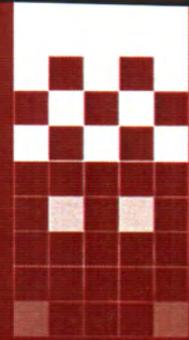




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FACULTY OF APPLIED SCIENCES



BOOK OF ABSTRACTS

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(ICAS2015)

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8-9 May 2015
Tetova, Macedonia

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Control and management of environmental noise

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Abstract

The negative effects caused by noise in the society are observed in the literature by several authors (Berglund & Lindvall, eds, 1995). The negative effects of noise can be direct (hearing loss, speech difficulties, sleep disorder), indirect or secondary effects, such as long-term effects on physical and mental health as a result of long-term disturbance of noise exposure and prolonged sleep disorder.

Considering that the World Health Organization (WHO 1947) defines health as complete physical, mental and social wellbeing and not merely the absence of disease, commitment to the community in the control and management of environmental noise is a quite clear. Job (1996) highlights the indirect adverse health effects of noise, as probable cause for the reaction of society, in order to take appropriate measures for its control. The common goal is to satisfy necessity that all activities in the community must comply with the desire of people to quietly society.

Operational objectives include requirements for the protection, promotion and improvement of quality of life, or the need for environmentally sustainable development, reducing health risks and prevent environmental degradation.

This policy seeks to promote environmental well-being by preventing and minimizing noise.

In this paper will be given a review of main processes involved in the implementation of policy for control and management of noise level.

Keywords: control, management, noise level, environmental

1 Introduction

Environmental noise is a worldwide problem. However, the manner of dealing the problem differs immensely from country to country and is very much dependent on culture, economy and politics. But the problem persists even in areas where extensive resources have been used for regulating, assessing and damping noise sources or for creation of noise barriers. For example, huge efforts have been made to reduce traffic noise at source. In fact, today's cars are much quieter than those manufactured ten years ago, but the traffic volume has increased so much that the effect of this effort has been wiped out and the annoyance level has increased. Manufacturing quieter cars might have eased the problem for a period but it certainly hasn't removed it.

The Green Paper estimates that, in terms of the number of people affected by noise, 20% of the population (i.e., 80 million people) suffer from unacceptable noise levels that cause sleep disturbance, annoyance and adverse health effects. An additional 170 million citizens in Europe live in areas where noise levels cause serious annoyance during the daytime. In financial terms, environmental noise costs society an estimated 0.2% to 2% of the Gross Domestic Product. Even the lower of these figures represents an immense cost [1].

Increasing noise in urban areas is quite normal phenomenon with increasing number of motor vehicles. Participation of faulty and old vehicles in traffic is cause of increased traffic noise. Today automotive industry pays more attention to the design and production of vehicles that will create less noise. Particular attention is paid to reducing noise in the passenger cabine, in which direction are achieved good results. But the noise that is transferred of the vehicle to the environment is still not resolved satisfactorily. Old and defective vehicles present especially big environmental polluters. In our country because of the low standard are used vehicles aged over ten years where the exploitation life is at an end and that represent environmental contaminants in many ways [2].

2 Scope of the Policy for Control and Management of Environmental Noise

The policy is specifically aimed at assessing noise from wide range of environmental noise sources scheduled under the Law on Environmental Noise Protection (Official Gazzete on Republic of Macedonia, No.79/07, 163/13). Local government is an independent regulator for noise under the legislation, and thus has discretion in dealing with noise within its area of responsibility. The policy is designed for large and complex environmental noise sources and specifies substantial monitoring and assessment procedures that may not always be applicable to the types of sources councils need to address. However, local government may find the policy helpful in the carrying-out of its land-use planning responsibilities (for example, the setting of targets in local and regional environmental plans).

In the context of physical planning, the term **initial noise** is used to denote the noise at a certain point before changes, for example, the extension of a production facility or building of barriers, are implemented. A variety of methods are used to assess specific noise. These methods can range from the drastic, such as the shutting down of a production plant to isolate the residual noise, to sophisticated systems that include simultaneous and correlated measurements at several points close to and away from the source.

The uncontrolled growth of cities leads to neighborhoods close to industrial facilities or airports, which creates etc. mixed zones.

Environmental noise occurs for several reasons:

- noise from residential buildings;
- noise from nearby industrial facilities;
- traffic noise.

The noise in residential buildings occur as a result of:

- noise from domestic electrical appliances;
- speech of people in the apartment;
- noise from neighboring apartments;
- noise that comes from streets;
- noise from installations in the building where the apartment.

The street noise in urban areas is a major problem, and occurs as a result of:

- The impact of loading and unloading of goods in the nearby shopping facilities;
- Noise from nearby facilities such as café bars, restaurants, music clubs;
- Noise from construction machines.

These noise sources are represented differently in urban areas, which is more evident presence of noise in the central urban area.

Traffic noise is among the group of the biggest environmental pollutants. Traffic is a major source of noise and it accounts for around 80% of the noise as factor that pollutes the environment. The increase in the number of cars that raises the modern pace of life leads to increased noise.

3 Application of the Policy for Control and Management of Environmental Noise

The assessment procedures in the policy for control and management of environmental noise can apply to any one of the following three situations [3]:

- new development impacts—for example, new industrial premises proposed near an existing residential area;
- modification of an existing development and its impact—for example, proposed expansion of an existing industrial premises;
- noise associated with existing development.

In summary, noise management involves the following main steps:

1. Determining the project specific noise levels for intrusiveness and amenity that are relevant to the site or the area.
2. Measuring and determining existing background and ambient noise levels, using the method relevant to the expected level of impact.

3. Where the proposed development is expected to produce annoying noise characteristics, adjustments are to be applied to the noise levels produced by the development in question.
4. Predicting or measuring the noise levels produced by the development in question, having regard to meteorological effects (such as wind, temperature inversions).
5. Comparing the predicted or measured noise level with the project-specific noise levels and assessing impacts.
6. Considering feasible and reasonable noise mitigation strategies where the project-specific noise levels are exceeded.
7. Negotiation between the regulatory/consent authority and the proponent and between the community and the proponent to evaluate the economic, social and environmental costs and benefits from the proposed development against the noise impacts.
8. The regulatory/consent authority sets statutory compliance levels that reflect the achievable and agreed noise limits for the development.
9. Monitoring of environmental noise levels from the development to determine compliance with the consent/licence conditions.

Figure 1 provides an overview of the main processes involved in applying the policy. The flow charts in Figures 2 to 4 present a step-by-step guide to how the policy works, with references to relevant sections in the policy.

4 Mitigating measures to environmental noise level

When the predicted noise level exceeds the project specific noise levels, mitigation measures that will reduce noise levels to meet the project-specific noise levels need to be considered. The degree of noise impact quantifies the extent of mitigation required, and points to an appropriate mix of noise control measures to be adopted as a mitigation strategy. This policy focuses on achieving the desired environmental outcomes—there is no prescribed management or mitigation strategy to achieve the project-specific noise levels. In this way, the noise source manager has maximum flexibility in controlling noise.

Below are listed mitigation and management measures might be appropriate for particular types of development associated with specific noise problems. Essentially, there are three main mitigation strategies for noise control:

1. Controlling noise at the source. There are two approaches: Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA).
2. Controlling the transmission of noise. There are two approaches: the use of barriers and land-use controls—which attenuate noise by increasing the distance between source and receiver.
3. Controlling noise at the receiver.

Noise-source controls includes:

- enclosing the source—the design of the enclosure and materials used to absorb sound will affect the attenuation achieved
- silencing exhausts—muffler design and noise barrier systems
- active noise control, effective on a limited range of noise sources
- times of operation.

Controls along the sound-transmission path includes:

- noise barriers—more effective if near source or receiver; effectiveness also controlled by materials used (reflective or absorptive) and by height
- mounds, bunds and trenches
- site design to maximise the distance from the critical noise source to the receiver, and with intervening buildings to act as barriers.

Noise control measures at noise receiver includes:

- insulation
- double-glazing of windows and use of air conditioning
- acquisition.

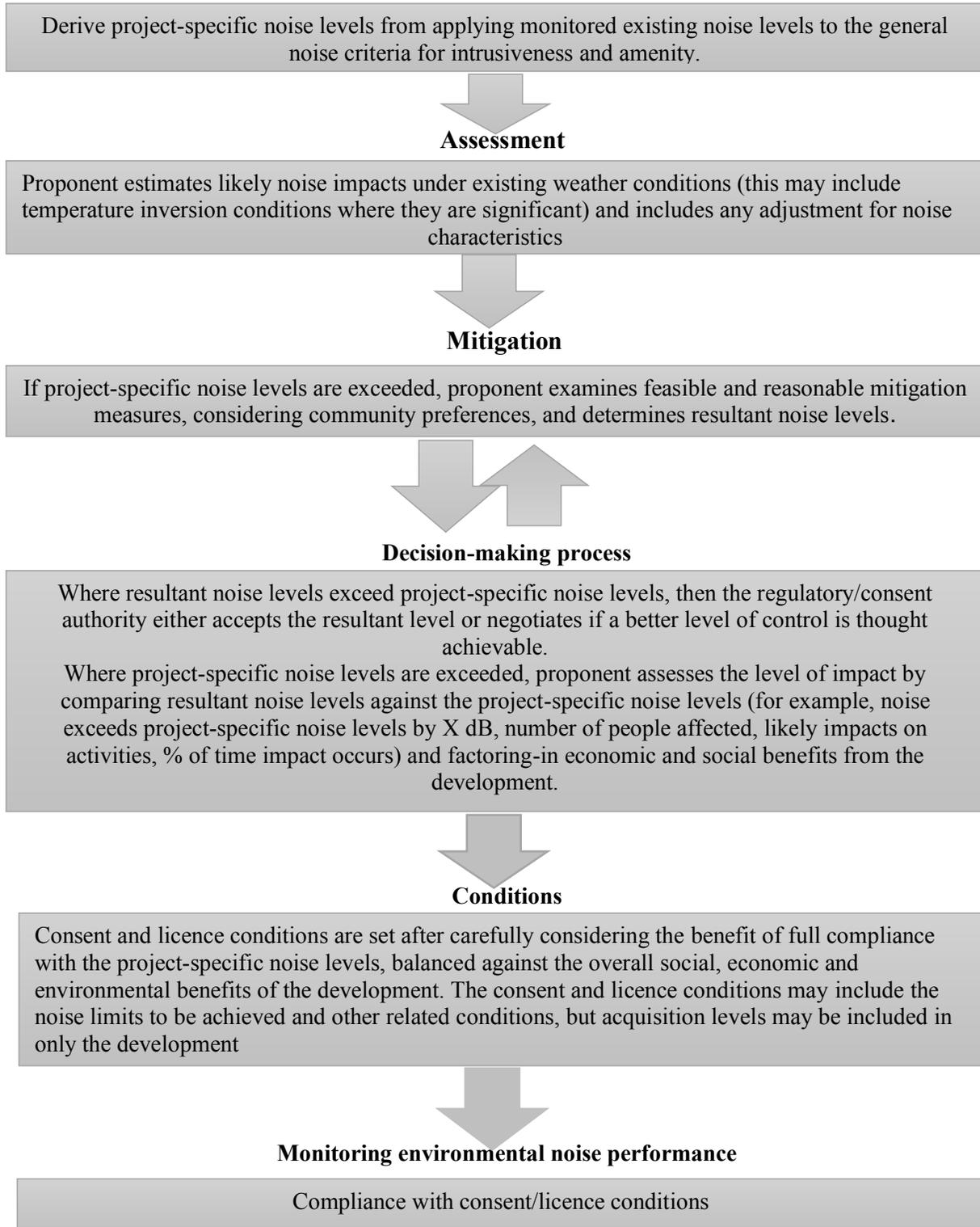


Fig. 1. Main processes involved in applying the policy for control and management of noise level

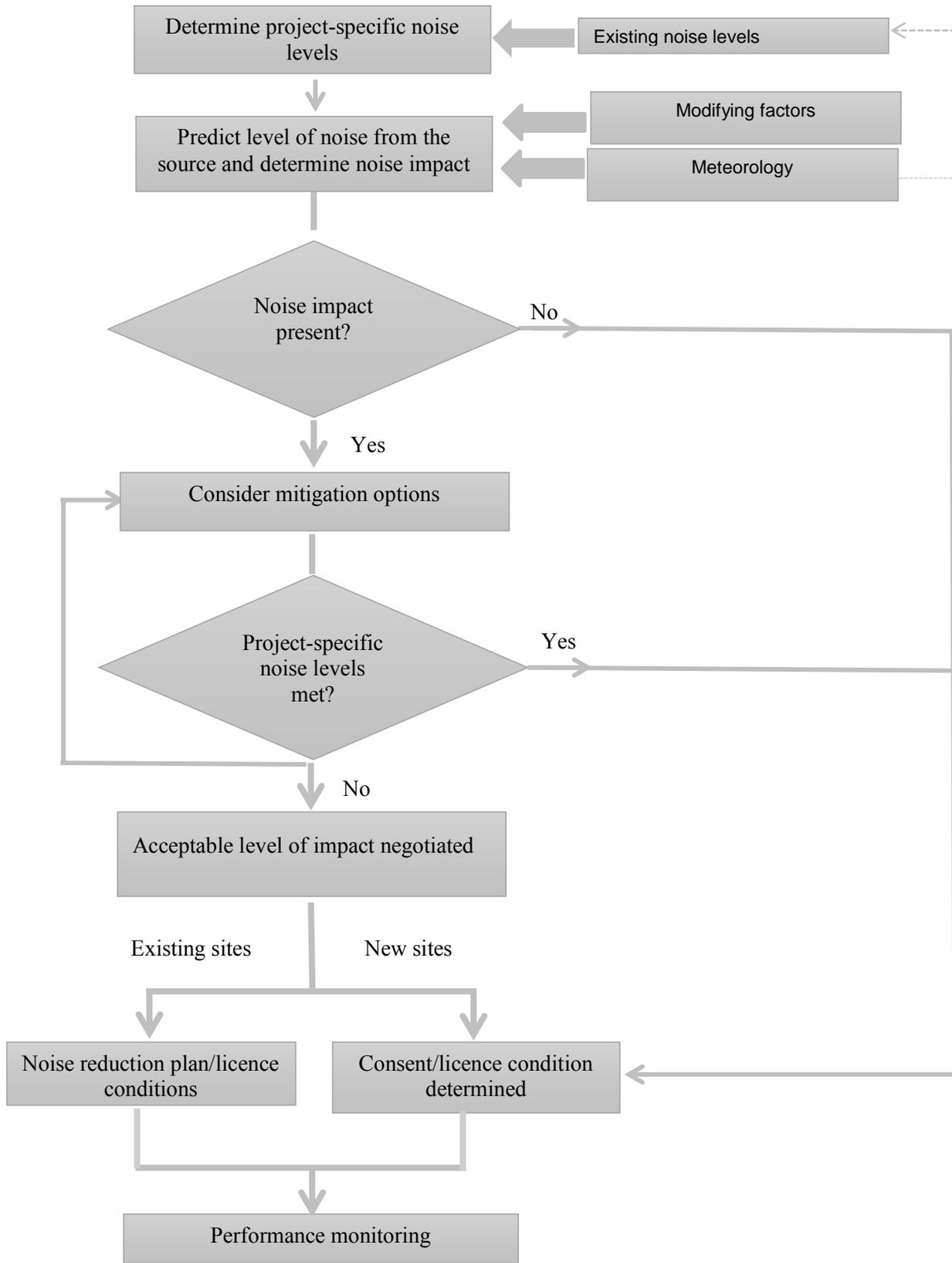


Fig 2 The overall process of assessing and managing noise impacts

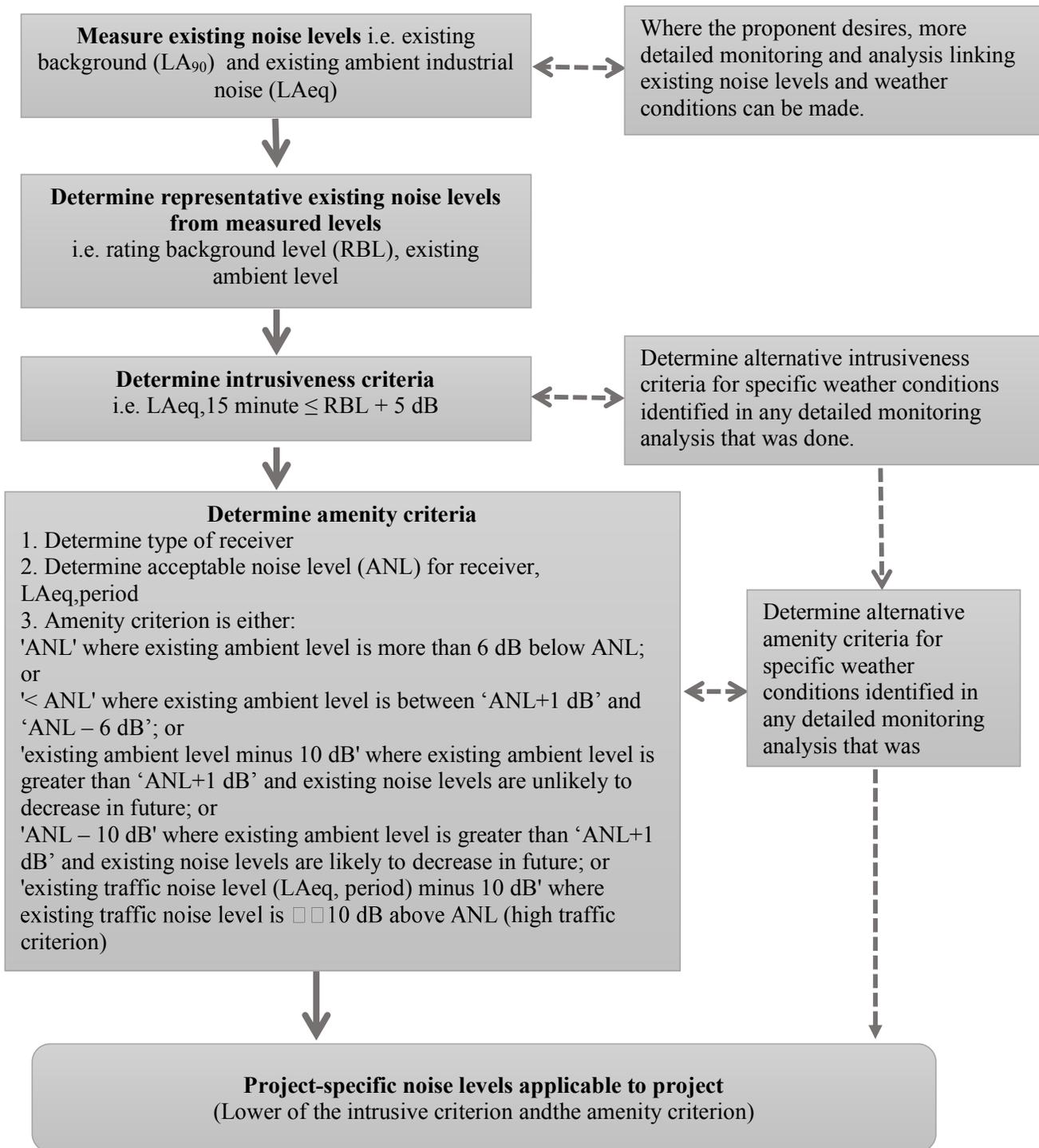


Fig.3 Determining the project-specific noise levels

Conclusion

The assessment of noise impact is complex and subjective, and is rarely (if ever) able to be considered in isolation from other social and economic aspects of a development or activity. The policy outlines processes to help strike a feasible and reasonable balance between the establishment and operation of industrial activities and the protection of the community from noise levels that are intrusive or unpleasant.

EPA is committed to continual review of the policy procedures and criteria, to determine how appropriate the policy is. Three areas will be evaluated:

- policy procedures - through consultation with acoustic practitioners, who collect the appropriate field data, apply the procedures and assess noise impacts to see how practicable these procedures are;
- policy framework - through consultation with proponents and noise source managers, who negotiate the noise limits and develop appropriate noise mitigation strategies to see how well this framework helps to derive the noise levels incorporated in statutory instruments;
- amenity levels - through consultation with communities affected by industrial noise sources to which the policy is applied to help indicate whether amenity levels set in the policy are adequate and are being achieved.

A program of consultation is developed to gauge the policy's effectiveness, once there has been sufficient time to allow the results of applying the policy to become evident. The outcome of the program is to ascertain whether policy objectives have been fulfilled, and to suggest improvements.

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