

Written evidence submitted by Tranquil City Ltd (UGS0066)

Call for Evidence on Urban Green Spaces

Submission on behalf of Tranquil City Ltd

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As per the request for evidence, please find an overview of Tranquil City Ltd, the submitting organisation, and the following summary of evidence.

Who is Tranquil City?

Tranquil City is an environmental data and research organisation, founded in 2017. It is a team of multi-disciplinary environmental and urban practitioners and academic collaborators with a mission of promoting the benefits of healthy, nature connected urban lifestyles through the use of data, technology, innovation and leading industry knowledge.

Why is our knowledge relevant for this Call for Evidence?

As the Director of Tranquil City, I believe that we have unique, evidence-based insights on the benefits of urban green spaces for society, environment and climate. We have recently completed two evidence reviews on behalf of Department for Environment, Food & Rural Affairs (DEFRA) and Natural England, that relate directly to the questions raised in the Call for Evidence. For DEFRA, the review is titled 'Acoustic Benefits of Green Infrastructure in Urban Areas', and for Natural England, the review is titled the 'Provision and Management of Greenspaces and Routes that Generate Additional Use and Enjoyment'. These reviews provide useful overviews of the evidence base to address these questions, as well as notable reference lists that relate to topics mentioned in this Call for Evidence.

Our response to the Call for Evidence focuses on the impacts and considerations of urban green spaces on the environmental challenge of 'noise pollution'. This addresses an observed policy gap in the ability for urban greening to mitigate the impacts of noise but also in promoting positive soundscapes.

Response to Call for Evidence

What environmental challenges are urban areas facing, and how could wider access and inclusion to green spaces (including dog-friendly spaces) address these challenges?

4. Noise pollution

Urban green spaces play an important role in addressing acoustic related environmental challenges. These include the challenge of noise pollution, but also the promotion of positive soundscapes that result in health, wellbeing and biodiversity benefits.

Summary:

- Urban green spaces provide essential escape from noise pollution.
- Urban green spaces are not always quiet and noisy spaces can detract from people's experience.
- Urban green spaces can reduce the significance of road traffic and rail noise in cities.
- Views of greenery can significantly reduce the perceived level of road traffic and rail noise.
- Green and blue spaces can mediate the negative effects of noise exposure.
- Urban green spaces promote natural sounds that divert attention from noise and improves restoration.
- Landscape design can significantly affect the soundscape quality of urban green spaces.
- Green infrastructure can attenuate noise and introduce natural sounds outside of green spaces.
- Urban green spaces should be protected from noise exposure to encourage biodiversity.
- By reducing and displacing transport noise urban green spaces may reduce the need for carbon-intensive façade protection against noise and allow for natural ventilation.

See the below description of each of the above statements with the associated references.

Urban green spaces provide essential escape from noise pollution.

A review of the physical health and wellbeing benefits of green space conducted by Lovell, White [1] on behalf of Natural England, reported strong positive relationships between access to green space and neighbourhood greenness with physical health and wellbeing. It highlighted that several systematic reviews in relation to noise concluded that Green Infrastructure was likely to provide escape from noise pollution and a reduction of the mental health and stress-related psychosocial impacts due to noise.

Green spaces in urban areas can be essential places for people to find respite from noise, particularly if people are exposed to high levels of environmental noise at home [2-6].

Serene green environments are correlated with neighbourhood satisfaction and that inequalities in relation to the availability of high-quality green space is dependent on socioeconomic status (income, nationality and homeownership status) [7].

Urban green spaces are not always quiet and noisy spaces can detract from people's experience.

Green spaces are not always "quiet" and exposure to noise can detract from people's experience, enjoyment, and activities in green spaces [8, 9]. It was found that people walking in green spaces tended to avoid areas exposed to higher sound levels [8]. It is suggested that green spaces with high levels of noise exposure may in fact affect people's decision to visit the space, the length of the visit, and their enjoyment [10].

Urban green spaces can reduce the significance of road traffic and rail noise in cities.

The integration of Green Infrastructure in a city area can reduce the significance of transportation noise exposure, with a well distributed plan being more effective than a clustered approach [11, 12].

Views of greenery can significantly reduce the perceived level of road traffic and rail noise.

Numerous studies supported the finding that views of Green Infrastructure can significantly reduce the perceived level of road traffic noise by up to 10 dBA [13-19]. Visual scenes featuring vegetation are perceived to have a higher noise reduction than in reality which is known as 'psychological noise reduction' [20]. The visual effect of greenery on perceived noise sensitivity was found to be less significant for rail noise, but still of benefit [16].

However, an inverse relationship in relation to aircraft noise was found, where residents with higher levels of green areas nearby had increased levels of annoyance, equivalent to a 10 dBA increase in level [16].

Green and blue spaces can mediate the negative effects of noise exposure.

People with more green space nearby were reported to be less sensitive to noise in general [14, 15].

Views of blue spaces have been found to mediate the negative perceptions of noise that can lead to annoyance; though, this finding is supported by limited evidence [21-23]. Additionally, surveys show that visible greenery and wetlands in high rise dwellings reduced people's noise annoyance compared to a control of "no greenery" [23].

Urban green spaces promote natural sounds that divert attention from noise and improves restoration.

Urban green spaces introduce natural sounds that can contribute to the promotion of more positive soundscapes, distract attention away from transportation noise, and benefit health and wellbeing [13, 21, 24, 25]. Soundscape is the "acoustic environment as perceived or experienced and/or understood by a person or people, in context", as defined in ISO 12913-1 [26]. It's important to consider the effects of acoustic environments beyond that of noise mitigation, as positive sounds can have a significant benefit to health and wellbeing. For example, people who live in areas with a greater proportion of green spaces report to hear birdsong significantly more often than people in areas with a lower proportion of green spaces [14].

Birdsong and water elements (fountains, flowing water, cascades) are the most preferred natural sounds by people in urban parks [27-31]. This preference was found to vary throughout the seasons. Both natural sounds and visuals have been shown to positively correlate with perceptions of tranquillity, especially the presence of the sound of flowing water [30].

Certain natural sounds can provide a type of masking effect in relation to attention-grabbing sounds that divert people's attention away from other more negative sounds, in what is termed "informational masking" [13], and have been found to improve the potential for mental restoration [13, 31, 32].

Water sounds can partially mask mid- to high-frequency sounds, reducing the perceived loudness of noise, and increasing the pleasantness of a soundscape. Water sounds and views can reduce stress and negative moods, as well as improve the potential for mental restoration [33, 34].

Landscape design can significantly affect the soundscape quality of urban green spaces.

Landscape design forms and elements can affect the types, diversity, and significance of sounds in a green space, resulting in a wide range of soundscape quality [19, 27, 31, 35]. Several studies found that the presence of natural

sounds in green spaces resulted in increased preference, pleasantness, perceptions of tranquillity and health and wellbeing outcomes [27-31].

Trees and hedges can promote wind-induced sounds and bird sounds, which can reduce stress and negative emotions, and increase potential for restoration [27, 31, 36]. Flowing water bodies, such as rivers, streams and the sea, generate more favourable masking sounds compared to still water bodies, such as lakes and canals [21, 37]. However, intense movement of water, such as waterfalls with significant low frequency content, can reduce pleasantness and detract from tranquillity [38, 39].

Green infrastructure can attenuate noise and introduce natural sounds outside of green spaces.

The planning of Green Infrastructure placement in not only green spaces, but in predominantly urban areas, such as streets and public squares, can provide opportunities for the introduction of more natural sounds as part of daily activities. Based on our research, a network of Green Infrastructure elements is important for promoting quieter, healthier and more biodiverse urban environments, with tree belts, Sustainable Drainage Systems (SuDS), Vertical Greenery Systems (VGSS) and Green Roofs providing notable noise mitigation if designed with acoustics in mind. For example, the addition of green roofs can further reduce sound diffracting over a building by 2-6 dBA [40-42], and at low frequencies up to 10 dBA [40]. Therefore, Green Roofs may be useful in providing additional forms of urban green space, whilst reducing the spread of sound over long distances and offering quieter conditions on façades not directly exposed to road, rail or other environmental noise sources.

6. Pressures on biodiversity and ecosystems in urban centres

Urban green spaces should be protected from noise exposure to encourage biodiversity.

Urban green space provides opportunities for wildlife and biodiversity to thrive in cities, especially where there is a reduction in man-made noise and artificial lighting. Anthropogenic noise exposure to habitats results in reduced presence of birds and insects [43, 44]. Additionally, the presence of noise can affect different species in various ways, dependent on their vocal call [45]. Birds with higher frequency vocal calls were more significantly negatively affected by masking by noise sources. Therefore, some species were found to alter the frequency spectrum of their vocal calls accordingly.

5. Climate change and carbon storage

Urban green spaces may reduce the need for carbon-intensive façade protection against noise and allow for natural ventilation, reducing and displacing transport noise [46, 47].

Further documentation of the evidence set out above is available upon request.

Please contact me if you require any further information and/or clarification on the above points.

Kind Regards

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