



## Managing noise conflicts between residential and recreational needs in urban areas

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### ABSTRACT

Urban areas are developed areas, meaning there are a density of structures and a range of activities and uses. While urban planners aim to provide a functioning urban area they also seek to provide a vibrant one for the benefit of the residents. This is particularly the case in ‘urban renewal’ when residential uses are integrated back into commercial areas. The benefits of range of recreational activities close at hand are promoted to the new residents by the planners and developers. However unless careful planning has been applied this proximity of conflicting land uses can lead to complaints to the environmental agencies about excess noise. The challenges in managing the noise require government agencies to work together towards achieving a balance. If the planning rules are too onerous the dynamic environment will not be achieved but if the noise is not considered at the planning stage any remedial control work to meet the environmental noise limits can be costly and difficult. This paper will discuss the various aspects that need to be considered and some practical management options.

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### 1. INTRODUCTION

An urban area is the region surrounding a central business area (CBD) and can be towns, cities or suburbs. Most urban areas strive to have their own character which, in part, is an outcome of the specific range of permitted land uses. These usually include residential housing plus commercial buildings. The general term “commercial” includes office/work areas but also shops, cafes, restaurants, bars etc. Urban areas need to integrate extensive transport infrastructure such as roads, buses, trams and railways to allow for movement within and outside the area. For a comprehensive urban area there is a need for social infrastructure that allows for recreational activities including both passive activities, like peaceful parks, and activities that encourage social interaction including playgrounds, sports fields etc. There are obvious benefits from placing recreational activities near to those who are going to use them. However this can, and does, lead to conflict in a number of ways with a major one being conflict in regard to noise. This paper will discuss the various aspects that need to be considered and some practical management options.

### 2. URBAN DESIGN

An urban design focusses on layout, appearance and functions for localities in which people live and engage with each other. The current discussion on creating “Resilient Cities” [1] requires consideration of future impacts including climate change. The design features thus aim to maximize the use of land and space and provide a diverse mixture of uses. One approach to this is to ‘activate’ the streetscape by providing for commercial activities at the lower levels with residential levels above. This results in dense mixed neighbourhoods with more effective use of all areas including public open spaces.

While there are clear benefits for urban design that encompasses these principles, there are challenges to maintain a satisfactory acoustic environment throughout. Most of the discussion concentrates on planning and optimizing the travel needs for all aspects that are part of the community. The principles do make some reference to considering general health and well-being with a goal “to

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*create easily accessible and safe working environments, healthy surrounding neighbourhoods, and no negative impacts on the natural environment” [1].*

A noise control engineer while accepting the intent of the goals tends to look at these initiatives in a different way to the urban planners. With increased densification there are increased opportunities for conflict between the different acoustic expectations and demands of the different users. The noise from transportation is just one obvious area of conflict. However with more reliance on public transport in the urban context there is the opportunity to consider the transport system and to exert greater control on the noise with properly designed vehicles, routes, interchanges and underground networks.

Social and recreational activities however present a greater challenge for noise management in the urban context and in part this arises from placing noise producing uses near to noise sensitive (residential) areas. The expectations of the residential component of what comprises an acceptable acoustic environment may be not be in keeping with the expectations of those involved with the social and recreational activities which are part of the same urban context.

For convenience of this discussion these can be separated into two general categories of social/recreational activities: ongoing and occasional. The former category includes facilities like restaurants clubs, bars that may be co-located with the residential component. The latter special events such as music festivals and motor sports events which can be in the open spaces within or just on the edge of the residential area. These require different approaches to noise management.

### **3. ONGOING RECREATIONAL ACTIVITIES**

Ongoing recreational activities include restaurants clubs, pubs etc. that provide live or recorded amplified music. The main noise sources are from the amplified music and the noise from the patrons. If the venue is enclosed, that building enclosure can be designed to ensure that the suitable noise reduction is provided to ensure that the amplified music is not excessive outside the venue. For a new build if the uses of all the commercial spaces are known at the design stage this can be achieved albeit at a higher cost to achieve the higher noise reduction for those tenancies.

Problems can arise when there is a change of use of commercial premises. If the new use includes amplified music and this was not considered as a use at the design/construction stage, the demands on the enclosing structure increase. Along with other specific requirements for the new lease use, the methods for noise control need to be demonstrated at the development approval stage. While the goal noise level in the potentially most effected residence is usually provided by the local authority, assumptions need to be made about the expected internal noise level for the venue to be able to demonstrate compliance. For music there are many factors that can influence the level but it is not unreasonable to assume it will be somewhere between 90 and 100 dBA [2]. Thus the noise reduction required could be up to 70 dBA. This provides quite a challenge and is difficult to implement unless there has been some provision at the design stage for the possibility of a higher noise reduction being required in the future. This can be as simple as making provision for sufficient head room to be able to install a higher performance ceiling at some time in the future.

A greater challenge is the noise from venues that open onto the public space and from the patrons when outside the venue. This sound is considered by some to be an essential part of the “active streetscape” but can cause considerable annoyance to those living nearby. One can argue that the residents should be aware that if they choose to live in a complex with an “activate” streetscape they cannot expect a quiet environment. However there is a limit to what is fair for those residents. One approach is to define some areas as ‘music’ zones with higher acceptable noise levels and define the responsibilities for compliance based on the “agent of change” [3].

### **4. OCCASSIONAL RECREATIONAL ACTIVITIES**

The management of the environmental noise from occasional or intermittent recreational activities such as music festivals or motor sports events needs to be considered in a different manner to the regular or ongoing activities. By their very nature festivals or special events are part of society and deserve special consideration. Most cities encourage such events for on the one hand they provide a boost to the local economy as well as providing for the diverse social needs of the community. Music festivals will remain a social event into the future for as Holt [4] has discussed there is not only the performance aspect but also the unique value of participating in a live concert and there is the direct financial benefit to the performers and promoters. Participation in motor sport events is also a

personal involvement and is unlikely to be replaced by a digital experience in the near future.

When the occasional recreational activities bring with them the potential for high noise levels there is a need to provide a balance between the benefits of the event for those involved and who are part of the society and the annoyance for those who happen to live in the vicinity of the event. Most environmental agencies have a policy that allows for a higher noise level than would be the case for an ongoing activity and include time restrictions.

While many jurisdictions have policies, one such policy is the authorization process that has applied in the city of Canberra for over a decade and has been demonstrated to be effective. The outdoor concert environmental noise policy [5] requires an authorization application for each special event. This authorisation then provides a limit to the noise level at one or more defined locations and the limit for hours for the event. A noise management plan is required to demonstrate how the conditions of the authorization are to be achieved. The authorisation provides a clear statement of what is required and provides certainty for both the promoter and the community that may be affected. For those events which are considered low risk and have demonstrated previous good control the conditions are less onerous than for larger, higher risk events.

A clear example of the effectiveness of this policy approach is provided by the data for an annual music festival held on a university campus from 11:00 through to 22:00 hrs on a Sunday. Figure 1 presents a comparison of the noise level data obtained at the compliance location, approx. 200m from the rear of the dual main stage in 2010 and 2016. The compliance level was set at  $L_{A10,10min}$  65 dBA. Despite assurance from the promoters that there would be compliance the data from 2010 shows excess of between 5 and 10 dB for the duration of the event. It is important to note that once a festival is up and running it is not a practical solution to the environmental noise excess to propose that the volume be turned down in the venue. Small changes and adjustments can be made to reduce the noise a little but noise reductions usually require major readjustments to the sound system and the entire stage set up.

The 2010 event clearly exceeded the authorisation level and was indeed a great annoyance to the community and this clearly demonstrated to the promoters and forced them to admit that their methods for controlling the sound were not sufficient. Rather than refuse permission for the event the government authority and the independent acoustic consultants have worked with the promoters to achieve improvements each year. The improvement can be seen in the 2016 data which shows only two short periods of excess. This has been achieved from the combination of a number of measures including passive noise reduction and improvements in the sound installation. Figure 2 is a view from behind the main stage, in the general direction of the compliance location for the 2010 event and there is no shielding for the elevated line array, the ground based speakers or the on-stage speakers. This can be compared with Figure 4 which is a view from a similar location for the 2016 event where significant shielding from large containers, strategically placed to enclose the rear section of the stage. This passive shielding has been combined with use of speaker systems which have more directional sound distribution and better focus the sound onto the audience area.

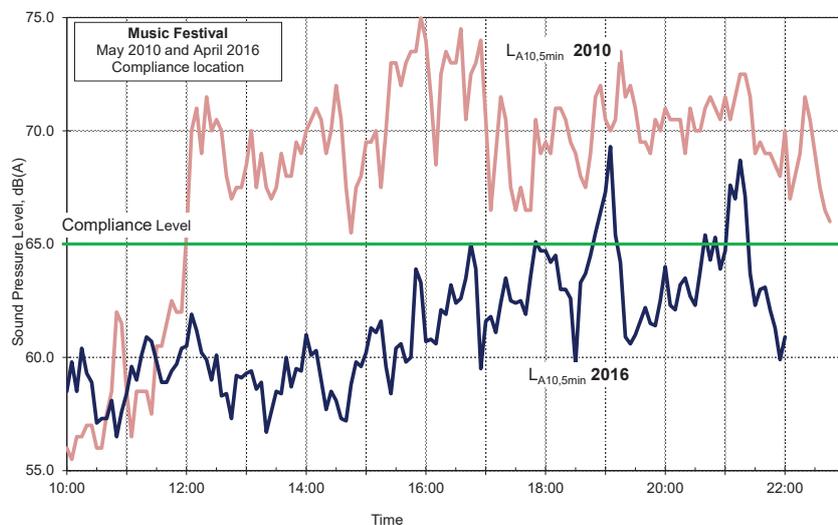


Figure 1 – Comparison of the noise level at the compliance location during 2010 and 2016



Figure 2 - View from behind stage, 2010



Figure 3 - View from behind stage, 2016

Another example of improvement that can be gained over time is the reduction in noise from a 3 day car event for which the compliance location is approx. 150m from the boundary of the venue. The event has a variety of components including burn outs plus some short outdoor music concerts in the evenings. Figure 4 provides a comparison between the data at the compliance location 2010 and 2016. Over these years there have been small changes in the venue layout, optimizing shielding opportunities and substantially better control by the event management. This is clearly demonstrated from the reduction in the noise levels during the Friday and the Sunday components of the event.

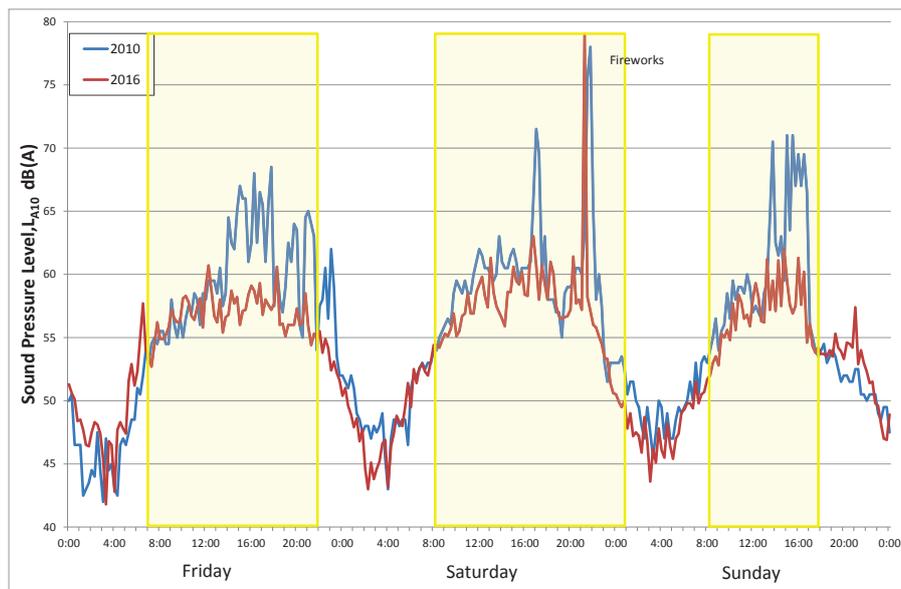


Figure 4 – Comparison of the noise levels for 2010 and 2016 for a 3 day car event.

The important factor for both of these examples is the approach taken by the authority. While the noise limit is defining in the annual authorization, the authority has not stopped or fined the event because of the excesses. The authority has acknowledged the broader benefits of the event to parts of the community and sought achievement of an improvement each year. This has forced the promoters to work with the acoustic consultant and also to review their own event management options. Both these examples demonstrate that achieving reductions for major festivals or events may well require time. It is during this time that communication with the affected community is vital.

## 5. CONCLUSIONS

An active urban area requires both residential and social/recreational activities and these can lead to conflicts because of noise. For ongoing social activities it is essential that the noise control be provided at the outset of the approval for the use. This normally requires appropriate noise reduction

incorporated the structure itself and hence implemented at the design, development approval stage. There is a clear role for the planning authority to ensure that this is achieved. Events that are not ongoing and hence considered as special events require a different approach. In many cases the full impact of the event is not known until the first time it is held. An effective policy is then one that encourages noise reduction while allowing for those who enjoy the participation in the event.

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