
| Monitoring Location (Fairway) – 1 | On light pole just outside the backyard of 51 Balfour Crescent |
| Monitoring Location (Fairway) – 2 | On light pole by Wilson Avenue and Balfour Crescent |

| Monitoring Location Number | Address/Location |
|---|---|
| Monitoring Location (Fairway) – 3 | On light pole by Wabanaki Drive and Fairway Road South |

## 4.4 SPORTSWORLD PMTSA RECEIVERS AND MONITORING LOCATIONS

A total of ten (10) noise-sensitive receivers were selected to represent noise-sensitive uses within the proposed Strategic Growth Areas A, B and C land uses in the Sportsworld PMTSA.

The selected noise-sensitive receivers have exposure to all major noise sources within or near the PMTSA, including Highway 8 and related on-off ramps, King Street East, Sportsworld Drive, Maple Grove Drive, Pioneer Tower Road, Gateway Park Drive, Heldmann Road, Sportsworld Crossing, the future ION LRT (or BRT) and the future Sportsworld Station, freight train pass-by and yard noise, and existing commercial/industrial sites across Highway 8. Please refer to Figure 3 for the proposed noise receivers' locations.

A total of three (3) noise monitoring locations were selected and summarized in Table 3 below and are shown in Figure 3.

Table 3: Sportsworld PMTSA Monitoring Locations

| Monitoring Location Number | Address/Location |
|---|---|
| Monitoring Location (Sportsworld) – 1 | On light pole by yard at 79 Wagon Street |
| Monitoring Location (Sportsworld) – 2 | On light pole in parking lot of Sportsworld Arenas |
| Monitoring Location (Sportsworld) – 3 | On light pole by King Street East and Baxter Place |

# 5 SOUND LEVEL MONITORING

## 5.1 MONITORING STANDARDS

All noise monitoring was completed in accordance with the Ministry of the Environment, Conservation and Parks (MECP) document NPC-103 "*Procedures for Measurement of Steady or Impulsive Sound*". The NPC-103 procedure provides measurement guidance based on the noise type, what instrumentation to use, measurement location, settings and configuration for the instrumentation, documentation, and weather conditions.

All monitoring sound level meters used exceeded the instrumentation requirements outlined in the NPC-103, and as required, were calibrated before and after monitoring. Data collection was completed early to avoid winter conditions, to mitigate the weather condition limitations outlined in the NPC-103.

## 5.2 INSTRUMENTATION

The following Sound Level Meter (SLM) equipment and calibrator were used during the monitoring campaign to capture data at the nine (9) monitoring locations:

- Sigicom - INFRA C50 Wireless Sound Level Monitor Type 1; and
- Larson Davis – Precision Sound Level Calibrator Model Cal200.

The INFRA C50 Wireless Sound Level Monitor is a Class 1 (IEC 61672-1:2013) integrating sound level meter and noise monitor with a built-in data logger. The Larson Davis CAL200 Sound Level Calibrator is a battery-

operated precision microphone calibrator that is Class 1 (IEC 60942:2003) compliant and is used to calibrate sound level meters and other sound measurement equipment.

Both instrument types are Class 1 classification and meet the NPC-103 guideline for acceptable instrumentation.

Figure 4 shows a typical setup of the noise instrumentation used for this Study.

## 5.3 SOUND LEVEL MONITORING PROCEDURES AND RESULTS

LEA personnel completed sound level monitoring at the nine (9) monitoring locations identified in Figure 2 and Figure 3 in Section 4 of this report.

Five (5) locations in the Block Line and Sportsworld PMTSA's were monitored from Wednesday, November 13, 2024, to Monday, November 18, 2024, culminating in six (6) days of continuous data. The remaining four (4) locations in the Block Line and Fairway PMTSA's were monitored from Tuesday, November 19, 2024, to Tuesday, November 26, 2024, culminating in eight (8) days of continuous data.

A summary of measurement data is provided below in Table 4, Table 5 and Table 6. Raw monitoring data is attached in Appendix B.

The sound level monitoring was conducted during the dates mentioned above to allow a sufficiently long period to gather at least seventy-two (72) hours of consecutive data while accounting for any changes in the environment or human influence on background ambient noise, such as human activity, natural sounds, fluctuations in traffic volumes, and different weather conditions. The deployment period also allowed the capture the change of sound levels due to typical traffic patterns in the area.

The SLM's were mounted to City of Kitchener light poles at approximately 3.5 metres above the ground. The SLM's were calibrated before collecting any measurements and were outfitted with windscreens and bird spikes to help eliminate extraneous environmental sound. Sound levels were measured at one (1) second intervals, and the data was separated between Day (7:00-23:00) and Night (23:00-7:00), the Day $LA_{eq-16hr}$ and Night $LA_{eq-8hr}$'s are outlined below.

Table 4: Block Line PMTSA Sound Level Monitoring Summary

| Date (2024) | Monitoring Location (Block) - 1 | | Monitoring Location (Block) - 2 | | Monitoring Location (Block) - 3 | |
|---|---|---|---|---|---|---|
| | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) |
| Wednesday, November 13 | 69 | 62 | 62 | 52 | - | - |
| Thursday, November 14 | 70 | 63 | 63 | 53 | - | - |
| Friday, November 15 | 70 | 62 | 65 | 52 | - | - |
| Saturday, November 16 | 69 | 60 | 60 | 46 | - | - |
| Sunday, November 17 | 68 | 63 | 60 | 54 | - | - |
| Monday, November 18 | 70 | 62 | 62 | 53 | - | - |
| Tues. November 19 | - | - | - | - | 71 | 65 |

| Date (2024) | Monitoring Location (Block) - 1 | | Monitoring Location (Block) - 2 | | Monitoring Location (Block) - 3 | |
|---|---|---|---|---|---|---|
| | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) |
| Wed. November 20 | - | - | - | - | 72 | 65 |
| Thurs. November 21 | - | - | - | - | 71 | 65 |
| Fri. November 22 | - | - | - | - | 71 | 65 |
| Sat. November 23 | - | - | - | - | 71 | 64 |
| Sun. November 24 | - | - | - | - | 70 | 66 |
| Mon. November 25 | - | - | - | - | 72 | 65 |
| Tues. November 26 | - | - | - | - | 71 | 65 |
| Max Value | 70 | 63 | 65 | 54 | 72 | 66 |
| Linear Average Value | 69 | 62 | 62 | 52 | 71 | 65 |

' – ' No noise data was recorded during this day

Table 5: Fairway PMTSA Sound Level Monitoring Summary

| Date | Monitoring Location (Fairway) - 1 | | Monitoring Location (Fairway) - 2 | | Monitoring Location (Fairway) - 3 | |
|---|---|---|---|---|---|---|
| | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) |
| Tues. November 19 | 58 | 49 | 62 | 56 | 70 | 65 |
| Wed. November 20 | 59 | 50 | 63 | 55 | 70 | 66 |
| Thurs. November 21 | 60 | 50 | 62 | 55 | 70 | 67 |
| Fri. November 22 | 59 | 54 | 62 | 54 | 70 | 64 |
| Sat. November 23 | 62 | 46 | 61 | 54 | 69 | 63 |
| Sun. November 24 | 57 | 50 | 60 | 56 | 69 | 64 |
| Mon. November 25 | 62 | 51 | 62 | 56 | 70 | 67 |
| Tues. November 26 | 57 | 50 | 63 | 55 | 70 | 65 |
| Max Value | 62 | 54 | 63 | 56 | 70 | 67 |
| Linear Average Value | 59 | 50 | 62 | 55 | 70 | 65 |

Table 6: Sportsworld PMTSA Sound Level Monitoring Summary

| Date | Monitoring Location (Sportsworld) - 1 | | Monitoring Location (Sportsworld) - 2 | | Monitoring Location (Sportsworld) - 3 | |
|---|---|---|---|---|---|---|
| | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) | $LA_{eq}$ (16hr) Day (dBA) | $LA_{eq}$ (8hr) Night (dBA) |
| Wednesday, November 13 | 62 | 57 | 69 | 66 | 72 | 69 |
| Thursday, November 14 | 60 | 55 | 69 | 65 | 74 | 70 |
| Friday, November 15 | 59 | 54 | 67 | 61 | 73 | 67 |
| Saturday, November 16 | 62 | 50 | 65 | 58 | 71 | 65 |
| Sunday, November 17 | 56 | 54 | 64 | 62 | 70 | 69 |
| Monday, November 18 | 60 | 57 | 66 | 66 | 73 | 69 |
| Max Value | 62 | 57 | 69 | 66 | 74 | 70 |
| Linear Average Value | 60 | 55 | 67 | 63 | 72 | 68 |

The monitoring values from Table 4, Table 5 and Table 6 will be used to calibrate the noise model and to determine stationary sound level limits (further details below in Section 7.1).

# 6 NOISE MODELLING METHODOLOGY

## 6.1 GENERAL APPROACH

To model all noise sources within the PMTSAs, 3D models will be created using the Cadna/A computer software, Version 2025.

Given the proximity of the Block Line and Fairway PMTSAs, they will be combined into one Cadna/A model. This will provide more accurate results as these two PMTSAs may acoustically impact each other and have a few noise sources in common. A second model will be prepared for the Sportsworld PMTSA. Therefore, two (2) 3D models will be created to analyze future sound levels at the three (3) PMTSAs.

Three (3) methodologies with implementation in the Cadna/A software will be used to analyze the various types of noise sources. These consist of:

- The ISO 9613-2 for stationary noise sources;
- The FTA method for railway noise sources; and
- The TNM algorithm for roadway noise sources.

The following sections will provide more details regarding each of these methodologies.

## 6.2 ISO 9613-2

The stationary noise assessment will be based on the MECP-approved ISO 9613-2 standard: *"Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation"* (1996). Sound levels due to sources of stationary sound will be calculated using the Cadna/A computer software. Based on sources of known sound emissions, the ISO 9613-2 method predicts the equivalent continuous A-weighted sound pressure level under favourable weather conditions for the propagation of sound.

## 6.3 FTA METHODOLOGY

The railway noise assessment will be based on the US Federal Transit Authority's (FTA) Transit Noise and Vibration Impact Assessment with implementation in the Cadna/A computer software. The FTA protocol also provides a general assessment and screening procedures for the computation of stationary noise impacts from rail yards. Sound Exposure Levels (SELs) will be referenced from the FTA's various transit vehicles to match the ION LRT and freight train rolling stock traveling along the PMTSAs.

We note that the FTA methodology was selected over the Sound from Trains Environmental Analysis Method (STEAM) transit assessment methodology, which is commonly employed in Ontario for simple train noise models. The FTA methodology was employed because STEAM is a 2D model that does not account for 3D terrain and shielding, train speed profiles, and various noise penalties associated with trains traveling on different surfaces (e.g. over bridges, ballast, fixed tracks). STEAM only allows one model per receiver and cannot generate contours. STEAM is not appropriate for predicting sound levels in locations with complex terrain geometries and shielding, so it is not applicable to this study area.

The FTA method is a commonly used method of prediction for complex rail transit projects in Ontario.

## 6.4 TNM METHODOLOGY

The roadway noise assessment will be based on the MTO-approved US Federal Highway Administration Traffic Noise Model (TNM) Version 2.5 algorithm with implementation in the Cadna/A computer software. The TNM algorithm is a widely accepted and recognized method for noise modelling in transportation engineering. Its use is particularly relevant in the analysis of traffic noise impacts and mitigation measures associated with roadway design and construction projects.

We acknowledge that the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) traffic assessment methodology is a tool widely used in Ontario for simple projects. Similarly to STEAM, ORNAMENT is a 2D model that cannot generate contours, can only account for simple terrain and a limited number of roadways.

## 6.5 CADNA/A PARAMETERS FOR MODELLING

The following parameters will be used in the Cadna/A model:

- Order of reflections: 1
- Generally, a global ground absorption coefficient of 0 will be used. However, ground absorption will be refined to account for different surfaces including, grass, soft ground, water, and ballasted tracks.
- Sound shielding of buildings will be considered.

- Sound reflection of buildings will not be considered.
- Weather parameters favourable for the propagation of sound will be used
- Sound source directivity will be accounted for
- The model will also incorporate 3D terrain model.

## 6.6 MODELLING ASSUMPTIONS

To model the three (3) PMTSAs, assumptions will be made to simplify modelling to account only for acoustically significant noise sources. For example, when adding two (2) sound sources together that are more than 10 dB in difference, the quieter noise source will have a negligible effect on the overall noise. For example, adding one noise source of 50dB and another of 40dB would result in a total noise of 50.4dB, and a change of 0.4 dB would be indiscernible to the human ear – the human ear can typically discern changes in sound that are higher than 3 dB.

Therefore, noise sources will be broken down into major and minor noise sources. The modelling will not include minor sources in the model; for example, local residential streets in the PMTSAs. Major sources would consist of major arterial roads, freeways, railways or rail yards, and industry sound. These have been outlined in detail in Section 3.

Based on guidance from the City, the planned stage 2 ION LRT expansion will be completed by the horizon year 2041. The planned expansion will extend beyond Fairway station to Cambridge, with a station at Sportsworld.

Future (year 2041) building heights within the PMTSAs will be based on either existing development applications or maximum allowable densities.

# 7 SOUND LEVEL CRITERIA

## 7.1 NPC-300 STATIONARY SOUND LEVEL CRITERIA

The noise assessment criteria for stationary noise will be based on the Ministry of the Environment, Conservation and Parks (MECP) Publication NPC-300 *"Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning"* dated 2013.

In general, and in accordance with NPC-300, the surrounding area is currently considered a Class 2 acoustical environment. In a Class 2 area, the background sound levels during the daytime (07:00 to 19:00) periods are dominated by the activities of people; usually, road traffic often referred to as *"urban hum"*. However, the background sound levels in a Class 2 area during the evening (19:00 to 23:00) and nighttime (23:00 to 07:00) hours are defined by the natural environment and infrequent human activities. The sound level limits for stationary noise sources are summarized in Table 7.

Table 7: MECP Sound Level Limits (1-hour Equivalent) for Stationary Noise Sources in Class 2 Area

| Time Period | Time of Day | Class 2 Area - Sound Level Limits[1] $L_{eq-1hr}$ (dBA) |
|---|---|---|
| Outdoor Points of Reception | 07:00 – 19:00 (Daytime) | 50 |
| | 19:00 – 23:00 (Evening) | 45 |
| Plane of Window of | 07:00 – 19:00 (Daytime) | 50 |

| Time Period | Time of Day | Class 2 Area - Sound Level Limits[1] $L_{eq-1hr}$ (dBA) |
|---|---|---|
| Noise Sensitive Spaces | 19:00 – 23:00 (Evening) | 50 |
| | 23:00-07:00 (Nighttime) | 45 |

*(1) or the minimum existing hourly background level $L_{eq}$, whichever is higher*

Note that although in general existing modelled sound levels will be compared against Class 2 area sound level criteria, measured or modelled ambient sound levels at certain locations will be used instead, which is consistent with NPC-300.

Furthermore, it is assumed that by horizon year 2041, the PMTSAs will be sufficiently developed and intensified to correspond to a Class 1 area acoustical environment.

In accordance with the MECP Guideline NPC-300, in a Class 1 area the background sound levels during the daytime (07:00 to 19:00), evening (19:00 to 23:00) and nighttime (23:00 to 07:00) periods are dominated by the activities of people, usually road traffic, often referred to as "urban hum". The sound level limits for stationary noise sources are summarized in Table 8 below.

Table 8: MECP Sound Level Limits (1-hour Equivalent) for Stationary Noise Sources in Class 1 Area

| Time Period | Time of Day | Class 1 Area - Sound Level Limits[1] $L_{eq-1hr}$ (dBA) |
|---|---|---|
| Outdoor Points of Reception | 07:00 – 19:00 (Daytime) | 50 |
| | 19:00 – 23:00 (Evening) | 50 |
| Plane of Window of Noise Sensitive Spaces | 07:00 – 19:00 (Daytime) | 50 |
| | 19:00 – 23:00 (Evening) | 50 |
| | 23:00-07:00 (Nighttime) | 45 |

*(1) or the minimum existing hourly background level $L_{eq}$, whichever is higher*

## 7.2 NPC-300 TRANSPORTATION SOUND LEVEL CRITERIA

### 7.2.1 Indoors

The indoor noise level impact due to road and rail traffic will be evaluated as per the noise criteria outlined in NPC-300. The indoor sound level limit due to road traffic for a living or dining room area during the daytime (07:00-23:00) and nighttime (23:00-07:00) hours are a $L_{eq-16hr}$ and $L_{eq-8hr}$ of 45 dBA, respectively. The indoor sound level limit due to road traffic for a bedroom during daytime is a $L_{eq-16hr}$ of 45 dBA and during the nighttime hours an $L_{eq-8hr}$ of 40 dBA. Moreover, the indoor sound level limit due to rail traffic for a living or dining room area during the daytime and nighttime hours are a $L_{eq-16hr}$ and $L_{eq-8hr}$ of 40 dBA, respectively. Finally, the indoor sound level limit due to rail traffic for a bedroom during the daytime is a $L_{eq-16hr}$ of 40 dBA and during the nighttime hours an $L_{eq-8hr}$ of 35 dBA.

The required limits as per NPC-300 guidelines are summarized in Table 9. Moreover, NPC-300 has ventilation requirements related to transportation noise sources, in order to allow residents to close their windows for a quieter living environment. These are presented in Table 10.

Table 9: MECP Sound Level Limits for Indoor Spaces

| Type of Space | Time Period | Sound Level Limits | |
|---|---|---|---|
| | | Road | Rail |
| Living/Dining, Den Areas of Residences | 07:00 – 23:00 | $L_{eq\ (16\ hours)}$: 45 dBA | $L_{eq\ (16\ hours)}$: 40 dBA |
| | 23:00 – 07:00 | $L_{eq\ (8\ hours)}$: 45 dBA | $L_{eq\ (8\ hours)}$: 40 dBA |
| Sleeping quarters | 07:00 – 23:00 | $L_{eq\ (16\ hours)}$: 45 dBA | $L_{eq\ (16\ hours)}$: 40 dBA |
| | 23:00 – 07:00 | $L_{eq\ (8\ hours)}$: 40 dBA | $L_{eq\ (8\ hours)}$: 35 dBA |

Table 10: MECP Ventilation Requirements

| Plane of Window Sound Level ($L_{eq}$) | Ventilation Requirement | Warning Clause Requirement |
|---|---|---|
| Daytime (07:00 to 23:00) | | |
| ≤55 dBA | None | None |
| 55 ≤65 dBA | Forced air heating with provisions for the installation of central air conditioning | Recommended |
| > 65 dBA | Central air conditioning | Required |
| Nighttime (23:00 to 07:00) | | |
| ≤50 | None | None |
| 50 ≤60 | Forced air heating with provisions for the installation of central air conditioning. | Recommended |
| > 60 | Central air conditioning | Required |

### 7.2.2 Outdoors

Guidelines set out by NPC-300 recommend that equivalent noise levels (i.e. $L_{eq\text{-}16hr}$) in outdoor living areas should not exceed 55 dBA. If the predicted $L_{eq\text{-}16hr}$ is greater than 60 dBA, noise control measures should be implemented to reduce the level to 55 dBA. If it is not technically, economically, or administratively feasible to achieve a level of 55 dBA, noise levels between 55 dBA and 60 dBA may be acceptable, provided that the future occupants of the dwellings are made aware of the potential noise problems through a warning clause. The required limits are summarized in Table 11.

Table 11: MECP Sound Level Limits for Outdoor Living Area

| Type of Space | Time Period | Sound Level Limits |
|---|---|---|
| | | Road and Rail |
| Outdoor Living Area (OLA) | 07:00 – 23:00 | $L_{eq\ (16\ hours)}$: >55 dBA (may consider noise control measures)<br>$L_{eq\ (16\ hours)}$: >60 dBA (noise control measures are required) |

## 7.3 APPLICABILITY OF NPC-300

In addition to the MECP's NPC-300, there are other sound level criteria and guidelines applicable to Ontario projects.

The first one is the "*Ministry of Transportation Environmental Guide for Noise (2022)*" which offers guidance on implementing noise control measures for existing noise-sensitive land uses adjacent to existing freeways undergoing expansion, or adjacent to new highway projects. According to MTO, noise mitigation measures should be considered if the 24-hour equivalent sound pressure level exceeds sixty-five (65) dBA at assessment locations. The MTO recommends designing mitigation strategies to achieve a Leq-16hr below 55 dBA where practical.

It also emphasizes assessing the technical feasibility of noise mitigation, requiring an average noise reduction of at least five (5) dBA at the first row of receivers. However, the MTO Environmental Guide for Noise applies to Noise Impact Assessments to determine the acoustical impact of new MTO highways or improvements to existing MTO infrastructure. Further, this guide does not provide guidance or sound level criteria related to trains. As such, during the land development process, developers will not be required to meet the MTO Environmental Guide for Noise requirements.

Another potentially applicable noise guideline in Ontario is the "*MOECC/MTO joint protocol, A Protocol for Dealing with Noise Concerns during the Preparation, Review and Evaluation of Provincial Highway's Environmental Assessments"* (MTO/MOECC, 1986). According to the protocol, if the anticipated noise impact of a proposed roadway improvement is 5 dB or less, noise mitigation measures are not required. However, if the noise impact exceeds 5 dB, an investigation into potential noise mitigation is mandated. Similar to the MTO guidelines, the protocol applies to Noise Impact Assessments to determine the acoustical impact of new roadways at the municipal level. It also does not provide train sound level criteria. Similar to the MTO Environmental Guide for Noise, developers are not required to meet MOECC/MTO requirements when developing a site.

Therefore, the MTO Environmental Guide for Noise and the MOECC/MTO Protocol sound level criteria are not applicable to this Study.

Thus, in Phase 2 of this project, future sound levels will be compared against NPC-300 indoor and outdoor requirements. Future noise-sensitive land uses exceeding any of the NPC-300 sound level criteria will be identified using tables and graphics (contours). Potential areas requiring noise control measures (e.g. upgraded windows, noise barriers) will also be identified. Future noise-sensitive land uses exceeding sound level criteria, and for which mitigation is considered unfeasible will also be identified.

## 7.4 CITY OF KITCHENER NOISE BY-LAW

The City of Kitchener Noise By-Laws are outlined in Chapter 450 of the By-Law, which provides information on excessive noise complaints and construction noise. Construction noise is permitted seven (7) days a week from 7 a.m. to 7 p.m., but exemptions can be applied for; it states that exemptions apply to 11 p.m. Upon reviewing past approved exemptions related to construction, the exemptions can be approved for all hours of the night when necessary for construction projects. Thus, construction noise must be considered for day and nighttime hours.

## 7.5 D-6 COMPATIBILITY BETWEEN INDUSTRIAL FACILITIES

The City of Kitchener must follow the Ontario guideline D-6 Compatibility between Industrial Facilities, which is outlined below. The goal of these guidelines is to minimize the encroachment of industrial land uses on sensitive land uses, and vice versa.

> "The guideline applies to all types of proposed, committed and/or existing industrial land uses which have the potential to produce point source and/or fugitive air emissions such as noise, vibration, odour, dust and others, either through normal operations, procedures, maintenance or storage activities, and/or from associated traffic/transportation.
>
> This guideline also considers ground borne vibration, but does not deal with other emissions into the soil or ground and surface water. These other matters are addressed through the *Environmental Protection Act* (EP Act), in particular *Regulation 346* and *Regulation 347*, the *Ontario Water Resources Act* (OWR Act) in general, and the Municipal Industrial Strategy for Abatement (MISA)."

The D-6 Compatibility Guidelines references minimum separation distances between sensitive uses and industry, as follows:

- Class I Industrial Facility: 20 metres minimum separation distance
- Class II Industrial Facility: 70 metres minimum separation distance
- Class III Industrial Facility: 300 metres minimum separation distance

When these minimum separation distances cannot be achieved, a detailed acoustical study must be undertaken to determine the noise discharges onto the environment and their impact on the worst-case sensitive uses. The guideline further states that "noise shall be addressed through Ministry Publication LU-131 for all situations to this guideline."

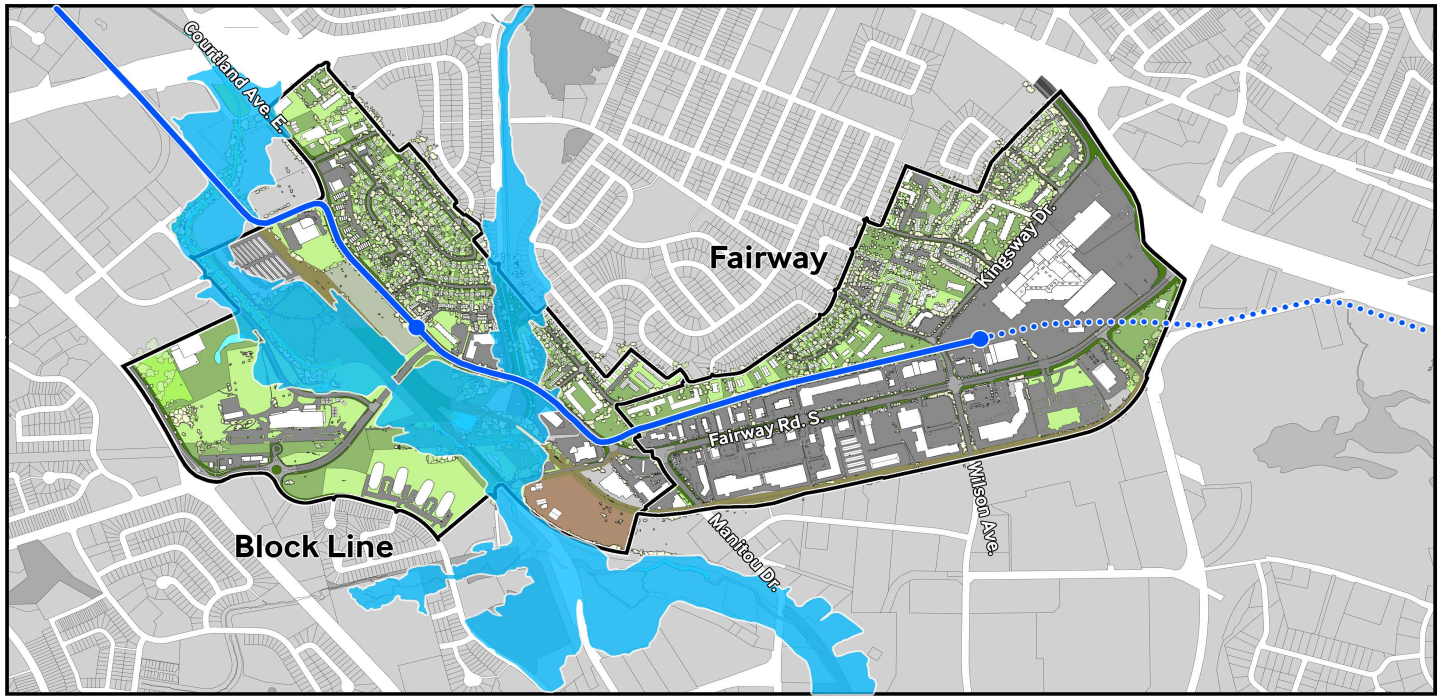
It is noted that LU-131 has been superseded by publication NPC-300.

In order to ensure land-use compatibility, LEA will model all acoustically significant facilities within or in proximity of the PMTSAs, regardless of whether the minimum separation distances are exceeded.

# 8 CONCLUSIONS AND NEXT STEPS

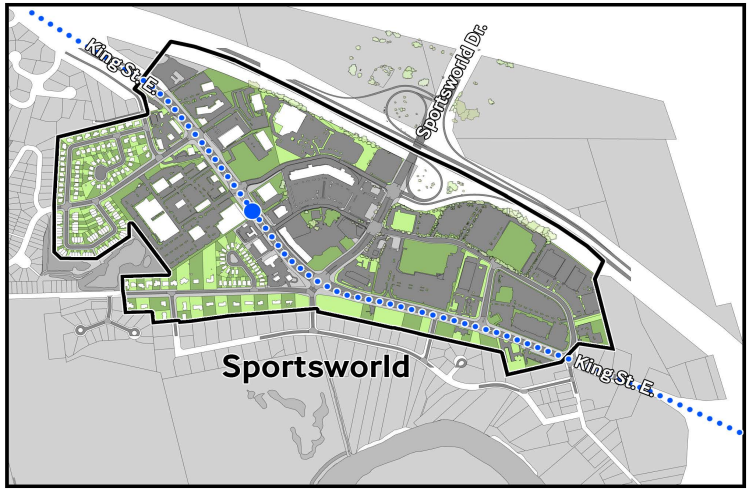
Based on the project schedule, LEA will now move to Phase 2 of the project. This involves building the noise models for the three (3) PMTSAs based on all noise criteria, methodology, and monitoring standards outlined in this Phase 1 report. Once modelled, the future sound levels will be compared against NPC-300 criteria and the D-6 Compatibility guidelines using tables and graphics for easy understanding to non-experts.

Any exceedances required noise mitigation measures to ensure land-use compatibility, or any land-use incompatibilities will be identified and outlined in the final report at the end of Phase 2.



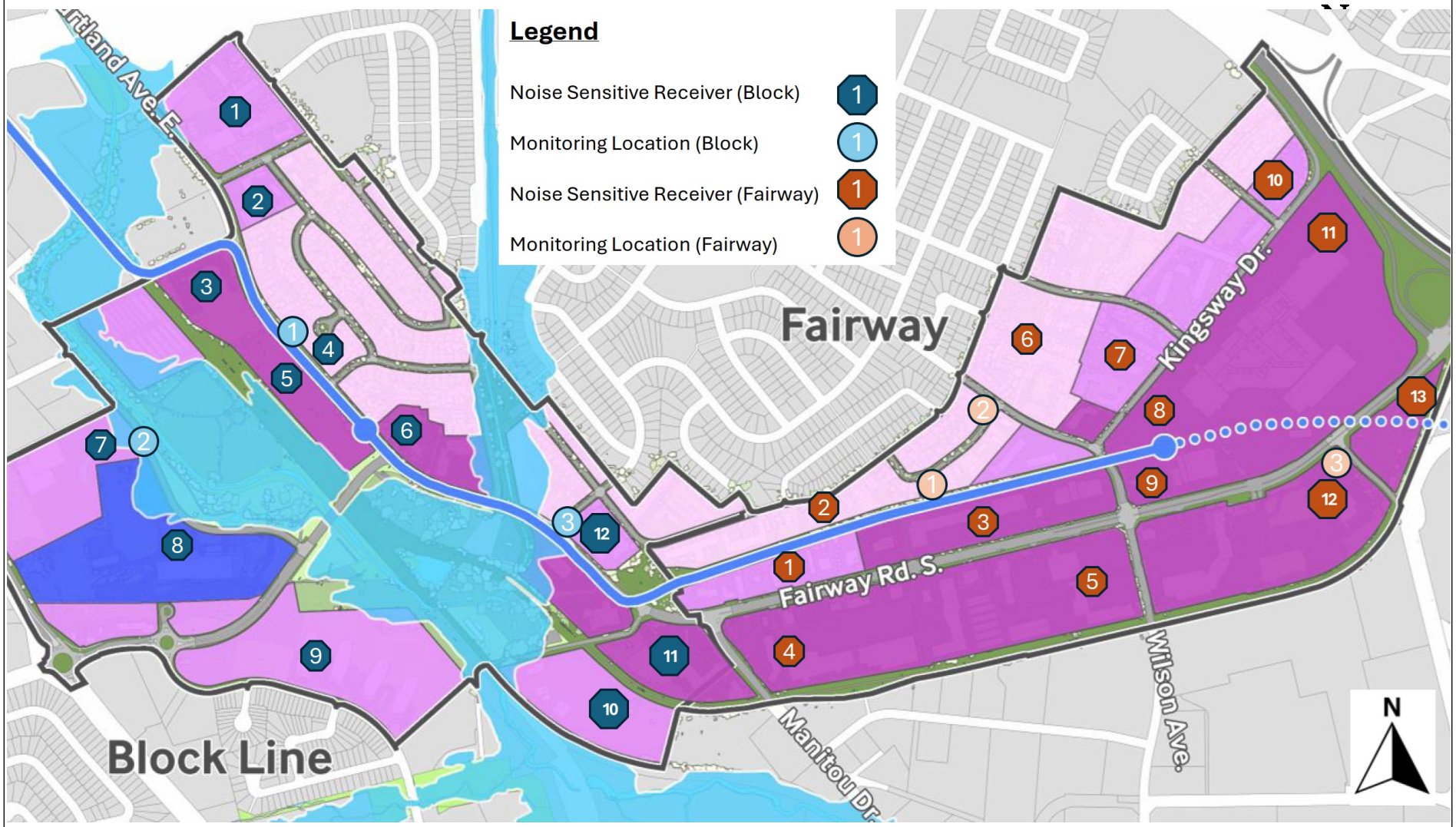

**Growing Together East**

N



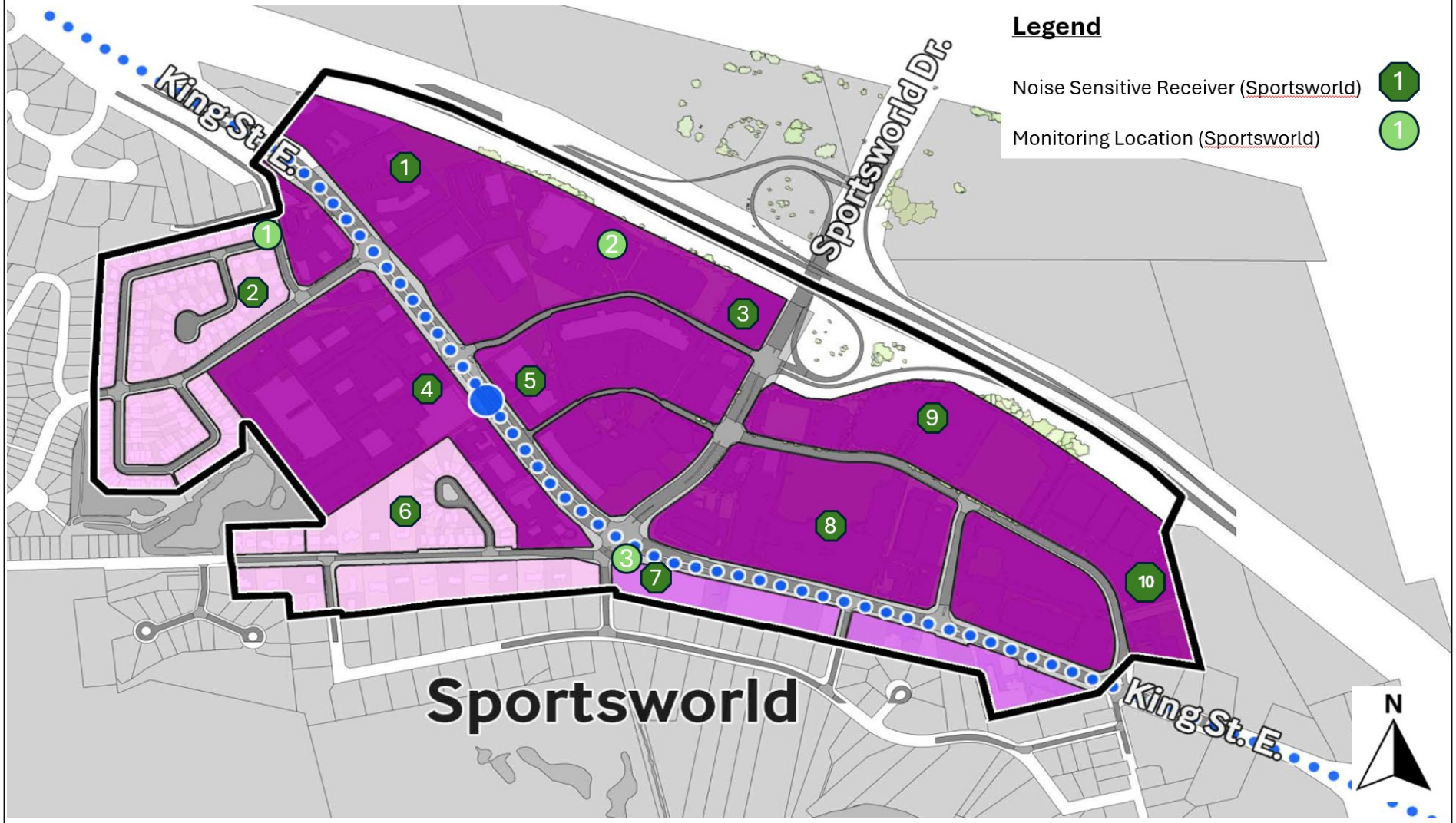

| | | |
|---|---|---|
| LEA Consulting Ltd. | Project ID: 25175.01<br>Scale: NTS<br>Drawn by: ID<br>Reviewed by: DEA/FV<br>Date: Dec 12, 2024<br>Revision: 1 | **Project Name**<br>Growing Together East Transportation & Noise Analysis Study - Phase 1 Memo<br>**Figure Title**<br>Growing Together East Study Area |

**Figure 1**




| | | |
|---|---|---|
| LEA Consulting Ltd. | Project ID: 25175.01<br>Scale: NTS<br>Drawn by: ID<br>Reviewed by: DEA/FV<br>Date: Dec 12, 2024<br>Revision: 1 | **Project Name**<br>Growing Together East Transportation & Noise Analysis Study - Phase 1 Memo<br>**Figure Title**<br>Noise Sensitive Receivers and Monitoring Locations - Block Line & Fairway |

**Figure 2**




| | | |
|---|---|---|
| LEA Consulting Ltd. | Project ID: 25175.01<br>Scale: NTS<br>Drawn by: ID<br>Reviewed by: DEA/FV<br>Date: Dec 12, 2024<br>Revision: 1 | **Project Name**<br>Growing Together East Transportation & Noise Analysis Study - Phase 1 Memo<br>**Figure Title**<br>Noise Sensitive Receivers and Monitoring Locations - Sportsworld |

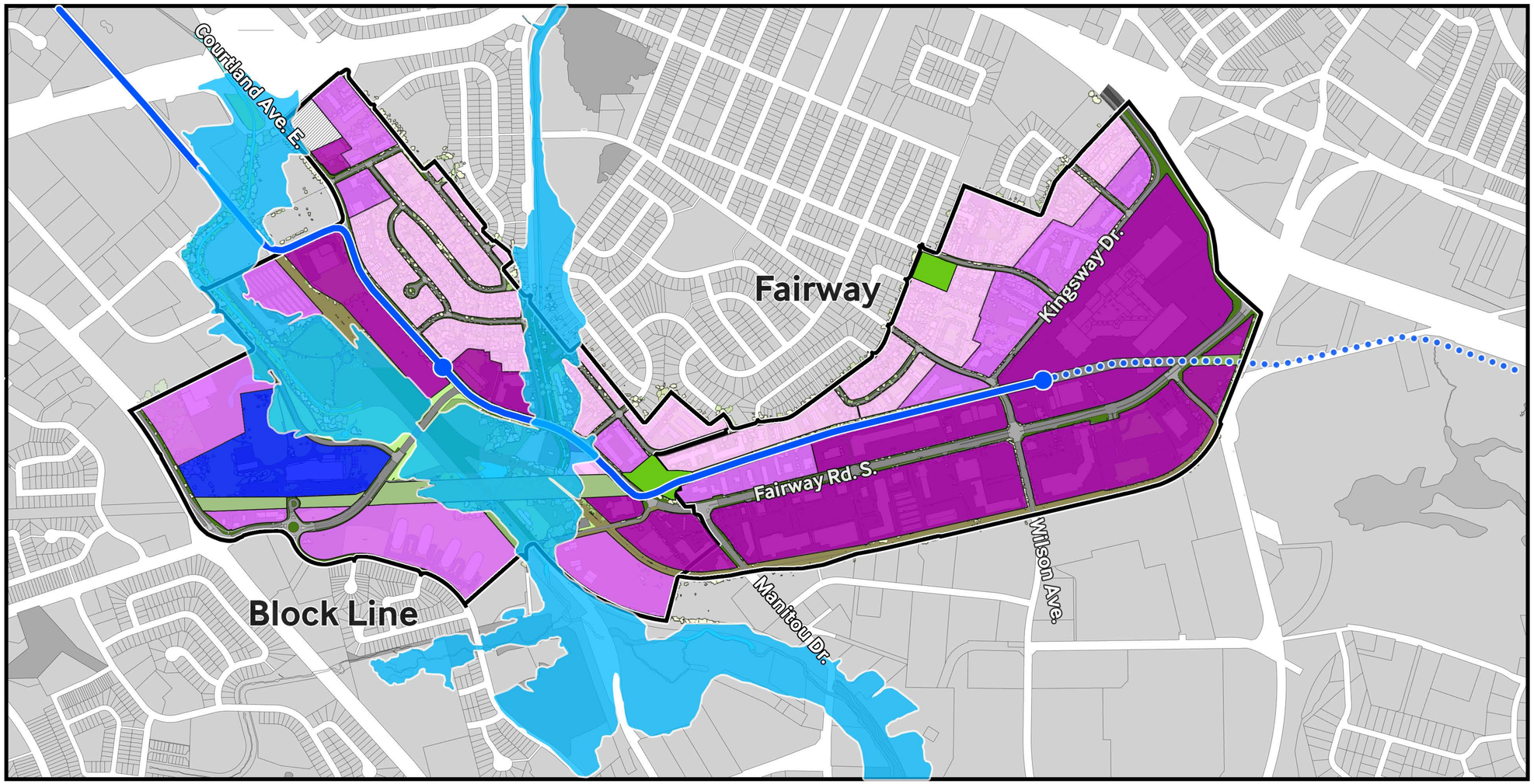
**Figure 3**

| | | |
|---|---|---|
| LEA Consulting Ltd. | Project ID: 25175.01<br>Scale: NTS<br>Drawn by: ID<br>Reviewed by: DEA/FV<br>Date: Dec 12, 2024<br>Revision: 1 | **Project Name**<br>Growing Together East Transportation & Noise Analysis Study - Phase 1 Memo<br>**Figure Title**<br>Typical Sound Level Monitor Set-Up - Site Photo |

**Figure 4**

# APPENDIX A

## Draft Land Use Maps




## Growing Together East Draft Land Use

- SGA-A
- SGA-B
- SGA-C
- Institutional
- Open Space
- Floodway
- ION LRT/Future Route

**Disclaimer**
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**November 2024**

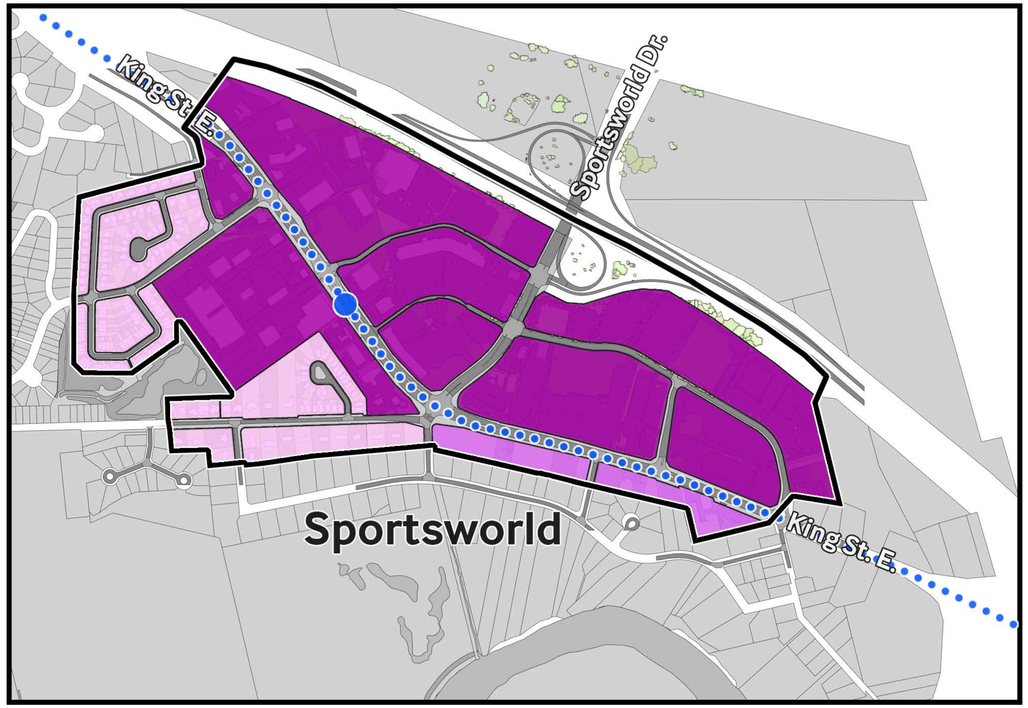
**Strategic Growth Area A**
The Strategic Growth Area A land use designation is generally intended to accommodate intensification within existing predominantly low-rise residential neighbourhoods, lands further away from Rapid Transit station stops, and/or lands where existing lots are generally too small to support high rise buildings. It is anticipated that the majority of development and/or redevelopment will occur through infill including missing middle housing and compatible non-residential uses.

**Strategic Growth Area B**
The Strategic Growth Area B land use designation is intended to accommodate significant intensification at building heights between those in the Strategic Growth Area A land use designation and those in the Strategic Growth Area C land use designation. Lands designated Strategic Growth Area B are also intended to serve as a transition between Low Rise Residential Uses on lands within the Strategic Growth Area A designation, and medium and high density uses within the Strategic Growth Area C designation. Some areas within the Strategic Growth Area B land use designation contain smaller lots and/or existing Low Rise Residential Uses. While significant intensification is planned for these lands, the implementing zoning may restrict building heights as an interim measure to ensure orderly development through a development application.

**Strategic Growth Area C**
The Strategic Growth Area C land use designation is intended to accommodate significant intensification at high density. Lands designated Strategic Growth Area C are generally centrally located within Intensification Areas and/or represent redevelopment opportunities at higher density. It is anticipated that some areas within the Strategic Growth Area C land use designation will require the assembly of lands for development. Further, some lands designated Strategic Growth Area C are adjacent to lands planned for medium density uses or which contain existing Low Rise Residential Uses. As such, the implementing zoning may restrict building height as an interim measure to ensure orderly development through a development application demonstrating that the policies of this plan are met.

**Institutional**
The primary use of land within the Institutional land use designation is intended for institutional uses that are of a community or regional nature, such as secondary and post-secondary educational facilities, long-term care facilities and social, cultural and administrative facilities. This land use designation also includes small-scale institutional uses compatible with surrounding uses such as public and private elementary schools, libraries, day care centres, and places of worship. Some of these small-scale institutional uses may also be permitted in other land use designations found in this Plan.

**Open Space**
Open Space is a valuable resource to the community and contributes to the quality of life in Kitchener. The primary intent of the Open Space land use category is to provide for a comprehensive and connected open space system of parks and trails, a buffer between land uses, and increase the opportunities for recreation and general enjoyment of an area while having regard for the City's natural areas that not designated as part of the Natural Heritage System.



# APPENDIX B

## Sound Level Monitoring Data

# Noise report

***NB!***
*Chart data is aggregated by 1 minute.*

| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-13 12:00 - 2024-11-19 12:00 (America/Toronto) |
| **Measuring point** | BLM01 - 18 Parkhill Ct |
| **Description** | On light pole facing backyard of 18 Parkhill Ct |
| **Sensor type** | C50 |
| **Sensor serial no.** | 116945 |
| **Master(s) serial no.** | 116945 |
| **Latest calibration** | 2024-05-14 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Wednesday | 2024-11-13 | 69.25 | 96.88 | 62.2 | 82.03 |
| Thursday | 2024-11-14 | 70.32 | 90.84 | 63.16 | 89.32 |
| Friday | 2024-11-15 | 69.99 | 99.14 | 61.68 | 95.14 |
| Saturday | 2024-11-16 | 68.66 | 97.07 | 60.24 | 81.14 |
| Sunday | 2024-11-17 | 67.53 | 97.25 | 62.51 | 84.59 |
| Monday | 2024-11-18 | 70.23 | 93.14 | 62.32 | 85.81 |
| Tuesday | 2024-11-19 | 69.71 | 89.23 | – | – |

# Noise report

***NB!***
*Chart data is aggregated by 1 minute.*

| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-13 12:00 - 2024-11-19 12:00 (America/Toronto) |
| **Measuring point** | BLM02 - Lennox Lewis Way |
| **Description** | On light pole by Lennox Lewis Way & Activa Sportsplex Access |
| **Sensor type** | C50 |
| **Sensor serial no.** | 117798 |
| **Master(s) serial no.** | 117798 |
| **Latest calibration** | 2024-10-30 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Wednesday | 2024-11-13 | 62.34 | 92.18 | 52.07 | 81.6 |
| Thursday | 2024-11-14 | 63.06 | 93.2 | 53.05 | 83.57 |
| Friday | 2024-11-15 | 65.4 | 111.45 | 51.96 | 81.92 |
| Saturday | 2024-11-16 | 60.24 | 93.73 | 46.27 | 77.41 |
| Sunday | 2024-11-17 | 60.31 | 94.35 | 53.47 | 83.34 |
| Monday | 2024-11-18 | 62.18 | 95.38 | 53.16 | 82.69 |
| Tuesday | 2024-11-19 | 62.67 | 93.51 | – | – |

# Noise report



| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-19 12:00 - 2024-11-27 12:00 (America/Toronto) |

***NB!***
*Chart data is aggregated by 1 minute.*

| | |
|---|---|
| **Measuring point** | BLM03 - Siebert Ave |
| **Description** | On light pole by Siebert Ave & Courtland Ave E |
| **Sensor type** | C50 |
| **Sensor serial no.** | 117669 |
| **Master(s) serial no.** | 117669 |
| **Latest calibration** | 2024-08-12 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Tuesday | 2024-11-19 | 71.05 | 102.6 | 65.01 | 93.47 |
| Wednesday | 2024-11-20 | 71.92 | 105.1 | 65.01 | 88.03 |
| Thursday | 2024-11-21 | 71.02 | 96.04 | 65.17 | 97.41 |
| Friday | 2024-11-22 | 71.37 | 96.94 | 64.72 | 94.99 |
| Saturday | 2024-11-23 | 70.57 | 96.29 | 64.13 | 99.49 |
| Sunday | 2024-11-24 | 70.31 | 106.47 | 65.89 | 107.96 |
| Monday | 2024-11-25 | 71.64 | 102.49 | 65.44 | 88.79 |
| Tuesday | 2024-11-26 | 71.43 | 99.79 | 64.74 | 89.37 |
| Wednesday | 2024-11-27 | 72.1 | 101.46 | – | – |

# Noise report

| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-19 12:00 - 2024-11-27 12:00 (America/Toronto) |
| **Measuring point** | FM01 - 51 Balfour Cres |
| **Description** | On light pole just outside the backyard of 51 Balfour Crescent |
| **Sensor type** | C50 |
| **Sensor serial no.** | 117670 |
| **Master(s) serial no.** | 117670 |
| **Latest calibration** | 2024-08-12 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

***NB!***

*Chart data is aggregated by 1 minute.*

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Tuesday | 2024-11-19 | 58.36 | 93.85 | 49.09 | 77.68 |
| Wednesday | 2024-11-20 | 58.87 | 95.78 | 50.02 | 76.7 |
| Thursday | 2024-11-21 | 59.61 | 98.25 | 49.96 | 74.75 |
| Friday | 2024-11-22 | 58.71 | 102.56 | 53.89 | 94.59 |
| Saturday | 2024-11-23 | 62.3 | 102.69 | 46.32 | 74.92 |
| Sunday | 2024-11-24 | 57.28 | 96.3 | 50.43 | 74.91 |
| Monday | 2024-11-25 | 61.86 | 99.15 | 50.89 | 75.72 |
| Tuesday | 2024-11-26 | 57.44 | 94.64 | 50.18 | 76.72 |
| Wednesday | 2024-11-27 | 70.89 | 104.13 | – | – |

# Noise report



| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-19 12:00 - 2024-11-27 12:00 (America/Toronto) |

***NB!***
*Chart data is aggregated by 1 minute.*

| | |
|---|---|
| **Measuring point** | FM02 - Balfour Cres |
| **Description** | On light pole by Wilson Ave & Balfour Cres |
| **Sensor type** | C50 |
| **Sensor serial no.** | 117798 |
| **Master(s) serial no.** | 117798 |
| **Latest calibration** | 2024-10-30 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Tuesday | 2024-11-19 | 61.8 | 95.06 | 55.59 | 86.75 |
| Wednesday | 2024-11-20 | 62.63 | 97.9 | 55.41 | 81.24 |
| Thursday | 2024-11-21 | 61.69 | 96.32 | 55.32 | 78.77 |
| Friday | 2024-11-22 | 62.05 | 92.82 | 54.43 | 74.47 |
| Saturday | 2024-11-23 | 60.89 | 96.2 | 53.85 | 85 |
| Sunday | 2024-11-24 | 60.24 | 94.41 | 55.68 | 89.2 |
| Monday | 2024-11-25 | 61.83 | 94.59 | 55.65 | 82.3 |
| Tuesday | 2024-11-26 | 63.26 | 96.53 | 55 | 79.61 |
| Wednesday | 2024-11-27 | 62.37 | 95.75 | – | – |

# Noise report



| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-19 12:00 - 2024-11-27 12:00 (America/Toronto) |

***NB!***
*Chart data is aggregated by 1 minute.*

| | |
|---|---|
| **Measuring point** | FM03 - Wabanaki Drive |
| **Description** | On light pole by Wabanaki Dr & Fairway Rd S |
| **Sensor type** | C50 |
| **Sensor serial no.** | 116945 |
| **Master(s) serial no.** | 116945 |
| **Latest calibration** | 2024-05-14 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Tuesday | 2024-11-19 | 70.17 | 98.78 | 64.47 | 87.21 |
| Wednesday | 2024-11-20 | 70.32 | 99.54 | 66.19 | 98.42 |
| Thursday | 2024-11-21 | 69.67 | 96.8 | 66.92 | 102.25 |
| Friday | 2024-11-22 | 70.23 | 99.52 | 64.35 | 90.74 |
| Saturday | 2024-11-23 | 68.8 | 100.14 | 62.59 | 88.46 |
| Sunday | 2024-11-24 | 68.79 | 101.52 | 64.38 | 92.57 |
| Monday | 2024-11-25 | 70.26 | 99.65 | 67.32 | 99.97 |
| Tuesday | 2024-11-26 | 70.08 | 100.24 | 64.53 | 90.32 |
| Wednesday | 2024-11-27 | 70.17 | 90.35 | – | – |

# Noise report

*NB!*
*Chart data is aggregated by 1 minute.*

| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-13 12:00 - 2024-11-19 12:00 (America/Toronto) |
| **Measuring point** | SM01 - 79 Wagon Street |
| **Description** | On light pole by yard at 79 Wagon St |
| **Sensor type** | C50 |
| **Sensor serial no.** | 116946 |
| **Master(s) serial no.** | 116946 |
| **Latest calibration** | 2024-05-14 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Wednesday | 2024-11-13 | 61.53 | 93.39 | 56.76 | 76.23 |
| Thursday | 2024-11-14 | 60.31 | 84.14 | 54.53 | 73.99 |
| Friday | 2024-11-15 | 59.23 | 83.06 | 54.02 | 78.39 |
| Saturday | 2024-11-16 | 61.51 | 88 | 49.91 | 79.97 |
| Sunday | 2024-11-17 | 55.87 | 80.77 | 54.17 | 76.83 |
| Monday | 2024-11-18 | 59.96 | 89.1 | 56.64 | 74.6 |
| Tuesday | 2024-11-19 | 62.14 | 86.24 | – | – |

# Noise report

| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-13 12:00 - 2024-11-19 12:00 (America/Toronto) |
| **Measuring point** | SM02 - Sportworld Arenas |
| **Description** | On light pole in parking lot of Sportsworld Arenas |
| **Sensor type** | C50 |
| **Sensor serial no.** | 117669 |
| **Master(s) serial no.** | 117669 |
| **Latest calibration** | 2024-08-12 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

***NB!***

*Chart data is aggregated by 1 minute.*

| Date | | Day Mon - Sun 7 - 23 50 dB | | Night Mon - Sun 23 - 7 45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Wednesday | 2024-11-13 | 68.95 | 97.84 | 65.53 | 98.46 |
| Thursday | 2024-11-14 | 69.12 | 89.27 | 65.06 | 76.11 |
| Friday | 2024-11-15 | 66.92 | 80.92 | 61.04 | 75.84 |
| Saturday | 2024-11-16 | 65.1 | 83.79 | 58.05 | 75.17 |
| Sunday | 2024-11-17 | 63.65 | 81.89 | 61.69 | 75.52 |
| Monday | 2024-11-18 | 65.92 | 81.28 | 65.52 | 77.19 |
| Tuesday | 2024-11-19 | 70.48 | 95.08 | – | – |

# Noise report

| | |
|---|---|
| **Project** | Kitchener GTE |
| **Project maintainer** | - |
| **Time frame** | 2024-11-13 12:00 - 2024-11-19 12:00 (America/Toronto) |
| **Measuring point** | SM03 - Baxter Place |
| **Description** | On light pole by King St E & Baxter Pl |
| **Sensor type** | C50 |
| **Sensor serial no.** | 117670 |
| **Master(s) serial no.** | 117670 |
| **Latest calibration** | 2024-08-12 |
| **Aggregate** | max |
| **Unit** | dB(A) |
| **Quantity** | - |
| **Interval time** | 1 second |
| **Aggregated time** | 1 minute |
| **Table threshold** | High |

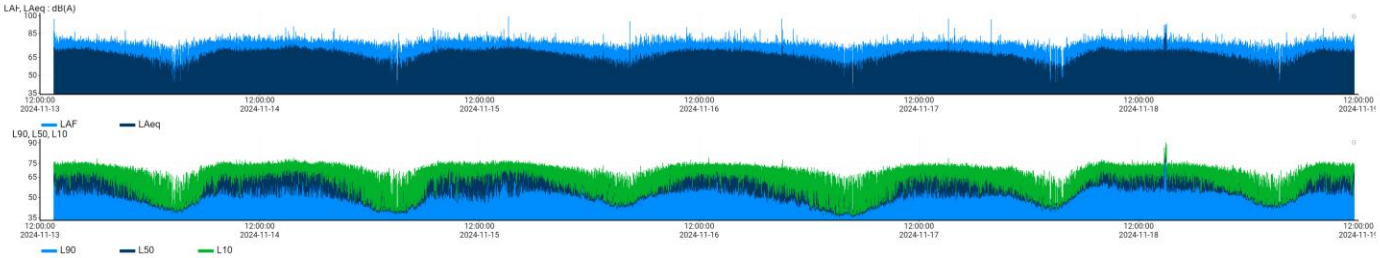
***NB!***

*Chart data is aggregated by 1 minute.*

| Date | | Day<br>Mon - Sun<br>7 - 23<br>50 dB | | Night<br>Mon - Sun<br>23 - 7<br>45 dB | |
|---|---|---|---|---|---|
| | | LAeq | LAF, dB(A) | LAeq | LAF, dB(A) |
| Wednesday | 2024-11-13 | 71.97 | 97.11 | 69.14 | 100.72 |
| Thursday | 2024-11-14 | 73.45 | 103.18 | 69.75 | 97.62 |
| Friday | 2024-11-15 | 72.85 | 101.74 | 67.15 | 96.94 |
| Saturday | 2024-11-16 | 70.56 | 100.26 | 64.79 | 95.9 |
| Sunday | 2024-11-17 | 69.92 | 100.4 | 68.68 | 103.66 |
| Monday | 2024-11-18 | 72.47 | 96.36 | 69.29 | 99.74 |
| Tuesday | 2024-11-19 | 73.44 | 98.12 | – | – |

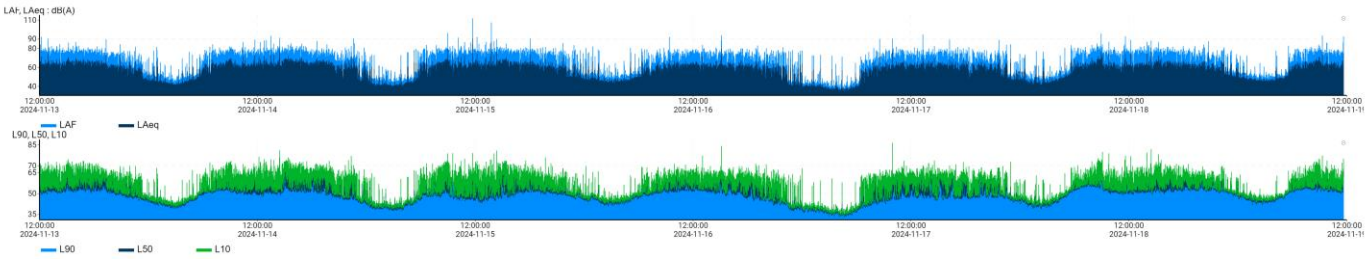
## BLM01 - 18 Parkhill Ct, On light pole facing backyard of 18 Parkhill Ct

Sensor: C50 #116945 Master(s) serial no.: 116945 Unit: dB(A),
Latest calibration: 2024-05-14 Interval time: 1 second



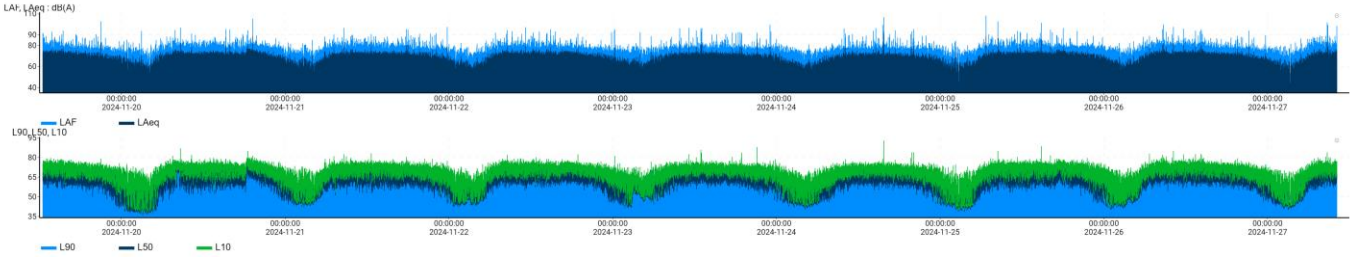

## BLM02 - Lennox Lewis Way, On light pole by Lennox Lewis Way & Activa Sportsplex Access

Sensor: C50 #117798 Master(s) serial no.: 117798 Unit: dB(A),
Latest calibration: 2024-10-30 Interval time: 1 second



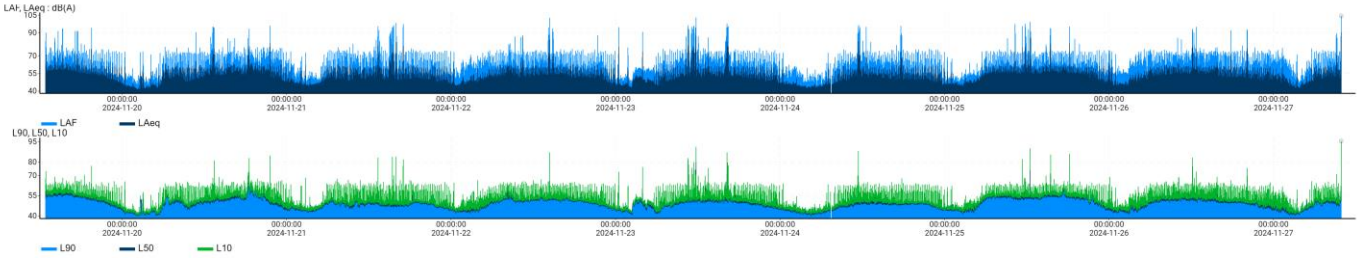

## BLM03 - Siebert Ave, On light pole by Siebert Ave & Courtland Ave E

Sensor: C50 #117669 Master(s) serial no.: 117669 Unit: dB(A),
Latest calibration: 2024-08-12 Interval time: 1 second



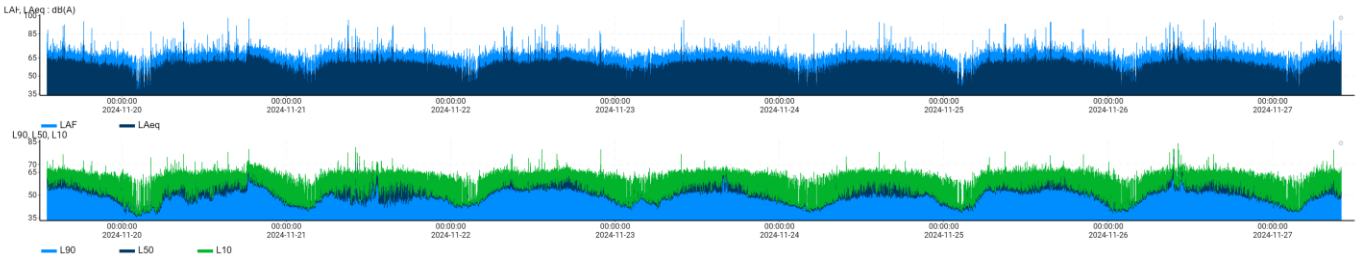

## FM01 - 51 Balfour Cres, On light pole just outside the backyard of 51 Balfour Crescent

Sensor: C50 #117670 Master(s) serial no.: 117670 Unit: dB(A),
Latest calibration: 2024-08-12 Interval time: 1 second



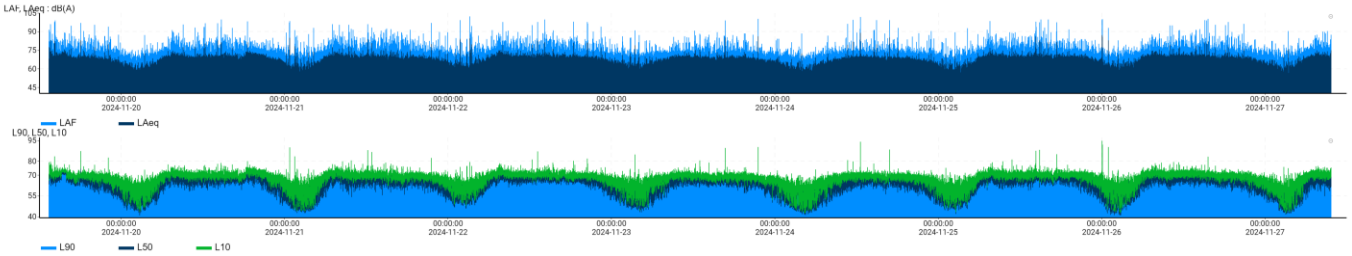

## FM02 - Balfour Cres, On light pole by Wilson Ave & Balfour Cres

Sensor: C50 #117798 Master(s) serial no.: 117798 Unit: dB(A),
Latest calibration: 2024-10-30 Interval time: 1 second



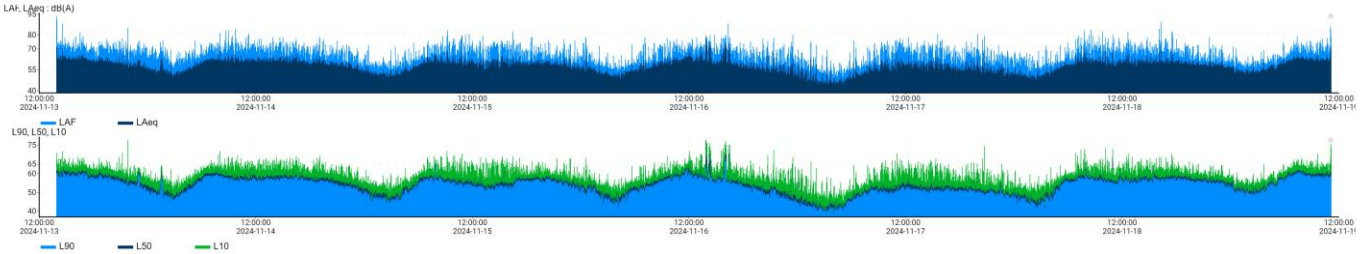
## FM03 - Wabanaki Drive, On light pole by Wabanaki Dr & Fairway Rd S

Sensor: C50 #116945 Master(s) serial no.: 116945 Unit: dB(A),
Latest calibration: 2024-05-14 Interval time: 1 second



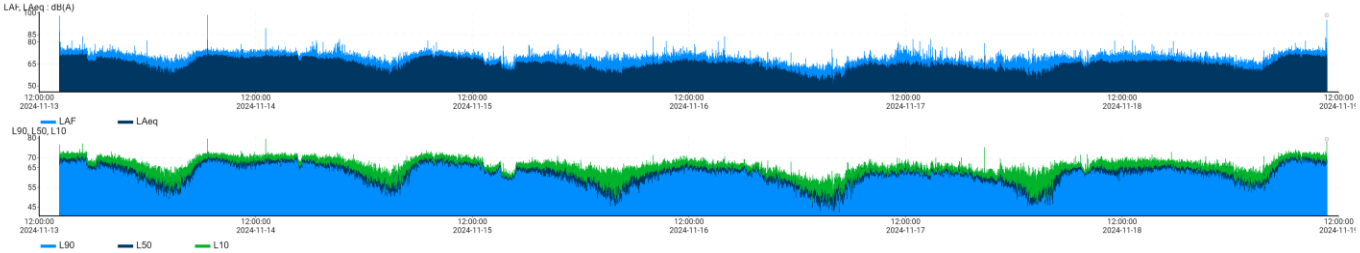

## SM01 - 79 Wagon Street, On light pole by yard at 79 Wagon St

Sensor: C50 #116946 Master(s) serial no.: 116946 Unit: dB(A),
Latest calibration: 2024-05-14 Interval time: 1 second




## SM02 - Sportworld Arenas, On light pole in parking lot of Sportsworld Arenas

Sensor: C50 #117669 Master(s) serial no.: 117669 Unit: dB(A),
Latest calibration: 2024-08-12 Interval time: 1 second




## SM03 - Baxter Place, On light pole by King St E & Baxter Pl

Sensor: C50 #117670 Master(s) serial no.: 117670 Unit: dB(A),
Latest calibration: 2024-08-12 Interval time: 1 second