

## Tranquillity Trails for urban areas

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### ABSTRACT

Tranquil spaces can be found and made in the city and their promotion and use by residents and visitors is an important means of building resilience. Studies have shown that spaces that are rated by visitors as tranquil are more likely to produce higher levels of relaxation and less anxiety that should ultimately result in health and well-being benefits. Such spaces can therefore be classed as restorative environments. Tranquil spaces are characterized by a soundscape dominated by natural sounds and low levels of man-made noise. In addition, the presence of vegetation and wild life has been shown to be an important contributory factor. Levels of rated tranquillity can be reliably predicted using a previously developed model TRAPT and then used to design and identify tranquil spaces, improve existing green spaces and develop Tranquillity Trails to encourage usage. Tranquillity Trails are walking routes that have been designed to enable residents and visitors to reflect and recover from stress while receiving the benefits of healthy exercise. This paper describes Tranquillity Trails designed for three contrasting areas. Predictions of the rated tranquillity have been made along these routes and feedback from users was elicited at one site that confirmed the expected benefits. 199 words

### 1. Introduction

Much research has shown that tranquil spaces are restorative environments that can help reduce stress and relieve anxiety (Ulrich et al., 1991; Takano et al., 2002; Grahn and Stigsdotter, 2003; Lechtzin et al., 2010; Hunter et al., 2010; Van den Berg et al., 2015). Questionnaire surveys of open green spaces have shown a strong association between rated tranquillity of a place and percentage of visitors feeling more relaxed after their visit (Watts et al., 2013).

Laboratory studies conducted at the University of Bradford have shown that the significant factors affecting rated tranquillity of a place  $TR$ , are the average level of man-made noise and the percentage of natural and contextual features in the landscape (Pheasant et al., 2010). The equation TRAPT (Tranquillity Rating Prediction Tool) expresses this relationship in urban areas (Watts et al., 2013) as:

$$TR = 10.55 + 0.041 NCF - 0.146 L_{day} + MF \quad (1)$$

Where  $TR$  is the tranquility rating on a 0–10 rating scales.  $NCF$  is the percentage of natural and contextual features and  $L_{day}$  is the equivalent constant A-weighted level during daytime (e.g. from 7am to 7pm) from man-made noise sources. Contextual features include listed buildings, religious and historic buildings, landmarks, monuments and elements of the landscape, such as traditional farm buildings, that directly contribute to the visual context of the natural environment. It can be argued that when present, these visually cultural and contextual elements

are as fundamental to the construction of ‘tranquil space’ as are strictly natural features.

The behaviour of this equation has been studied by examining trends in  $TR$  with  $L_{day}$  at different levels of  $NCF$ . It was noted that at the extremes of  $L_{day}$  where  $TR$  becomes greater than 10 or less than 0 then  $TR$  values are set to 0 and 10 respectively.  $MF$  is a moderating factor that was added to the equation following a study that was designed to take account of the presence of litter and graffiti that would depress the rating, or natural water sounds that would improve it (Watts and Marafa, 2017). This minor adjustment is designed to take account of the actual environmental conditions at the time of assessment and is unlikely to influence the calculated  $TR$  by more than  $\pm 1$  scale point. It was considered that the level of any water sounds were very low and the amount of litter and graffiti minor, so both were not considered a significant influence on predicted tranquillity levels at any of the study site locations and so no adjustments were made.

$TR$  values in urban open spaces have been related to the level of rated relaxation of people after visiting such spaces where there was a very close relationship  $R^2 = 0.96$  (Watts et al., 2013). For example, for a  $TR$  value of 5.0 nearly 50% of visitors report that they are “more relaxed” after visiting the park while at a value of 8 approximately 80% report being “more relaxed”. These results have been used to validate the following category limits for  $TR$  defined previously (Watts et al., 2013):

- < 5 unacceptable
- 5.0–5.9 just acceptable

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6.0–6.9 fairly good  
 7.0–7.9 good  
 ≥8.0 excellent

A previous study (Watts, 2017) employed TRAPT to gauge the benefits of “greening” urban areas. In this paper we look at a means of encouraging people to visit existing green and tranquil spaces. The study described in this paper uses TRAPT to identify tranquil spaces and then to develop Tranquillity Trails (TTs). TTs are walking routes that have been designed to enable residents and visitors to reflect and recover from stress while receiving the benefits of healthy exercise.

On a community level it is important that people use green spaces so they experience, connect and benefit from contact with nature and so are more likely to support nature friendly policies now and in the future (Bragg et al., 2013).

Three TTs designed for contrasting areas are described and then predictions of the rated tranquillity have been made along these widely different walking routes. The *TR* profiles of the TTs have then be compared and contrasted by examining the percentage of time a walker would spend experiencing the different levels of *TR* described above.

It is important to consider the benefits of walking around the TTs since this will help gauge usefulness and could be used to promote usage. Feedback from one site was used to assess the benefits of using that TT. These benefits were then related to the extraversion scale of personality using a shortened form of the Eysenck Personality Questionnaire (Francis et al., 1992). It was considered that those scoring lower on the extraversion scale (i.e. more introverted) would value tranquillity more highly due to the tendency to require more peaceful surroundings to perform more efficiently.

## 2. Method

### 2.1. Study sites

The present study used the insights gained from these previous surveys and experiments to devise walking routes or Tranquillity Trails (TTs) that link quiet green spaces in urban areas using relatively tranquil paths and roads. The aim is to design a route that is simple and safe to follow and will allow users to experience a relatively degree of tranquillity despite being in an urban area. Clearly the challenge is greater in a city with higher concentrations of people and traffic than for a town. The first three TTs that have been designed are in Bradford, Kingsbridge and Guildford. These are all in England though further ones are currently being develop in Ireland and Hong Kong.

Bradford forms part of the West Yorkshire Urban Area conurbation which in 2001 had a population of 1.5 million and is the fourth largest urban area in the United Kingdom with the Bradford subdivision of this urban area having a population of nearly 530,000. In contrast, Kingsbridge is a market town and tourist hub in the South Hams district of Devon, England, with a population of just over 6000 at the 2011 census. Of intermediate size is Guildford that is a large town with a population of 143,00 lying 43 km south west of central London. Fig. 1 shows the study site on a map of England and Wales and it can be seen that they are well separated and lie in quite different geographical areas.

### 2.2. Determination of *TR* profile

To compare and contrast levels of tranquillity achieved at each site it was considered necessary to determine the variation of *TR* values around each TT. This involved calculating the values of the important factors  $L_{day}$  and  $NCF$  (see Eq. (1)) at a sufficient number of points to define a profile.

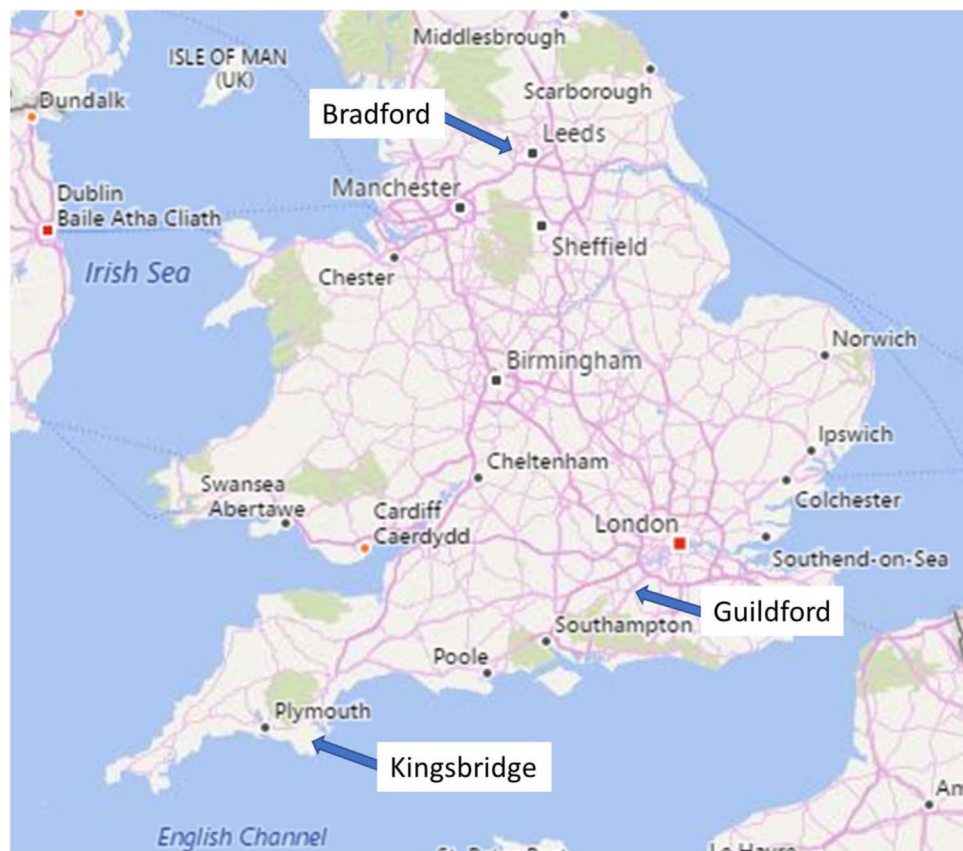


Fig. 1. Location of the three Tranquillity Trails.

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