

## Noise Management Gap Analysis

This document outlines recommended health guidelines related to sound exposure, current approaches to mitigate and prevent excess noise in Calgary, examples of practices in other jurisdictions and a preliminary list of opportunities that require further investigation and feasibility assessments.

Type of Sound	Health Organization Guidelines	Existing Legislation & Practices to Manage Noise	Practices in Other Jurisdictions to Prevent/Mitigate Sound Exposure	Calgary Opportunities for Management of Sound and Resources
<p><b>All Sound Types</b></p>	<p>World Health Organization<sup>1</sup> (WHO) reports noise above 140 dB for adults and 120 dB for children can immediately cause harm to the ears.</p> <p>WHO<sup>2</sup> recommends no more than 30 dBA(Leq) of continuous background noise to avoid sleep disturbances. Individual events over 45 dB(LAmax) should be avoided.</p>	<ul style="list-style-type: none"> <li>• <i>City of Calgary (CoC):</i> The Community Standards Bylaw prohibits continuous (over 3 minutes) sound exceeding 65 dBA(Leq) during the daytime (7 am-10 pm weekdays and 8 am-10 pm on weekends) and 50 dBA(Leq) during night-time in residential developments. Downtown, continuous sound is prohibited at 75 dBA(Leq) at daytime and 60 dBA(Leq) at night-time.</li> <li>• <i>CoC:</i> Bylaw officers investigate bylaw infractions when they receive complaints. Fines for noise-related offenses range from \$125 to \$500.</li> <li>• <i>CoC:</i> Noise Exemption Permits can be applied for, free of charge when an activity is expected to exceed sound level or timeframe limits (ex: construction, concrete finishing, festivals, and events).</li> <li>• <i>CoC:</i> Planning policy and implementation consider sound when designing communities and assessing developments.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>European Union:</i> All European Union urban areas over 100,000 people need to have noise models that get updated every 5 years. Amsterdam, Madrid and Paris have a lot of experience with noise modeling and mapping.</li> <li>• <i>Canton of Geneva, CHE:</i> Uses noise monitoring to update their noise calculated noise model, especially with traffic noise.</li> <li>• <i>London, UK:</i> Influences and provides advice on the design and layout of new developments at pre-application stages as part of improved acoustic design.</li> <li>• <i>Vancouver:</i> Noise Bylaw incorporates different zones (e.g.: activity, event, intermediate, and quiet zones) with different noise restrictions enabling more choices related to sound /vibrancy.</li> <li>• <i>Edmonton:</i> Investments in the Urban Forest Management Plan aim to reduce or mask noise (among other environmental benefits).</li> </ul>	<ul style="list-style-type: none"> <li>• Calculate noise levels in Calgary using sound modeling.</li> <li>• Launch a noise monitoring pilot to identify problematic areas.</li> <li>• Publish sound level exposure data to help raise public awareness.</li> <li>• Explore advocacy opportunities for the National Research Council Canada to improve acoustic regulations in the design and layout of residential developments (e.g.: improve acoustic performance of windows, increase insulation, and develop regulations that would require “quiet sides’ of homes in relevant locations).</li> <li>• Review the Land Use Bylaw for opportunities to reduce the impact of noise.</li> </ul>

<sup>1</sup> World Health Organization (1999); Guidelines for Community Noise. Source: [Guidelines for community noise \(who.int\)](https://www.who.int/publications/i/item/9789241545731)

<sup>2</sup> ibid

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	<p>WHO recommends that average noise exposure levels should not exceed 70 dBA(Leq) over a 24-hour period, and 85 dBA(Leq) over a 1-hour period to avoid hearing impairment.<sup>3</sup></p>	<ul style="list-style-type: none"> <li>• <i>Government of Canada:</i> National Building Code 2019 Alberta Edition outlines requirements related to limiting the transmission of sound from both inside and outside of buildings (reducing impacts of many forms of noise exposure).</li> </ul>		<ul style="list-style-type: none"> <li>• Identify equity considerations in exposure to sound (based on location or housing type) and assess existing or new opportunities for noise mitigation with an equity lens.</li> <li>• Investigate increased access to space for trees and layers/composition of species to reduce or mask noise.</li> </ul>
<p><b>Road Traffic</b></p>	<p>WHO<sup>4</sup> recommendations for road traffic sound levels:</p> <ul style="list-style-type: none"> <li>• Below an average of 53 dBA(Lden)<sup>5</sup>;</li> <li>• Below an average of 45 dBA(Lnight)<sup>6</sup> at night</li> </ul>	<ul style="list-style-type: none"> <li>• <i>CoC:</i> Surface Transportation Noise Policy specifies a target noise level of 60 dBA Leq (24) in most residential areas. The policy also specifies design expectations and responsibility for providing noise attenuation.</li> <li>• <i>CoC:</i> The Noise Barrier Retrofit program prioritizes upgrades based on the areas that would most benefit from barriers.</li> <li>• <i>CoC:</i> New roads are tested for smoothness using the International Roughness Index. Smoother roads last longer and contribute</li> </ul>	<ul style="list-style-type: none"> <li>• <i>London, UK:</i> Has integrated noise management considerations into the policy, planning, and design of the City’s transport, cleaning, planning, highway management, and improvement activities.</li> <li>• <i>Canton of Geneva, CHE:</i> Produced noise maps to measure and understand traffic noise.</li> <li>• <i>Malmo, Sweden:</i> Paved roads with noise-dampening asphalt &amp; reduced speeds to 40km in the City Centre.</li> <li>• <i>Amsterdam, Netherlands:</i> Experimented with closing major traffic routes to private cars to</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate the impacts and costs associated with a potential reduction in road noise target levels to WHO-recommended levels.</li> <li>• Explore increased noise barriers and trees around noisy roads.</li> <li>• Continue upholding smoothness standards and balance road surface/roughness with noise and safety considerations.</li> </ul>

<sup>3</sup> World Health Organization (1999); Guidelines for Community Noise. Source: [Guidelines for community noise \(who.int\)](https://www.who.int/publications/m/item/guidelines-for-community-noise)

<sup>4</sup> Environmental noise. In: Compendium of WHO and other UN guidance on health and environment, 2022 update. Geneva: World Health Organization; 2022 Source: [who\\_compendium\\_noise\\_01042022.pdf](https://www.who.int/publications/m/item/compendium-noise-01042022)

<sup>5</sup> L<sub>den</sub> is an average sound pressure level over all days, evenings and nights in a year.

<sup>6</sup> L<sub>night</sub> is the equivalent continuous sound pressure level when the reference time interval is the night.

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		<p>less noise but are more susceptible to slippery winter conditions.</p> <ul style="list-style-type: none"> <li>• <i>CoC</i>: Community Standards Bylaw prevents waste collection vehicles during nighttime hours (except downtown which allows 6 am to 10 pm).</li> </ul>	<p>reduce traffic flow and noise and to encourage public/active transport.</p> <ul style="list-style-type: none"> <li>• <i>Barcelona</i>: Created “superblocks” road and building forms that reduce vehicle traffic within the neighborhood and in turn reduce traffic noise.</li> </ul>	
<b>Noisy Vehicles</b>	<ul style="list-style-type: none"> <li>• World Health Organization<sup>7</sup> (WHO) reports noise above 140 dBA for adults and 120 dBA for children can immediately cause harm to the ears.</li> <li>• Nighttime disturbances: Individual events over 45 dB(LAmax) should be avoided.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>CoC</i>: Traffic Bylaw states vehicles must not exceed 96 dBA at the point of reception (e.g.: squealing tires, roaring engine, stereo).</li> <li>• <i>CoC</i>: Community Standards Bylaw prohibits loud revving and stereo noise on a property.</li> <li>• <i>CoC</i> Community Peace Officers to support enforcement of the Traffic Safety Bylaw with a new team being trained in Q2 2024.</li> <li>• <i>CoC</i>: Traffic Safety Bylaw amendments to better address vehicle noise are being assessed with a report coming in Q3 2024.</li> <li>• <i>Government of Alberta (GoA)</i>: <a href="#">Vehicle Equipment Regulation</a> requires mufflers without excessive noise and prohibits mufflers that increase the noise made by the expulsion of gasses from the engine.</li> <li>• <i>GoA</i>: The Traffic Safety Act allows municipalities to define what is objectionable noise from a vehicle, methods of measuring noise, and prohibit operating a vehicle where objectional noise is produced.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Toronto</i>: The Noise Bylaw states a vehicle can have a maximum level of 92 dBA.</li> <li>• <i>Edmonton</i>: Bylaws were amended to increase fines to \$1000 for the emission of loud and unnecessary noise from a vehicle. Peace Officers and Police Service enforce City bylaws and Traffic Safety Act regulations.</li> <li>• <i>Winnipeg</i>: Neighborhood Livability Bylaw prohibits repairing, rebuilding, modifying, or testing vehicles within 150m of a residential property. It also prohibits idling a vehicle for more than 10 minutes during quiet hours within 150 meters of a residential property.</li> <li>• <i>Saskatoon</i>: Traffic Noise Sound Attenuation Policy and Noise Bylaw enforce vehicle noise through a graduated fine structure, allowing officers to increase fines with repeat offenses. Fines are different for an individual versus a corporation.</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunities will be described in an update to the Community Development Committee on Automated Systems in June 2024 and in amendments to the Traffic Safety Bylaw in Q3 2024.</li> <li>• Advocacy efforts related to Noise Attenuation could be explored with Alberta Transportation to allow for a more holistic approach across municipalities.</li> </ul>

<sup>7</sup> World Health Organization (1999); Guidelines for Community Noise. Source: [Guidelines for community noise \(who.int\)](https://www.who.int/publications/m/item/guidelines-for-community-noise)

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		<ul style="list-style-type: none"> <li>• <i>Government of Canada: <a href="#">Motor Vehicle Safety Regulations</a></i> require testing of vehicles to ensure they are within specific sound limits.</li> </ul>		
<b>Leisure and Events</b>	<ul style="list-style-type: none"> <li>• WHO<sup>8</sup> suggests limiting sound exposure to 100 dBA averaged over 15 minutes in entertainment venues.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>CoC:</i> The Community Standards Bylaw limits the level of sound emitted from an outdoor concert (65 dBA and 85 dBC over 1 hour at the point of reception of a residence).</li> <li>• <i>CoC:</i> Noise Exemption Permits are available for outdoor major events. The CoC evaluates events on a case-by-case basis and works to mitigate noise complaints.</li> <li>• <i>CoC:</i> Outdoor events in Tomkins Park were evaluated for noise impacts on the adjacent community in 2023. New practices, including live monitoring, are being considered based on study findings in Tomkins Park and some findings will inform courses of action for other outdoor venues.</li> <li>• <i>CoC:</i> Restrictions of certain events in Riley Park due to adjacent hospice.</li> <li>• <i>CoC:</i> Has completed a noise study around some outdoor recreation court-related activities (i.e., pickleball).</li> <li>• <i>CoC:</i> Maintains a distance between new court developments and residential areas based on</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Edmonton:</i> Limit types of activities in certain venues based on impact on the community (ex: outdoor venues with adjacent residential would assess specific noise-generating events e.g.: electronic dance music).</li> <li>• <i>London, UK:</i> Resists the introduction of noise-generating activities such as leisure and entertainment into areas with strong residential character.</li> <li>• <i>Victoria:</i> Developed guidance documents and strategies to reduce noise for retrofitting and developing new recreational courts and spaces for activities (reflecting the existing noise level of communities).</li> </ul>	<ul style="list-style-type: none"> <li>• A review was completed in 2023 to begin to assess sound levels near outdoor music venues and to explore potential improvements to manage sound at high-impact locations. Work is underway related to report recommendations including:             <ul style="list-style-type: none"> <li>• Create sound limits unique to the venue and impacts.</li> <li>• Ensure resources are available to support enforcement.</li> <li>• Build permanent sound monitoring stations at outdoor venues.</li> <li>• Expand the use of new monitoring based on the Event Sound Management Pilot.</li> </ul> </li> <li>• Develop a strategy to manage noise related to all recreation</li> </ul>

<sup>8</sup> Environmental noise. In: Compendium of WHO and other UN guidance on health and environment, 2022 update. Geneva: World Health Organization; 2022 Source: [who\\_compendium\\_noise\\_01042022.pdf](#)

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		the types of courts and the amount of noise the sport generates.		types (e.g.: soccer, basketball, tennis).
<b>Railway</b>	WHO <sup>9</sup> recommendations for railway noise levels: <ul style="list-style-type: none"> <li>• Average below 54 dBA(Lden)<sup>10</sup> over a year;</li> <li>• Below 44 dBA(Lnight)<sup>11</sup> overnight</li> </ul>	<ul style="list-style-type: none"> <li>• <i>CoC</i>: The City has a <i>Freight Rail Corridors Policy</i> and implementation plan to reduce new developments' sound exposure to rail lines in residential areas. This policy states noise levels should not exceed 35 dBA in bedrooms and 40 dBA in all other living areas.</li> <li>• <i>CoC</i>: C-trains crossing bells in residential areas are adjusted to balance both safety and noise impacts on the community.</li> <li>• <i>CoC</i>: Maintenance of C-Train rails is regularly completed to reduce noise.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Burnaby</i>: Building noise attenuation fence around light rail lines in targeted/residential areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate opportunities and costs of additional sound abatement in residential areas.</li> </ul>
<b>Aircraft</b>	World Health Organization <sup>5</sup> recommendations for aircraft noise levels: <ul style="list-style-type: none"> <li>• Average over a year below 45 dBA(Lden);</li> <li>• Nighttime below 40 dBA(Lnight)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Government of Alberta and CoC</i>: Compliance with GoA's Airport Vicinity Protection Areas Regulation in CoC planning processes. The regulation outlines uses that are prohibited within certain locations in Calgary, identified as Noise Exposure Forecast areas, due to potential noise impacts from aircraft flying over communities as they arrive or depart. Sensitive uses were evaluated and reduced in 2020.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>GoA</i>: Airport Vicinity Protection Areas Regulations prevent new subdivisions/redevelopment of residential areas (e.g.: higher density dwelling units) and restrict some land uses (e.g.: schools) based on noise exposure from airplanes flying over communities.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue to coordinate with YYC Airport Authority and the Government of Alberta.</li> </ul>

<sup>9</sup> Environmental noise. In: Compendium of WHO and other UN guidance on health and environment, 2022 update. Geneva: World Health Organization; 2022 Source: [who\\_compendium\\_noise\\_01042022.pdf](https://www.who.int/publications/m/item/who-compendium-noise-01042022.pdf)

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<b>Construction</b>	See all sound types.	<ul style="list-style-type: none"> <li>• <i>CoC</i>: The Community Standards Bylaw does not apply to construction in residential developments during the day-time, work on a City street or public utility, or its contractors.</li> <li>• <i>CoC</i>: Applicants for Noise Exemption Permits are encouraged to use noise-dampening boxes on equipment like generators.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Vancouver</i>: Construction on private property can be completed between 7:30 am and 8 pm on any weekday that is not a holiday, and between 10 am to 8 pm on any Saturday that is not a holiday. Construction is not permitted on Sundays.</li> <li>• <i>London (UK)</i>: Limits noise and vibration from construction activities through the planning consent process<sup>12</sup> (e.g.: Contractor and the City must agree on the working hours and methods used which may generate noise and vibration before starting work).</li> <li>• <i>Toronto</i>: Noise monitoring may be a requirement to receive a noise permit. This is completed by Bylaw Enforcement Officers at an additional charge.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore opportunities to encourage builders and developers to achieve the lowest practical noise levels.</li> </ul>
<b>Residential Noise</b> (e.g.: pets, air conditioners, power tools)	See all sound types.	<ul style="list-style-type: none"> <li>• <i>CoC</i>: The Community Standards Bylaw:               <ul style="list-style-type: none"> <li>• Prohibits use of power tools or motorized garden tools, and powered snow clearing during nighttime hours 10 pm to 7 am. (exceptions apply)</li> <li>• Prohibits use of air conditioner, fan, central vacuum system or generator that causes a continuous sound over 70 dBC during the day and 60 dBC at night (at point of reception).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <i>Vancouver</i>: Use of leaf blowers is regulated (i.e.: can only be operated in specific hours and within 50 meters of residential properties; cannot be used in some areas of the City; and must be “low-noise”).</li> <li>• <i>Ottawa and Toronto</i>: Air conditions cannot exceed 50 dBA at the point of reception.</li> <li>• <i>Toronto</i>: Prohibits use of powered tools from 7 pm to 8 am.</li> <li>• <i>Zurich, CHE</i>: Bylaws include a mid-day quiet hour on weekdays from 12 pm-1 pm. Quiet</li> </ul>	<ul style="list-style-type: none"> <li>• Engage with the public to collect opinions about use of power tools at various hours.</li> </ul>

<sup>12</sup> City of London (2019) Code of Practice for Deconstruction and Construction Sites, Ninth Edition. Source: [Code of Practice for Deconstruction and Construction Sites \(cityoflondon.gov.uk\)](https://www.cityoflondon.gov.uk/what-we-do/our-services/consultation-and-regulation/code-of-practice-for-deconstruction-and-construction-sites)

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		<ul style="list-style-type: none"> <li>• <i>CoC</i>: Responsible Pet Ownership Bylaw requires animal owners to supervise their pets so they do not cause nuisance behaviour including barking. Public education on responsible pet ownership is ongoing.</li> </ul>	time also includes Sundays and holidays (ex: no power tool use).	