



City of Hamilton

**Development of Policy Papers for Phase Two of the
Transportation Master Plan for the City of Hamilton
TRANSPORTATION AND NOISE POLICY PAPER**

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1. INTRODUCTION

1.1 Study Background and Objectives

The City of Hamilton *City-wide Transportation Master Plan* will provide inputs to the *Growth Related Integrated Development Strategy* (GRIDS) and make recommendations to Council on the adoption of a City-wide Transportation Policy that is cognisant of Vision 2020 and other City of Hamilton long-term planning objectives. The project has been divided into three distinct phases. The first phase consisted of the technical calibration of the existing transportation model to reflect current transportation conditions in Hamilton. The second phase, which is the object of this and other policy papers, will focus on the development of 23 policy papers in the following areas: Travel Demand, Urban Development, System Performance, Infrastructure Planning and Infrastructure Financing. Following the completion of the Policy Papers, the City will proceed to develop transportation scenarios (Phase 3 of the project) based upon the results of the policy work performed in Phase 2 and the land use scenarios developed through the broader GRIDS study and will test the efficiency and viability of these scenarios by integrating them into the calibrated model.

This policy paper addresses the issue of **Transportation Noise** in the City of Hamilton. Reducing transportation-related noise is an important part of the City's forthcoming Transportation Master Plan. The remainder of this section describes the sources and impacts of transportation noise. Section 2 reviews current policies that affect the amount of transportation noise in Hamilton. Section 3 illustrates quantitative noise thresholds and describes the transportation network in the City of Hamilton. Section 4 reviews noise mitigation policies from other jurisdictions. Sections 5 and 6 outline policy options for moderating or reducing transportation noise in the City of Hamilton.

1.2 Transportation Noise

Transportation noise, like air pollution, is an unwanted by-product of the movements of people and freight. The "urban hum" of traffic is such a common part of modern life that it often goes unnoticed. In fact, transportation tends to be the dominant source of noise in both urban and rural communities. Transportation noise can come from a variety of sources including roads and traffic, airports, railways and related facilities such as rail yards, maritime shipping and construction.

Transportation noise is often perceived as a nuisance and government programs often consider noise a low priority. Nevertheless, noise is a recognized environmental impact and a type of pollution that can negatively affect public health and a community's quality of life. Some evidence suggests that noise has stress-related health impacts on humans including sleep disturbance and cardiovascular disease¹. Noise can harm property values, disrupt peaceful neighbourhoods and reduce the attractiveness of cultural institutions, parks, recreation centers and natural areas. Transportation noise cannot be eliminated but it can be managed. For these reasons, the City of Hamilton wishes to address noise as part of its Transportation Master Plan. This paper discusses noise mitigation strategies with a focus on implementing noise barriers.

There are three primary issues related to transportation noise where the City could consider policy options:

¹ Basrur, Sheela. *Health Effects of Noise*. City of Toronto: Health Promotion and Environment Protection Office. 2000.

- **Noise Impacts from City Capital Projects:** New or expanded transportation facilities can create additional noise. Noise is a recognized environmental impact and must be studied under provincial law.
- **Noise Impacts on Future Urban Development:** Managing transportation noise can also mean managing the land near transportation facilities to prevent conflicts between transportation and land use activity.
- **Noise Impacts on Established Urban Areas:** In established neighbourhoods where noise is already a problem, barriers, such as noise walls, can be installed to reduce the impact of noise.

It is important to recognize that these three areas of concern are linked. Increased traffic from new urban growth can create more noise on existing roads in established neighbourhoods. This paper addresses these three areas of concern in such a way to take the interconnectivity of growth, traffic and noise into account.

This paper does not address the issue of **vibration** explicitly, although the issues and general policies are similar to noise. The issue of vibration is referenced in Section 5.5.

1.3 Noise Mitigation

Noise barriers are the most common techniques used in noise mitigation programs, also called noise mitigation programs. Noise barriers include noise walls, which are common along expressways in urban areas, and other obstructions meant to reduce noise such as earthen berms, which are common landscaping features in suburban developments. Barriers can be effective at reducing noise but can have negative aesthetic impacts on the surrounding neighbourhood. Barriers can also affect the value of nearby property either positively or negatively. Noise walls can be constructed within the road right-of-way even in tight urban areas. However, they are expensive to construct and are not visually appealing. Berms, essentially walls of earth, can be more attractive than noise walls but require large amounts of space to construct. Both require ongoing maintenance.

Noise travels around small obstructions necessitating barriers alongside a long extent of the transportation facility. To be effective, a noise barrier must cover a significant continuous length of the facility. The right of way, the property on which the facility (e.g. road) is constructed, is generally the best place to construct a continuous barrier. It is often difficult to coordinate a contiguous noise barrier among the many property owners outside the right of way.

There are other techniques to reduce the impacts of transportation noise. Sound proofing for existing buildings can include additional insulation or sound-resistant windows and doors. However, most municipalities will not pay for retrofitting private buildings. Changes to the transportation facility itself, such as a road alignment or elevation, are sometimes taken into account for new facilities, but not are generally too expensive to use for existing facilities. While these and other mitigation techniques should not be forgotten, they are outside the scope of this paper.

2. REVIEW OF EXISTING POLICIES

Transportation noise is largely the result of individual travel decisions over which government has no direct control. Nevertheless, the federal, provincial and municipal government have created a framework of policies to manage noise. This section outlines the roles and policies of each level of government.

2.1 Federal Policy Framework

The federal government plays an important indirect role in managing transportation noise. The Canadian government establishes national policies and standards related to transportation noise and makes information available to governments, businesses, and private citizens. The Canadian government is responsible for a number of initiatives and policies relating to noise through the departments of Environment Canada, Natural Resources Canada, and Transport Canada. Areas of federal involvement include:

- Establishing broad guidelines for inter-provincial transportation networks including airports, railways and navigable waterways, and through overseeing national codes and guidelines to ensure uniformity;
- Reviewing federally funded projects and projects that affect areas of federal interest (i.e., airports, national parks, etc.); and
- Improving public awareness of noise and monitoring its impacts.

The federal government does not usually get involved in local land use and transportation issues.

Federal policies, either in place or pending, which were established to help communities manage the impacts of transportation noise include:

- **Canadian Environmental Assessment Act:** This Act established a process for studying the environmental impacts of projects involving the federal government. It applies only to projects for which the federal government has decision-making authority or provides funding.
- **National Guidelines for Environmental Noise Control:** These guidelines provide techniques for noise measurement, and outline the roles of each level of government in environmental noise control. They also outline the concepts and procedures for developing a noise control program and include information on land-use planning; examples of noise control legislation; and technical reference material including instrument specifications, and measurement, as well as prediction and noise reduction techniques.

In addition to broad policies the federal government issues specific noise regulations for sectors of the transportation industry closely tied to inter-provincial goods movement.

- **Airports:** Regulation of airport operations is an entirely federal matter. Provinces and municipalities have no authority to regulate noise emanating from airports. Noise complaints are registered with and investigated by Transport Canada. To aid municipalities in understanding the noise impacts around airports Transportation Canada developed the *Noise Exposure Forecast* (NEF). The NEF is a noise-forecasting model used to predict aircraft noise, develop noise regulations, and assist in land-use planning

around airports. The federal government has also developed guidelines municipalities must follow for guiding land development around airports. Transport Canada's 1996 document, *Land Use In the Vicinity of Airports*, describes the operational requirements of airports, how surrounding land use affects airports, and establishes guidelines for land uses that would be incompatible with airport operations.

- **Rail Noise:** Federal law requires trains to blow their whistles when approaching a road crossing. While train whistles are an important safety feature they are also disruptive to the surrounding community. The federal government has created a process within the *Rail Safety Act of 2001* for communities to petition for the elimination of the train whistle requirement at individual crossings. In general, a mandatory whistle can be eliminated as long as the road operator, railroad company and Transport Canada agree that other safety features at the crossing, such as gates, will ensure the crossing remains safe.

The federal government has no direct involvement with local land-use decisions. However, the Canada Housing and Mortgage Corporation draws attention to problems associated with transportation noise near residential areas, supports efforts to protect residential areas against the effects of noise, encourages the cooperation of all levels of government to develop ways of alleviating problems associated with noise, and discourages the construction of new residential development on sites which are exposed to high levels of noise. The Corporation has published several documents on reducing the impacts of noise on housing².

2.2 Provincial Policy Framework

The Government of Ontario also plays an important role in managing noise by authorizing and funding transportation infrastructure and service, and through the regulation of land.

The Ontario Ministry of Transportation (MTO) and the Ministry of Environment (MOE) oversee provincial transportation facilities. The MTO is responsible for Environmental Assessments (EA), noise impact studies, and the installation and maintenance of warranted noise barriers along provincial transportation facilities. The MOE is responsible for setting Provincial policy objectives for land use planning and acceptable noise guidelines. Responsibility for enforcing land-use planning, however, has been delegated to municipalities. The MOE also reviews Municipal Class EAs on municipal roadway expansion/retrofit projects and assessments of roadway noise completed by municipalities.

Provincial government policy initiatives in place that directly and indirectly impact transportation noise include:

- **Environmental Protection Act:** In the Environmental Protection Act, sound and vibration are formally recognized as environmental contaminants. This puts noise pollution into the same legal category as air and water pollution. Section 14 of the Act makes it illegal to discharge a contaminant, including noise, into the natural environment if it causes or is likely to cause adverse effects.
- **Ontario Environmental Assessment Act:** The purpose of the Ontario Environmental Assessment Act (OEAA) is to provide for the protection, conservation, and wise management of the natural and human environment. The OEAA requires the preparation of Environment Assessments for most large Provincial and municipal infrastructure projects, unless they have been exempted³. Most municipal roadway projects, for example, must meet the Municipal Class EAs requirements. Noise impact assessments

² Canada Housing and Mortgage Corporation. *Road and Rail Noise: Effects on Housing*. 1981.

Canada Housing and Mortgage Corporation. *New Housing and Airport Noise*. 1981.

³ Ontario Ministry of the Environment. *Class Environmental Assessment for Provincial Transportation Facilities*. 1997 amended 2000.

may be conducted as part of a Class EA process⁴. EA and noise impact studies follow procedural rules for assessing the level and severity of noise created by a new transportation facility and its impacts on the surrounding area. The Ontario government and the federal government are currently working together to harmonize the federal and provincial EA approval processes.

Ontario has also issued several guidelines, regulations and sophisticated technical manuals to help local communities assess and manage transportation noise.

- **Noise Protocol:** A joint *Noise Protocol* from the MOE and the MTO⁵. This protocol applies general approaches and standards to MTO's capital construction program for urban and rural provincial highways. Under the Noise Protocol, outdoor noise levels near a new transportation project should be no louder than 55 decibels (dBs), or the prior ambient noise level, whichever is higher. Projects that increase noise levels more than 5 dBs require an assessment of mitigation strategies. However, if noise increases do not exceed 55dBs, do not require mitigation under the protocol. The protocol states that mitigation is only warranted if it will reduce noises levels by at least 5dBs and does not significantly affect project costs. These standards are often applied to local noise assessments as well.
- **Highway Noise Standards for Provincial Highways:** MTO *Directive (QST) A-1: Noise Policy and Acoustic Standards for Provincial Highways* provides guidance for assessing mitigation strategies. It states that noise control measures should be applied to meet the 55 dB limit or prior ambient noise levels "as is technically, economically, or administratively feasible."
- **MTO Environmental Office Manual:** The MTO *Environmental Office Manual: Technical Areas – Noise*, provides additional information on noise legislation and policies, prediction methodologies; and measurement and mitigation techniques⁶.
- **Construction Noise Guidelines:** Noise from construction is temporary, and largely unavoidable. For this reason provincial guidelines regulate noise output from individual pieces of construction machinery as opposed to a construction site⁷. Construction noise assessments must be conducted in compliance with *Directive QST A-1*, the *Noise Protocol* and the *Environmental Office Manual: Technical Areas – Noise*. If blasting is required, further regulations apply. Vibration impacts from construction activities and are monitored only when deemed necessary.
- **Traffic Vibration Guidelines:** Highway traffic can create ongoing vibrations and noise. Noise can occur when there are bumps in the roadway or vibrations from heavy trucks that cause vibrations in nearby buildings. When specific concerns arise, the MTO Environmental Office is to be contacted.
- **Railway Guidelines:** Canadian National railway, GO Transit, and Canadian Pacific Railway have developed noise guidelines for proposed residential developments adjacent to railways⁸. These guidelines are generally consistent with MOE noise guidelines, but do include specific references to setbacks for different types of rail facilities. For example,

⁴ See the City of Hamilton's *Red Hill Creek Expressway North-South Section Traffic Noise Impact Assessment*, 2003, as an example.

⁵ Ontario Ministries of Transportation, Communication, and Environment. *A Protocol for Dealing with Noise Concerns During the Preparation, Review and Evaluation of Provincial Highways' Environmental Assessments*. 1986.

⁶ Ontario Ministry of Transportation, Quality and Standards Division, Environmental Office. *Environmental Office Manual: Technical Areas - Noise*. (EO-V-10000-00). 1992.

⁷ The MOE *Publication NPC-115 Construction Equipment* contains guidelines for individual pieces of construction equipment.

⁸ GO Transit. *Noise Vibration and Safety Impact Policy*. 1988, updated March 2002. Canadian Pacific Railway. *Proposed Provincial Policy on the Environmental Protection of New Residential Development Adjacent to Railways*. 1983.

CN has a policy of a minimum of 300 m residential setback from rail yards, which is intended to address acoustic issues and ensure an acceptable living environment.

- **Noise Forecasting:** Ontario has developed several planning and forecasting tools to enable local communities to predict and assess noise impacts from future transportation facilities. The *Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT)*⁹ presents the background and description of the official procedure for predicting road traffic noise. The MOE requires the use of this forecasting model to assess noise impacts of new roadway projects and new housing developments, and to establish the ambient noise level criterion for the purposes of benchmarking. Other MOE documents present the methodology for predicting rail traffic noise¹⁰. Both models are incorporated into the MOE's STAMSON computer model package.

Land-use planning can reduce the impacts of transportation noise by separating sensitive land uses (residential neighbourhoods, parks, etc) from loud transportation facilities. The following policies outline the Province's role in shaping land use.

- **Planning Act:** Urban development and the redevelopment of land are subject to the policies provided in the Planning Act. The Act also provides for the MOE to have input into the development process with guidelines and policies regarding noise. However, the MOE has discontinued its review functions relating to land use and this function has been delegated directly to the municipalities. It is the responsibility of the individual municipalities to enforce land-use planning procedures, guidelines and regulations. Within the municipal planning process, the major control devices are official plans, plans of subdivisions, and zoning by-laws¹.
- **Land-Use Policy for Planning Near Special Transportation Facilities:** Several guidelines and policies provide direction relating to sensitive land uses in proximity to transportation facilities such as airports and railway yards.
 - Provincial Policy Statement: The Policy Statement (Section 3 of the Planning Act) provides policy direction on matters of provincial interest related to land-use planning and development¹¹. The statement includes information on the protection of transportation infrastructure and airports from incompatible urban development.
 - Publication LU-131: *Noise Assessment Criteria in Land Use Planning Publication LU-131* published by the MOE in 1997, provides noise criteria guidelines to be used for the planning of sensitive land uses adjacent to facilities such as airports, road and rail corridors and railway yards. This document is intended to assist municipalities in the preparation of applications under the Planning Act.
 - Noise Exposure Forecast System: The 1978 Ministry of Housing document *Land-use Policy Near Airports – based on the Noise Exposure Forecast (NEF) system* provides guidelines on the compatibility of land use in the vicinity of an airport. The Ontario government has taken steps to reduce noise impacts from airport by regulating aircraft equipment and flight paths while preserving airport effectiveness by preventing certain land-uses near airports.
 - Additional Technical Documents: The MOE guidelines for conducting sound level assessments are contained within *Publication NPC-206 Sound Levels Due to Road Traffic (1995)* that includes *NPC-101 Technical Definitions*; *NPC-102 Instrumentation*; *NPC-103 Procedures*; and *NPC-104 Sound Level Adjustment*.

⁹ Ontario Ministry of the Environment. *Ontario Road Noise Analysis Method for Environment and Transportation*. 1989.

¹⁰ Ontario Ministry of the Environment. *Sound From Trains Environmental Analysis Method*. 1990.

¹¹ Ontario Ministry of Municipal Affairs and Housing. *Ontario Provincial Policy Statement*. 1997. For more detail on the Policy Statement see <http://www.mah.gov.on.ca/userfiles/HTML/nts_1_8212_1.html>

2.3 City of Hamilton Policy Framework

The City of Hamilton has a strong framework of existing powers, policies, and initiatives that can be used to reduce the impact of transportation noise. This section presents information on the City's existing powers, policies, and initiatives relating to noise.

As a municipality, the City of Hamilton has either direct or indirect control over many local regulations and issues that impact the choices individuals make that, in turn, create noise.

- The City affects the amount of traveling residents do through zoning and secondary plans that determine the physical organization of the community;
- Zoning laws can also create or prevent conflicts between sensitive land uses and transportation noise;
- The City makes transportation infrastructure decisions that influence the location and severity of transportation noise;
- The City is responsible for passing noise-control ordinances, and implementing and enforcing delegated provincial powers regarding noise control; and
- The City owns and operates local roads and transit service.
- The City owns Munro Airport.

The following City policy documents establish the City's current approach to noise.

- **Vision 2020:** Hamilton's Vision 2020 document emphasises many quality-of-life factors that can be harmed by transportation noise. Residential serenity, public health, enjoyment of natural heritage, privacy, safety, and general community attractiveness can all suffer in the presence of excessive transportation noise.

"As a community, we cherish a clean, healthy environment. We work to prevent ecological degradation. Waste reduction, energy-efficiency and respect for ecological systems characterize all aspects of community life and public private decisions making."

"Human needs for space, privacy, safety, and aesthetic appeal are fulfilled."

"Major roads have minimal noise and pollution impacts on adjacent lands..."

- **Noise By-Law 03-020:** Existing City of Hamilton noise policies include *By-Law No. 03-020 To Regulate Noise* adopted in 2003. This document outlines the City's regulation of noise. It provides definitions, general prohibitions, exemptions, enforcement and administration of noise. It also formally adopts certain technical procedures developed by the province for measuring and assessing noise impacts from stationary and traffic sources. MOE guidelines (NPC-101, 102, 103, 104, 115, 206) that relate to road traffic noise form part of the By-law. This By-law's restrictions on transportation noise only extend to inappropriate operation of motor vehicles and not to the ambient noise created by the lawful operation of motor vehicles, nor to the issue of noise that may be created by future transportation facilities.

- **Municipal Infrastructure:** The City currently funds a variety of municipal infrastructure projects and services. However, the City does not current have a program to guide or fund the installation of noise barrier projects. The City's Public Works Department is in charge of constructing and maintaining municipal roads and "associated infrastructure." Noise mitigation measures such as noise walls require significant capital funding.
- **Hamilton International Airport:** While municipalities are not able to regulate private airports, the City of Hamilton purchased the airport from Transport Canada in 1995, giving the City additional leverage to address noise issues. The private management company that operates the airport does conduct some public consultation on the subject of noise. Between March 2003 and February 2004, Transport Canada found only three noise violations at Hamilton International Airport compared to 38 for Pearson International during the same period¹².
- **Former City of Hamilton Official Plan:** The former City of Hamilton Official Plan (February 2001) included policy direction on noise and vibration. Specifically, the OP states that it is the intend of the plan to minimize the effects of noise and vibration sources from the airport, inter-regional highways and railways for all residents. In this regard, the City will cooperate with agencies to determine acceptable levels of noise and vibration as well as develop design measures to mitigate potential impacts. This policy has been demonstrated many times in the past, for example in working in proximity to rail facilities the City has relied on MOE and CN guidelines for establishing setbacks and noise mitigation facilities.

¹² Transport Canada. *Corporate Offenders Enforcement Action Summaries*, <<http://www.tc.gc.ca/civilaviation/RegServ/Enforcement/Publications/Corporate/summary.htm>> Accessed April 11, 2004.

3. SUPPORTING INFORMATION AND ANALYSES

3.1 Quantitative Noise Thresholds

Examples of Sound Levels from Various Sources

To provide perspective on numerical decibel levels, Exhibit 3.3 illustrates the intensity of noise generated by various sources.

Exhibit 3.1: Decibel Levels¹³

Decibel Level	Sounds Like
130	Jet Take Off
100	Jack Hammer
90	Busy Street
65	Business Office
40	Living Room
25	Bedroom
0	Threshold of Hearing

Accepted Noise Thresholds for Mitigation

The MOE has developed guidelines to assess if outdoor noise is loud enough to warrant mitigation measures. These thresholds, shown in Exhibit 3.1, are generally accepted.

Exhibit 3.2: Outside Noise Thresholds for Residential Areas¹⁴

Decibel Level	Response
Less than or equal to 55dB	No response required
Between 55dB and 60dB	Mitigation should be considered
Above 60 dB	Mitigation techniques should be used where technically, economically and administratively feasible.

Perception of Changes in Noise Levels

Exhibit 3.2 illustrates established general thresholds for how people perceive changes in noise levels. These guidelines can be used for either increases or decreases in the decibel levels to which people are exposed.

¹³ City of Hamilton, Planning and Development Department. *Report to Mayor and Members Committee of the Whole, Noise By-Law (PD02166)*. September 13, 2002.

¹⁴ MOE. *Noise Assessment Criteria in Land Use Planning: Requirements, Procedures and Implementation*. 1997.

Exhibit 3.3: Impacts of Changes in Decibel Levels¹⁵

Change in Decibel Level	Impact
Less than 3dB change	Considered insignificant due to imperceptibility
Between 3dB and 5dB change	Considered a just-noticeable difference
Between 5dB and 10dB change	Considered marginally significant
Over 10dB change	Considered significant [perceived as doubling (halving) of sound exposure]

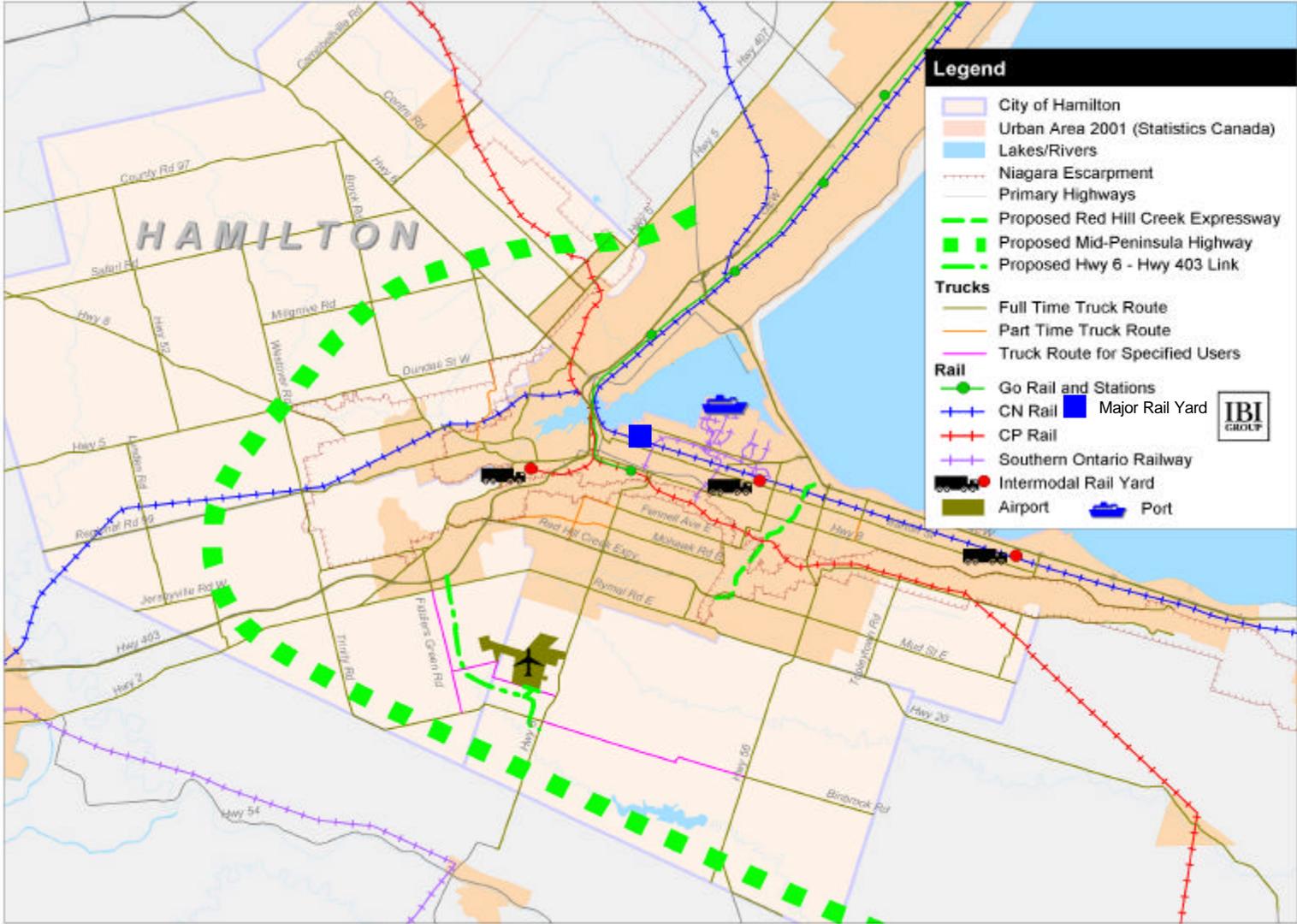
3.2 Hamilton Transportation Network

As illustrated in Exhibit 3.4, an extensive transportation network that passes directly through heavily populated urban areas serves the City of Hamilton. Unfortunately, while providing a highly level of accessibility, this creates ample opportunities for transportation noise to harm the quality of life in Hamilton.

- **Road Transportation:** The City of Hamilton’s network of city streets, major expressways and arterial roads promotes easy access for cars and trucks within the city area and beyond.
- **Air Transportation:** The City of Hamilton is serviced by the John C. Munro International Airport, an emerging air courier and cargo destination airport.
- **Railway Transportation:** CPR, CN, GO Transit and Amtrak pass through the City of Hamilton. The Southern Ontario Railway (SOR) is a regional carrier that serves the port and Nanticoke. Both CPR and CN have connections in all directions including links to Windsor, Detroit and Chicago to the west, and Montreal and Halifax to the east.
- **Marine Transportation:** Marine shipping from Hamilton Harbour, one of the busiest ports on the Great Lakes, connects Hamilton through the St. Lawrence Seaway to international shipping lanes and the Upper Great Lakes.

¹⁵ The City of Hamilton. *Red Hill Creek Expressway North-South Section Traffic Noise Impact Assessment*. 2003.

Exhibit 3.4: Hamilton Strategic Transportation Network



4. REVIEW OF PRACTICES IN OTHER JURISDICTIONS

As discussed previously transportation noise comes from new transportation infrastructure, conflicts between urban growth and existing transportation facilities, and transportation facilities in established urban areas.

All Ontario municipalities are required to assess noise impacts from new roads and develop mitigation strategies during a municipal class EA. Because a municipal class EA is the same for Hamilton's peer communities, it is not discussed in this section. Similarly, all Ontario municipalities are granted the same powers to regulate land by the Planning and Municipal Acts. However, no examples of proactive policies geared toward reducing conflicts between transportation noise and future development were found developed. Finally, several communities have developed systematic programs to install noise barriers in existing urban areas. Because Hamilton does not currently have an overarching noise barrier policy this concept warrants closer scrutiny. This section focuses on reviewing noise barrier programs in peer communities.

Communities establish official policies to ensure a uniform approach to identifying the most important needs and dealing with them equitably in light of available resources. Such policies also ensure transparency in the process and provide a documented resource for officials and residents alike to turn too. This makes the process clear and reduces the chances for misunderstandings. Many of the municipal noise mitigation programs now active in Ontario were based on a model program outlined in the Provincial Local Improvements Act. The program model established the role of municipal governments in undertaking requests by residents for noise walls and allowed municipalities to share the cost of noise barriers with the ratepayers who initiated the project. The Municipal Act superseded the Local Improvement Act in January 2003. The Municipal Act still permits municipalities to create a noise mitigation program, although it does not specify a program model or provide any funding.

4.1 Central Ontario Municipalities

Noise mitigation programs in several Ontario municipalities were examined for this paper including the Regions of Halton, Peel and Waterloo as well as the Town of Oakville. Common elements include:

- **Rational Program Structure:** In Ontario, many municipal noise mitigation programs took a strategic approach to responding to resident complaints and developed structured programs that methodically assess the noise impacts, determine if mitigation efforts are warranted, develop responses, and prioritize projects. Most of these programs were modeled on Local Improvement Act and are very similar.
- **Technical Guidelines:** Most municipal noise assessment programs refer to MOE technical guidelines (discussed previously) for measuring and assessing noise impacts and alternative mitigation solutions.
- **Cost Sharing:** All programs reviewed required impacted landowners to contribute to the cost of noise barriers. One major difference between municipal programs is the amount of additional funding local ratepayers are required to contribute to the project. For example, the Region of Halton requires 25% of the cost of noise barriers to be contributed by local ratepayers, while the Region of Peel requires 50%.

4.2 The Region of Halton

The Region of Halton's *Noise Abatement Policy for Regional Roads (Retrofit Locations) and New Developments*¹⁶ exemplifies the municipal approach to noise barrier programs. The policy provides a structured decisions-making process and funding to install noise barriers along municipal roads. The program contains technical processes for identifying noise problems, assessing the impacts, developing appropriate mitigation measures, and prioritizing solutions. The program imposes technical and financial criteria on each request to assure an effective investment. Halton's program establishes:

- **The Region's responsibility for noise barriers:** Halton's policy is limited to noise emanating from municipally owned transportation infrastructure and does not extend to railways, provincial roads or other sources of noise not directly owned by the Region. Halton acknowledges that other levels of government have policies in place (Environmental Assessment Act, etc.) to deal with these noise sources.
- **A process for handling resident requests:** Residents must submit an application to enter the program. The application must come from adjacent property owners.
- **Criteria for assessing requests:** The policy identifies noise sources and sensitive areas that qualify for protection. It also establishes the technical and financial criteria that must be met for the installation of noise barriers. Halton's policy follows MOE noise assessment guidelines.
- **A Method for determining appropriate solutions:** The Region's policy focuses on providing noise walls. However, it is sensitive to cost and aesthetics and requires an assessment of all potential noise mitigation strategies before adopting a decision. Solutions must reduce the noise impact by at least 5 dBA to be considered effective.
- **A Method for prioritizing and funding noise barriers:** The prioritization of requests is based on needs, costs, benefits, and the number of residents shielded from noise as derived from the technical criteria. Funding for high-priority projects is limited to the Region's budgetary capacity for noise barriers. Projects are also partially funded by residents through a special property tax assessment.

While Halton's policy is aimed at publicly financed retrofit measures for existing roads near existing homes, the policy stipulates that if a new region-owned road is built near existing houses, noise mitigation, if necessary, must be included in the project. Furthermore, the policy requires homebuilders to follow similar standards in providing noise mitigation measures in new developments near existing roads.

¹⁶ Date unknown.

5. IDENTIFICATION OF POLICY OPTIONS

This section identifies policy options for the three areas of transportation noise: new infrastructure such as road widenings, conflicts between urban growth and transportation noise, and noise barrier programs for already developed areas.

5.1 Reducing Noise Impacts from City Capital Projects

When the City develops a significant capital project, such as the widening of a road, the project must be developed using a Municipal Class Environmental Assessment process. This process is used to identify and measure the impacts on the surrounding human and natural environment. Noise is one of the environmental impacts that must be assessed in a Municipal Class EA.

In the absence of specific noise assessment requirements in the City of Hamilton, the noise assessment methods and criteria set out in the MOE/MTO Joint Protocol seem the most applicable for new City capital projects. The evaluation of noise impact according to the Joint Protocol is chiefly based on the change in the average 24-hour noise level from the future “no-build” to the future “build” condition. Low impact is defined as an increase of less than 5 dB above existing sound levels. Moderate impact is defined as an increase of 5 to 10 dB, and high impact is defined as an increase of more than 10 dB. It should be noted that the MOE/MTO Joint Protocol is applicable guideline when determining noise impact as part of the Municipal Class Environmental Assessment Process. Because the Municipal Class EA is already required for capital projects, further policies are not necessary.

Although additional policies are not required the City can continue to use its own planning and administrative processes to ensure that noise from municipal activities continues to be addressed. The City should continue to recognize noise as an environmental impact in the Official Plan and the Transportation Master Plan and consider providing training for City staff on the appropriate strategies to mitigation transportation noise.

5.2 Reducing Noise Impacts on Future Urban Development

New urban development can increase the conflicts between people and transportation noise. Growth usually means more traffic and more noise. By putting housing near roads that are already loud urban growth can also create noise problems even when the amount of sound does not actually increase. Requests for noise barriers in developing areas in addition to established neighbourhoods could strain the City's financial resources. There are low-cost regulatory steps the City can take to prevent future conflicts between transportation noise and new developments. The City already utilizes these approaches to some extent.

- **Noise Barriers for New Residential Development:** When new development places housing in proximity to existing transportation facilities, the City can require developers to conduct noise impact studies and provide noise mitigation and/or structural soundproofing. Such requirements could be made part of the development approval process. This would ensure new residential developments provide the same level of residential serenity that the City is working to provide in established neighbourhoods.
- **Land-Use Strategies to Reduce Noise Impact:** The City could use the MOE's *LU-131* land use planning guidelines to incorporate noise sensitivity into zoning and planning initiatives. This would require the City to develop an agency to review land-use planning applications, determine whether or not a noise study is required, and review the analysis. Land-Use responses can also include mandating sufficient distance between transportation noise sources such as roads, airports and rail

corridors and yards and sensitive uses such as residential development. This must be done in a way that recognizes the need for setbacks for sensitive uses, but also does not result in development being completely restricted from areas where intensification would help the City meet its objectives for more compact, transit supportive development.

It is particularly important that the City go above and beyond minimum setback requirements for residential development adjacent to the airport. Historic experience has shown that municipalities often under-predict the potential for airports to expand (e.g. in the case of the former Malton Airport in Toronto which grew to become one of the largest airports in North America). If proactive, the City of Hamilton can avoid future problems associated with residential development and the airport.

5.3 Reducing Noise Impacts in Established Areas

The City could consider establishing a formal program to examine requests for noise barriers. Even if transportation noise is not currently a major concern, it may become increasingly important in the future. An established program can help to ensure equity, clarity and transparency in the process and reduce the potential for confusion. Such a process would be similar to the Region of Halton program and the Municipal Class EA process. This program should, at a minimum assess the severity of the problem, identify the appropriate response, and prioritize and fund projects. The following four steps illustrate how such a program should be structured.

- **Establish Responsibility for Responding to Resident Requests** – Projects should be initiated by a resident request. The City should identify the appropriate department and the responsibility of tracking and responding to requests to a single staff person. It should be made clear that all requests for noise barriers should be addressed to that single point of contact.
- **Assess the Noise Problem** - The first challenge for the City is to determine the extent of the noise problem using predetermined qualitative or technical standards. Qualitatively, requiring a neighbourhood petition before further assessment can ensure valuable resources are only used to respond to significant problems with broad local support. If, for example, eight out of ten residents on an affected street feel the noise is not severe enough to warrant a noise wall, the process does not move forward.

The City should also rely on measurable technical standards (decibel thresholds) to determine if complaints warrant mitigation. With *By-Law 03-020* the City has already adopted the MOE's technical methodology for measuring and assessing the impact of traffic noise. The MOE recommends that constant noises above 55dBA should be mitigated. The MOE standards are common in municipal noise mitigation programs. The City can adopt the 55 dBs threshold to assess requests.

- **Identify the Appropriate Response:** The City should determine what types of mitigation techniques it is willing to fund. Some communities only fund the construction of basic noise walls. Others consider neighbourhood aesthetics and sometimes use other mitigation measures.

The City should use a predetermined process to determine the best mitigation technique based on an analysis of the costs and benefits of several potential solutions. The MOE recommends that only noise mitigation projects that can reduce noise levels by at least 5 dBs should be funded. The City could adopt a similar minimum standard to ensure effective solutions.

- **Prioritize Projects:** Due to financial limitations the City should adopt a rational method of prioritizing projects based on their costs and benefits. Rational programs ensure more effective use of funds than case-by-case solutions, especially when noise

barriers are popular. The ranking of projects can be based on any combination of the following criteria:

- **Need:** Severity of current noise impact based on decibel levels and/or number of residents impacted;
- **Cost:** The cost of developing and implementing the recommended mitigation strategy, as well as any side effects of the mitigation measures themselves; and
- **Benefits:** Total reduction in decibel levels anticipated, and/or number of residents protected.

By establishing predetermined criteria to prioritize individual projects based on costs/benefits the City can ensure an effective use of limited funds.

- **Funding and Implementation:** Local funding is crucial for noise barriers as the Provincial and federal governments do not fund noise barriers measures along municipal roads. Cost sharing is the most common local approach to financing noise barriers. In a cost sharing arrangement the capital cost of an infrastructure project is split between the municipality and the property owners who benefit directly from the project. Typically the municipality pays for the noise barriers and then levies a special property tax assessment to collect the property owners' contribution. Cost sharing can be set at a fixed ratio, or property owners can choose to contribute additional revenue to speed implementation. This mechanism allows for projects with strong community support to move quickly through the process and reduces the number of controversial proposals. However, allowing variable cost sharing raises issues of fairness as wealthier neighbourhoods can contribute more than less affluent parts of the community. A single fixed ratio of cost sharing can offset costs to the City, reduce the number of frivolous applications, maintain a sense of fairness, and preserve a strategic approach to reducing noise throughout the city.

Policies designed to manage noise must recognize the limits to available funding and staff time. Consequentially, noise barrier programs endeavour to use available resources as effectively as possible by taking a strategic approach to assessing the severity of each request, developing appropriate responses, and prioritizing projects for funding based pre-established criteria.

5.4 Ownership of Noise Barriers

Determining ownership and responsibility for noise barriers is an important facet of maintaining the community's infrastructure. The responsibility for ongoing maintenance and replacement should be established before barriers are erected. Barriers built on City-owned rights-of-way are clearly the City's responsibility, just as barriers along provincial highways are the responsibility of the Province. However, noise barriers constructed independently on private property present a challenge in terms of responsibility and uniformity. This section explores the issues involved with private noise barriers.

City should have the authority, through the zoning by-law, to restrict or mandate guidelines for private barriers. This may extend to noise walls and earthen berms incorporated into landscaping. Private barriers have the advantage of being installed quickly and reducing the financial burden on the City. However, allowing private barriers could lead to a network that is less effective and inconsistent in appearance. Ongoing responsibility for private barriers is also a concern. Allowing private barriers could raise expectations that the City will maintain the barriers after the developer leaves. In addition to concerns about conflicting construction standards and effectiveness private barriers may be located on inaccessible private property. The City cannot assume liability for noise walls that it is not free to maintain. Furthermore, it is not clear if private noise barriers are in high demand. Limited to the length of the property alongside the transportation facility, private barriers

may simply not be big enough to effectively reduce noise. However, noise barriers are being incorporated into new housing developments as amenities.

There are several options to private participation in the construction of new noise barriers.

- The City can allow property owners to erect noise barriers with minimal zoning regulation to reduce negative visual impacts on neighbouring property. This leaves the noise barrier forever the property owner's responsibility. This option may not be desirable because of the lack of uniformity. It may also not be effective in situations with numerous property owners.
- The City can mandate strict standards for barriers on private property to ensure uniform safety, effectiveness, and appearance. For large new developments this option may effectively reduce noise and maintain uniformity while lowering costs to the City.
- The City can allow property owners to pay the City to erect City-owned barriers in the public right of way. This option ensures uniformity and establishes public ownership and responsibility for the barrier.

If the City is to assume ownership of existing barriers on private property the only workable option may be for the property owner to cede the necessary property to the City in order to extend the public right of way to encompass the existing barrier. Another possibility is for the City to install additional noise barriers in the public ROW on the condition that the property owner removes the earlier barriers. The second option may be more desirable as it maximizes the use of the public right of way while leaving taxable property in private hands.

Clearly the legal and technical implications of ownership are complex. Although the number of existing private barriers is not known the City should establish some formal guidelines for taking possession of them if necessary. Furthermore, having rules in place to guide the responsibility for future barriers will prevent any problems from growing.

5.5 Other Policy Areas

Additional relevant policy options that are beyond the scope of this paper include:

- **Construction Specifications:** Advances in construction materials and processes should be taken into account when establishing technical noise mitigation guidelines;
- **Non-Municipal Transportation Facilities:** One fundamental issue is how the City will respond to noise caused by non-municipal facilities, such as provincial expressways or railways. In general, the City does not have the authority or responsibility to respond to noise problems caused by such sources. Specifically the City cannot construct noise walls in Provincial or railway rights of way with express permission from those property owners. However, the City may choose to leave open the possibility of partnering with the responsible institutions to address noise problems. The City also continually face challenges in dealing with often challenging (but provincially mandated) requirements placed on development with regard to setbacks from railway facilities, for example in the waterfront area. Further work is required to establish a common approach for addressing these issues, including an improved understanding of trade-offs as well as improved dialogue with the railways. One area where the City does have a role to play related to non-municipal transportation facilities is ensuring land uses proposed in proximity to these facilities are compatible. This is discussed in Section 5.2.
- **Vibration:** Vibration is an issue similar to noise in that it is important to ensure that sensitive land uses are not located close to facilities that generate vibration, for

example rail corridors. CN and CP both have policies related to vibration; for example CN requires vibration to be assessed for sensitive land uses within 75 m of rail corridors to ensure maximum criterion of 0.14 mm/sec RMS is not exceeded. The City should continue to work with railways to ensure vibration is considered in all new projects.

6. RECOMMENDED POLICIES

Based on the above review, the following policies are recommended for consideration in the Transportation Master Plan:

<i>Recommended Policy</i>
Develop and adopt a noise mitigation program and associated enforcement measures for all roads.
<i>Implementation</i>
<ul style="list-style-type: none"> • Develop and adopt an official policy for addressing transportation noise in a strategic manner. • Establish a method for tracking resident complaints of traffic noise and noise generated by municipal transportation facilities. • Adopt MOE guidelines for developing a noise assessment system. • Establish a funding policy for noise mitigation projects. • Determine, on an annual basis, the available resources for noise assessment planning and implementation, including staff resources and funding. • Review and assess options for the City to assume control of noise walls on private property. • Consider alternatives to reduce the source of noise (e.g. reducing traffic speeds through traffic calming) prior to considering physical mitigation measures.

<i>Recommended Policy</i>
Reduce the impacts of noise on future development.
<i>Implementation</i>
<ul style="list-style-type: none"> • Use the Official Plan and zoning by-laws to strategically prevent sensitive land uses from developing near loud transportation facilities, in particular residential and recreational activities should be discouraged near railways, airports and marine ports. Policies should be rigidly enforced and anticipate future expansion of facilities. • When warranted the City can require developers to include noise mitigation measures (berms, noise walls, sound proofing) in new residential developments as part of the regular development criteria. Criteria for new developments should be commensurate with standards for established areas.

7. IMPACTS OF POLICY OPTIONS

7.1 Assessment Factors

Assessment of policy options is based on factors for achieving sustainable growth and development across all of the policy papers developed in this project. They fall under the three major categories of **social, economic and environmental** impacts, and they are described briefly below.

Exhibit 7.1: Assessment Factors

Impact	Acts on	Description (or examples)
Social	Residential communities	Improves quality of life in neighbourhoods
	Safety and security	Reduces collisions; improves personal safety and security
	Ease of implementation & governance	Provides clarity, measurability, accountability
Economic	Development	Attracts employment, capital, optimal use of transportation infrastructure capacity, and future land use
	Land value	Increases land value, or does not decrease land values
	Operating and capital costs	Reduces or defers public and private costs of transportation capital (construction or acquisition of fixed infrastructure and rolling stock) and operations (maintenance, enforcement, delay, fuel, etc.)
	Congestion	Improves traffic flow (or slows deterioration thereof)
Environmental	Air quality	Reduction of Criteria Air Contaminants
	Noise and vibration	Minimizes noise impacts
	Natural environment	Improves water quality, green spaces, flora and fauna etc.

The rating system that will be used to apply these criteria is a visual five-point scale, to reflect a range from strong positive impact to strong negative impact. **(+, +, 0, --, --)**

+ Represents the strong positive impact, **0** represents absence of significant impact either way, and **--** represents strong negative impact.

7.2 Summary of Evaluation

The factors described in Section 7.1 are applied to the policy options described in Section 6. The results of a preliminary qualitative assessment using the rating scheme described previously are provided in Exhibit 7.2.

Exhibit 7.2: Impacts of Policy Options

Policy Option	Social			Economic				Environmental		
	Residential Communities	Safety and Security	Ease of Implementation and Governance	Development	Land Value	Operating and Capital Costs	Congestion	Air Quality	Noise and Vibration	Natural Environment
Develop and adopt a noise mitigation program for local roads in developed urban areas.	+	0	+	+	+	-	0	0	+	+
Reduce the impacts of noise on future development.	+	0	+	+	+	0	0	0	+	+