

# **Investigating the quality and accessibility of urban green spaces (UGS) in Birmingham, England.**

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## **Abstract**

Improving access to urban green spaces [UGS] is an essential aspect of developing just, healthy cities fit for the 21<sup>st</sup> century. However, pre-existing studies traditionally consider 'accessibility' through geo-spatial analyses, downplaying the demands of differing UGS user groups. This study aims to investigate how access to UGS is perceived by users in Birmingham, England, and how the quality of these UGS might impact their usage. The study develops an adaptation of the 'POSDAT' (Quality of Public Open Space Desktop Auditing Tool) to determine the quality of UGS within 3 miles of Birmingham's city centre. A randomly sampled survey, across the top 5 highest assessed quality UGS, asks users to report their perceptions of the UGS's quality and accessibility. The survey results re-affirm the importance of various green space facilities, identified in the existent literature, as important indicators of green space usage, especially those which promote small social interactions. Many surveyed users reported walkability would most likely influence their usage of UGS, and most surveyed users reported walking on the day of study. Notably, many users perceived an attractive environment and ample facilities for social interactions as key indicators of their UGS' high quality, rather than the traditional view across urban health literature of UGS as spaces to promote physical activity primarily. However, adjustments to POSDAT are suggested as necessary to improve its empirical reliability, including the introduction of increased weightings that reflect the availability of those UGS features that facilitate social interaction and boost users' wellbeing – ample seating, cafés, children's playgrounds and attractive natural environments – to distil an appropriate overview of UGS quality in the city.

## **Keywords**

Birmingham; urban green spaces; accessibility; perceptions.

## **Biography**

*Jay Chambers has recently graduated with a first-class honours degree in Global Sustainable Development from the University of Warwick. He conducted this research during his final year, as part of his final year dissertation. The research was inspired by his own experiences of urban living and passion for inclusivity. Jay was supervised by Dr Martin Lima-Velazquez at the University of Warwick. Jay will be continuing his studies in autumn 2025 at the University of Cambridge, on the MPhil in Anthropocene Studies.*

## **Introduction**

Urban Green Spaces (UGS) are an important area of urban development studies, which have increasingly come under finer assessment since the publication of the United Nations' 2030 Agenda, for Sustainable Development, which reinvigorated the importance of universal access to safe, inclusive and accessible green public spaces (UN, 2015). Within this field, several key benefits of UGS have been identified and investigated, including the provision of cultural ecosystem services which can contribute to the development of community cohesion within urban neighbourhoods serviced by high-quality UGS (De Vries et al., 2013; De Luca et al., 2021). Also, crucial to this investigation is the need for UGS to be 'accessible' to promote the healthy usage of these spaces. A major GIS based study conducted by Buckland and Pojani (2023) investigated the accessibility of UGS across five medium-sized cities in Europe, this included Birmingham, a large city located in the West Midlands region of the United Kingdom (see Figure 1).



**Figure 1** – Google Earth map, showing the location of Birmingham (grey marker) within the British Isles. (Source: Google Inc, 2024.)

Whilst Buckland and Pojani (2023)'s study generated some meaningful results, they stipulate that Birmingham's UGS accessibility is good when spatial income inequalities are accounted for, and they suggest that the lower income neighbourhoods, identified through census data, maintain a higher density of UGS availability. However, despite its relevance and high level of detail, their study did not fully explore the limitations of these UGS identified through GIS data, for instance, the impact that varied UGS quality could have on actual usage and thereby affecting the spatial inequality of UGS in Birmingham.

This study aims to build upon existing literature to investigate how the quality of UGS could affect UGS usage, firstly through the adaptation and application of the 'POSDAT' ([Quality of Public Open Space Desktop Auditing Tool], Edwards et al., 2013) assessment criteria to determine the quality of UGS within central Birmingham.

Secondly, the paper reports on 50 in-person randomly sampled surveys across the five highest-quality UGS identified, and to begin building a picture of the UGS users' perceptions of the quality and accessibility of those 'high quality' UGS.

Additionally, the adaptation and application of the POSDAT assessment to a British context represents a unique and novel exploration of the framework, which could be applied in similar European contexts. The adaptation here creates a 'UK' centric model of green space quality, showcasing the potential for contextualised assessments as a more accurate model of investigation.

## **Methods**

This study utilised a twofold methodology to assess both the 'quality' of UGS in Birmingham and 'accessibility' of those UGS as perceived by users.

To investigate the quality of UGS in Birmingham, an existing framework known as the 'Public Open Space Desktop Auditing Tool [POSDAT]' was adapted. POSDAT was originally designed as a desktop alternative to the earlier 'Public Open Space Tool' [POST] metric, which ranks green spaces based on direct observations in person and has been acknowledged as a valid metric (Giles-Corti et al., 2005; Taylor et al., 2011; Edwards et al., 2013). The tool has never before been applied to a British context, having been developed by Australian geographers. Here, I have adapted the framework to exclude questions which assess for uniquely Australian public facilities, for instance, the inclusion of public BBQs, and direct beachfront access are not typical, nor practical, features in British UGS which need to meet the demands of the British climate. For the purposes of this study, I added typical 'British' features of open green spaces, including the provision of canals, natural wetlands and/or boggy areas, and ensured that a higher number of trees present was awarded a higher score, reflective of the UK's woodland landscape. This framework determined a hierarchy of UGS quality, utilising information made publicly available on Birmingham City Council's public green and open spaces directory, as well as Google Maps imagery, where up to date images were available (Birmingham City Council, n.d.(b); Google Inc, 2024). For this study, I did not set a numerical score as a benchmark for high-quality, instead relying on the hierarchy of results which emerged to determine a scale of quality across all UGS that were investigated in the city. [See Appendix 1 for a full list of questions and scores included on the adapted POSDAT framework].

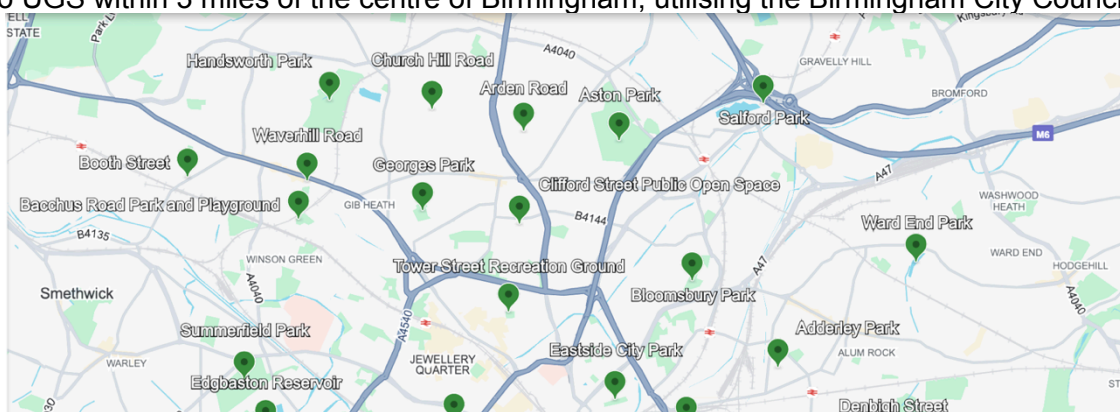
To investigate the accessibility of UGS in Birmingham, a randomly sampled survey of UGS users was completed. This study investigated only those UGS which were located within 3 miles of the city centre; in part a response to the assertion that Birmingham's inner districts contain the most plentiful public UGS access, as well as the suggestion that the quality of UGS is more relevant than their accessibility alone in determining the long-term public health benefits of the space (Mears et al., 2019; Luo et al., 2021; Buckland & Pojani, 2023). Additionally, this helped to keep the project scope manageable within the limited time and resources available. The random sample design was chosen to ensure an adequate number of participants were included, though it is acknowledged that this design does not eradicate the influence of unconscious bias which may limit the study's ability to represent the views of the whole population (Sedgwick, 2014). However, the use of a randomly sampled survey ensures that the investigation could be replicated in future, potentially with a larger scope to test the validity of any suggestions inferred here from the survey results. Further, given that census surveys have been conducted of Birmingham residents' perceptions in the past, this study is justified as a valid attempt to consider how these perceptions may differ when the sample of responses is restricted to only 'high quality' UGS, according to the adapted POSDAT framework, in the city (Hughes, 2020).

I recognise that my 'researcher identity' increases the likelihood of participant response bias influencing the survey results (Sedgwick, 2014). Thus, as part of the data collection process, participants were asked to read and agree to the participant consent form before proceeding to answer the questions. This additional step ensured that the individual understood and agreed to their responses being analysed as part of this study. Further, this form asks the participant to provide their genuine and honest answers, thereby aiming to mitigate the potential of response bias within the results, although this cannot be entirely discounted from the discussion of this data. Whilst it would be highly beneficial to conduct the survey at each UGS included in the POSDAT assessment, due to the logistical restraints of this study as part of an undergraduate project, only participants at the 5 highest-quality UGS were surveyed, with the aim of gathering 10 responses at each UGS. Further, although a very small sample has been collected, there is enough data to adequately conduct a descriptive statistical analysis of the results. This is an appropriate form of analysis to summarise the key findings from the data set, to be discussed in the context of existing literature (Hayes, 2024). Given such limited sample size, the results are intended as a basis for further empirical interrogation, rather than a representative statement on the perception of UGS accessibility in Birmingham. For a full breakdown of the questions included on the survey, and a brief justification for each, see Appendix 2.

## **Results**

### **Quality of UGS in Birmingham**

To investigate the quality of UGS in Birmingham, I adapted the existing POSDAT framework so that it is applicable to a British context of study. The scope of this assessment was limited to UGS within 3 miles of the centre of Birmingham, utilising the Birmingham City Council

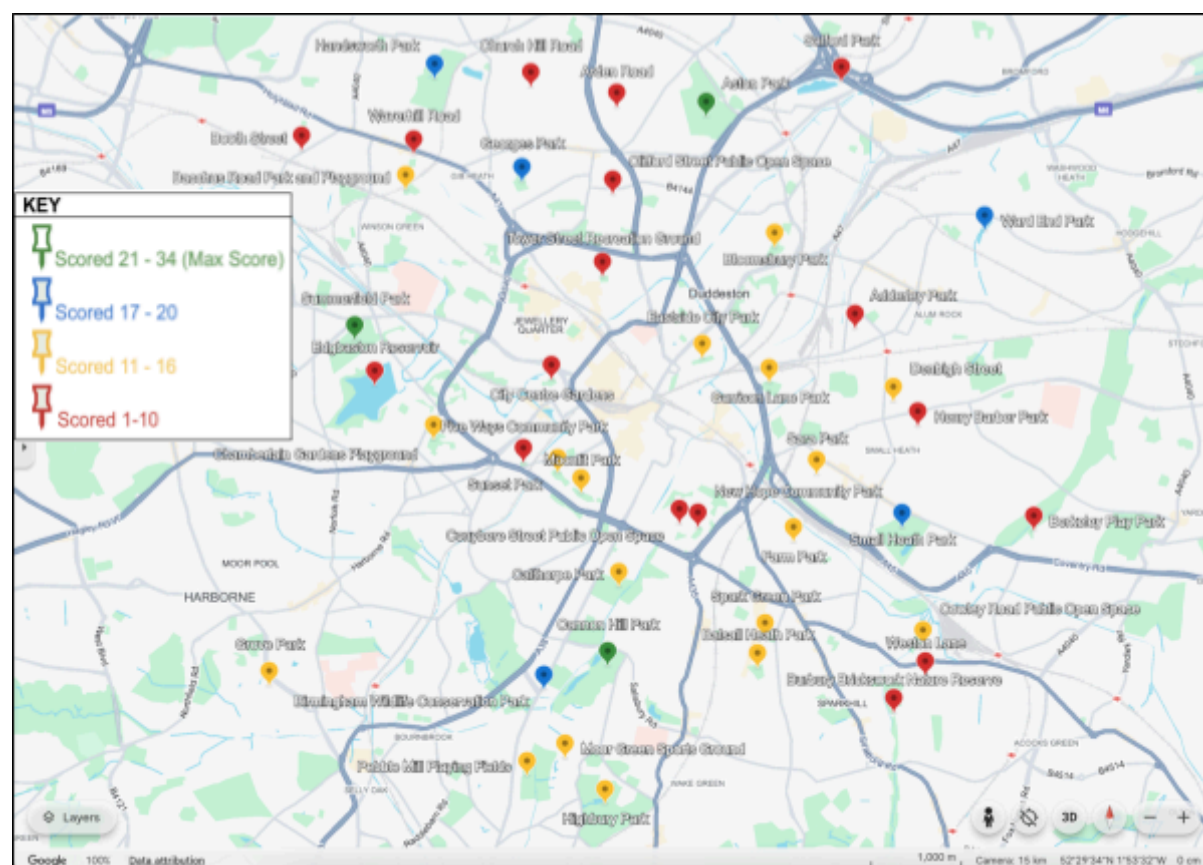




‘green spaces’ directory which automatically excludes private green spaces from its search. Figure 2 (see below) shows where each of these UGS is located on a map of the city.

**Figure 2** – Map of central Birmingham showing all public green spaces within 3 miles of the centre, identified by green markers. (Source: adapted from: Birmingham City Council, n.d.; Google Inc., 2024)

52 UGS were identified by this search, and each UGS was assessed for quality using the adapted POSDAT framework. For the full breakdown of these assessments, including the possible scores that each UGS could achieve per question, see Appendix 1.



**Figure 3** – Map of central Birmingham, showing all assessed public green spaces. Each pin is coloured according to the score that UGS achieved on the POSDAT assessment. [Source: adapted from: Birmingham City Council (n.d.); Google Inc. (2024).]

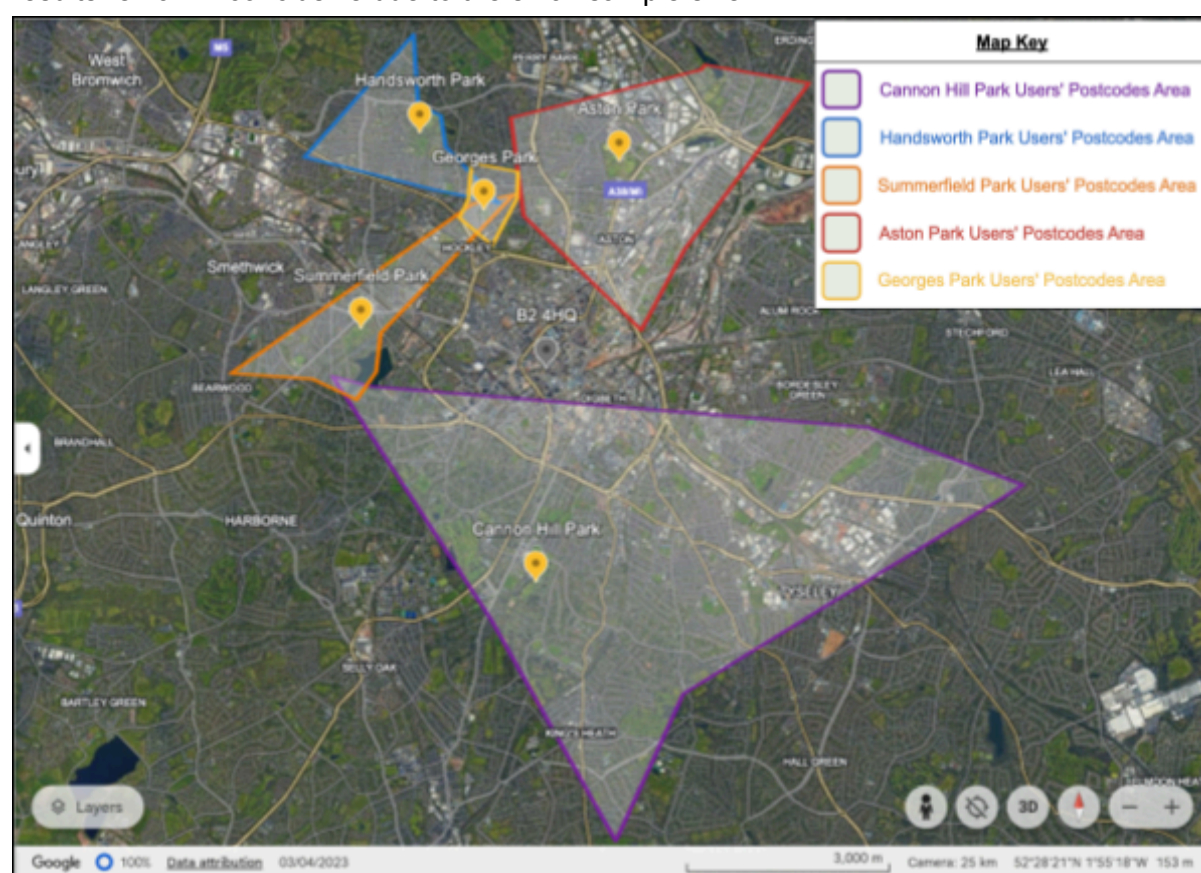
Figure 3 (above) maps out the results of the adapted POSDAT assessments. The Key indicates that green pins scored the highest and red pins the lowest on the assessment. These boundaries were chosen to show the range of quality across the studied UGS and allow the highest quality UGS in the area to emerge, although no official benchmark for ‘high quality’ compared to ‘medium’ or ‘low’ quality was established by either the original or adapted POSDAT. As detailed in the full breakdown of POSDAT assessment questions (see Appendix 1), a UGS typically scored more points for possessing a greater variety of exercise and leisure facilities for users, being well-lit throughout, and having at least one tree within the area. Cannon Hill Park, Aston Park, Summerfield Park, Handsworth Park and Georges Park were assessed as the 5 highest quality UGS within 3 miles of Birmingham city centre. Each of these UGS have been surveyed to begin to understand their users’ perceptions of the respective UGS’ accessibility.

## Perceived Accessibility of High-Quality UGS in Birmingham

To investigate the perceived accessibility of the high-quality UGS in central Birmingham, I conducted a randomly sampled survey of UGS users across the five highest assessed quality UGS in the area (see Figure 3). The survey consists of 9 questions, the full breakdown of which can be found in Appendix 2.

### Participants' Travel to UGS

Figure 4 (see below) displays the areas of participants' given postcodes from each survey across the five UGS. These results indicate that some UGS may attract users from a further distance based on their quality. For instance, Cannon Hill Park has the 'largest' and broadest scope of users' home addresses, as well as being assessed as the highest quality UGS within 3 miles of Birmingham city centre. However, whilst indicative of a potential correlation between the increased quality of a UGS and a broader spatial distribution of users, these results remain inconclusive due to the small sample size.



**Figure 4** – Map of Birmingham, displaying the postcode areas of survey respondents at each of the 5 UGS. Key indicates which area corresponds to each UGS. (Map Source: Google Inc., 2024; Key Source: Author)

Although just over half of the 50 users surveyed across all UGS walked to their UGS (28), the second most frequently reported transportation was a private car (11), followed by use of a bus (9). Across the 5 UGS surveyed, car usage was most common among participants at Aston, and walking was most common among participants at Georges, where no participants reported using a car to travel to the UGS. Also, most participants at Cannon Hill said that they travelled more than 10 minutes to access the UGS (6), whereas only 1 participant at Handsworth travelled for more than 10 minutes. These results indicate a potential correlation between the higher assessed quality of a UGS and users' willingness to travel further to use

it. However, most participants across all 5 UGS surveyed reported they did not view travel time as a barrier to their personal usage of the UGS (44).

#### Regarding UGS Quality

All five UGS surveyed were rated high quality spaces by the adapted POSDAT metric. A portion of the survey questions dedicated to testing the validity of these desktop assessments with UGS users' real perceptions of what makes a high-quality green space, presuming higher UGS usage correlates with higher UGS quality. Across the UGS surveyed, participants reported attractive natural environments (22 respondents) and walkability (17 respondents) of the space would influence their personal usage of that space the most. Most participants did not perceive the availability of parking as a key influence on their usage (32), despite several (11) reporting this was how they accessed the UGS on the day of survey.

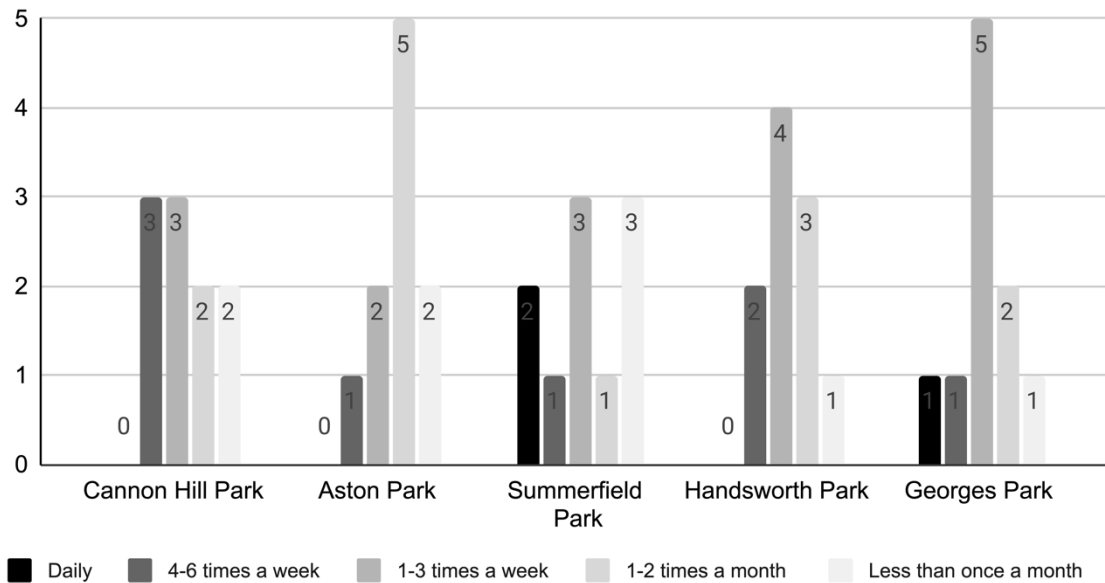
Asked if specific UGS features appealed to them, the most common responses from participants were ample seating (39), children's playgrounds (30), and on-site cafés (26). Despite the major focus in the POSDAT on facilities for sports games, only 22 participants reported this as an appealing feature, with many participants focusing on features which facilitate calmer forms of leisure (indicated by much seating being located along walkways) and social interaction (indicated by the preference for children's playgrounds and cafés). Although the POSDAT asked if the space allowed dogs, only 13 participants reported pet facilities as an appealing feature, indicating a lower preference for this usage type among this sample of users in Birmingham. These responses complement the participants' responses to the fifth question, of which 44% of participants perceived an attractive environment as the most influential feature affecting their usage of UGS in the city.

Most participants perceived their respective UGS as easily accessible (47), except for 2 surveyed at Aston and 1 surveyed at Cannon Hill; participants at both these UGS formed the largest 'postcode area' (see Figure 4) of surveyed users, suggesting these outliers live the furthest geographical distance from one of the high quality UGS and this impacts on their perception of its accessibility, regardless of potential travel mode (car usage was most commonly reported among participants at Aston).

#### Participants' Reported UGS Usage

Most often, across all 5 UGS surveyed, participants were not reporting using their UGS more than 3 times a week (28). However, between the UGS, these responses diverged. At Georges, 7 participants reported using the space at least once a week, with 1 reporting daily usage and 1 reporting 4-6 times a week. Whereas at Aston, half of the survey participants reported using the space once or twice a month, and 2 further participants reported less than monthly usage of the space (see Figure 5). However, given the small sample of this investigation, true regularity of UGS usage is difficult to claim; longitudinal data should be sought in future studies to further investigate a potential correlation.

### Responses to Survey Question 8: 'How often do you use this urban green space?'



**Figure 5** – Column Graph displaying participants' reported usage of their respective UGS. (Source: Author)

Furthermore, just over half of the participants, across all five UGS, reported that UGS was the closest to their home, i.e. their local green space. Although between the five UGS, these results diverged, with 8 participants at Cannon Hill reporting it was not their local space, but at Georges, 9 participants said it was their local green space. Thus, among this small range of UGS, the higher assessed quality UGS attracted more users from further afield than their lower assessed quality counterparts. These responses reinforce the UGS' catchments displayed in Figure 4, validating the metrics applied in the adapted POSDAT as holding genuine weight in determining the usage of a green space, and thus, its potential to positively impact residents' wellbeing. Of those participants who were not local to their surveyed UGS, over half said that they had travelled there largely for the greater range of features (mentioned earlier, but including on-site cafés, ample seating, open space suited to outdoor games and children's playgrounds) available within the space. Some participants (3) at Aston attributed their decision to the large manor house museum situated at the north side of the park (known as Aston Hall).

An unused green space is not a healthy one, and in this case, those UGS which, by desktop study and affirmed by the non-local participants responses, are known to provide a greater range of features and facilities to residents, are tending to attract greater usage from a wider geographical catchment. However, whilst the results of this survey begin to suggest a positive correlation between desktop assessment and users' perceptions, the low sample size collected demands further investigation with broader scope.



## **Discussion**

### **The results of the adapted POSDAT framework**

Of the 52 UGS included in the adapted POSDAT assessment, 9 UGS met at least 50% of the requirements of a 'high quality' UGS, suggesting that residents within the sample area may lack a high availability of high quality UGS despite the relatively high provision of UGS overall. Density of UGS was previously claimed as a key indicator of active living potential within an urban area, but the result of this assessment suggests that 'quality' – as measured by the POSDAT – may be getting overlooked in the pursuit of this (Gauvin et al., 2005; De Luca et al., 2021). The proliferation of abundant, lower quality, UGS in inner Birmingham suggests the area is affected by the 'green gentrification' dynamic – where UGS are primarily developed for the benefit of new [unaffordable] housing projects which decentre the role UGS play in supporting urban health (Anguelovski et al., 2022). Instead, these projects focus on the aesthetics of greenery as an asset to rapid economic growth (ibid.).

Further, the results indicate an uneven spatial distribution of UGS which have been assessed as high quality. The top 5 highest quality UGS, within the 3-mile study area, are located at least 2 miles from the centre (see Figure 3). None of these spaces are in the East of central Birmingham, suggesting residents in this area could be experiencing poorer active living potential due to being located at a greater distance from the city's highest quality green spaces (Mears et al., 2019). Although, this assessment does not fully examine the transport links across the city, which could contribute to mitigating this impact.

Overall, the results of the adapted POSDAT assessment suggests that equitable access to high-quality UGS in central Birmingham is poor. However, in isolation, these assessments do not interrogate the true accessibility of the highest quality UGS in the city, which supported the need for users' perceptions to be studied in tandem with spatial desktop assessments. The following section considers if users' perceptions of accessibility, as reported in the author's survey results, confirm the assumptions drawn from the POSDAT results, and how their perceptions could help to inform future UGS development in the city.

### **Users' perceptions of high-quality UGS in Birmingham**

The randomly sampled survey conducted urban green space users across the top 5 highest-quality UGS within 3 miles of Birmingham's city centre. This was an alternative way of considering users' perceptions to some existing studies, such as the Birmingham Green Space Survey (Birmingham City Council, 2022), which typically consider the accessibility of *any* green spaces within a given neighbourhood, or the vicinity of the respondent's postcode (ibid.).

Although a high proportion of respondents at Cannon Hill and Aston Parks reported using a car to travel to the UGS (40%), most respondents reported walking to their UGS, in under 30 minutes. This is a key finding which supports the traditional claim that UGS' walkability is often a key indicator of the active living potential of an urban neighbourhood (Gauvin et al., 2005). However, it is crucial to note the concept of 'walkability' doesn't necessitate increased active living for all populations, and usage of these UGS is further influenced by users' existing motivations or understanding of the benefits of an active lifestyle (ibid.). Whilst beyond the scope of this study, the influence of psychological pre-determination in urban health cannot be understated.

Additionally, among respondents across all five UGS, 44% reported that an attractive environment was most likely to influence their usage of the UGS, which suggests a weak correlation between this factor and UGS usage. Although this may suggest attractiveness of UGS is not a priority for Birmingham residents, Kondo et al.'s (2018) study found that accessing a variety of UGS may be a greater indicator of UGS usage, as some users may choose a more attractive environment for nature-based stress relief, whilst others choose a more open and emptier environment for sports and higher intensity physical activity. This could be a hidden factor at play within these results. Furthermore, respondents indicated that walkability was a key influence on their UGS usage, supporting the assertion that equal spatial distribution of UGS improves their usage (Lee et al., 2015). Regarding the adapted POSDAT, these results further suggest that the factor of accessibility remains a key indication of the overall quality of UGS and thus should receive due weighting in this novel assessment. Renewed focus on neighbourhood-scale development over the last decade also reflects a positive trend toward increasing the accessibility of UGS for residents (Aelbrecht & Stevens, 2019).

Regarding UGS facilities, across all respondents of the survey, ample seating and café facilities emerged as appealing and attractive, which indicates a strong desire among UGS users in the city for cultural services that facilitate social interaction in the community. These services are a major benefit of high quality UGS which are unrelated to physical activity, as they can facilitate friendly low-stakes interactions among citizens (De Luca et al., 2021). Whilst important to the grander project of creating social cohesion in urban places which are characterised by diversity (Aelbrecht & Stevens, 2019), it is difficult to ascertain the true impact that socially interactive UGS have on the city's health overall, given that many of the survey respondents were unwilling to travel beyond 30 minutes from their home to an UGS. Thus, this could indicate a greater need to improve the quality of other UGS which could improve neighbourhood-scale wellbeing and cohesion, an important aspect of urban health which has since gained renewed momentum following the rise of social isolation because of the measures taken to combat the COVID-19 global pandemic in 2020-21 (Pouso et al., 2021; Roe & McCay, 2021).

Across all UGS surveyed, 44% of respondents reported using their UGS irregularly, whilst 56% reported using their UGS at least once, and up to 7 times, a week. Whilst this suggests frequent UGS usage among many respondents, for the 44% using the UGS less often, it suggests a high number of citizens in this sample are not frequently experiencing the physical and social benefits which have been associated with high quality UGS previously (Riffat et al., 2016; González-Marín & Garrido-Cumbrera, 2024). Given the subjectivity of respondent-reported usage, and the high likelihood of respondent bias among these results, further 'objective' measurements of usage such as sensor collected data may be beneficial for a fuller picture of UGS usage in Birmingham to emerge.

Further, regarding proximity, only 20% of survey respondents from Cannon Hill Park reported that it was the closest UGS to their home, whilst 90% of survey respondents at Georges Park reported that it was their closest UGS. The catchment area for Cannon Hill (see Figure 4) was the largest of all the UGS surveyed, although this UGS attracted a higher number of car users (3) than Georges where all participants walked or cycled. These results indicate that Cannon Hill, the highest rated quality UGS, whilst attracting a larger area of users from further across the city, where cars are used to access the green space, this lowers the active

living potential of the space compared with an 'objectively lower quality', but more local/walkable green space like Georges Park.

This supports the inclusion of accessibility related questions on the adapted POSDAT framework, as this data cannot be ascertained by desktop surveyance of the UGS. As well as this, the higher percentage of respondents travelling further to reach high quality UGS supports the notion that walkability should not remain the single greatest metric of accessibility, and that other modes of transport which seek to reduce car usage, such as more frequent and reliable public transport, safe cycling routes and storage, or other measures which might encourage users, who are mobile and capable of choosing active travel, to opt for these routes. However, the POSDAT assessment adapted here for use in a British city negates the relevance of applying weighting to different UGS features which could hold greater bearing on the perceived quality of an UGS. Survey participants largely agreed that attractive natural environments, ample seating, cafés and children's playgrounds were more appealing green space features that increased their usage of UGS. These features could be given due weight in the POSDAT's expression of UGS quality for future investigation.

## **Conclusion**

This study aimed to address some gaps in the literature, namely the adaptation of the POSDAT (Edwards et al., 2013), developed in the Australian context, for usage in a British city. The successful adaptation of this assessment framework represents a useful pilot study for further research, although the framework does not currently consider the impact of weighting in determining quality scores. Future usage may wish to apply weighting to features which may be perceived as 'more impactful' by real users of UGS in the studied city/cities. These include ample seating, an on-site café, children's playground, and an attractive natural environment (at least one tree, a water feature, diverse flora planting).

Whilst the findings of this study reveal interesting new perspectives on UGS accessibility in the city, it is important to note that these should not be considered in isolation from the prior studies of Birmingham's green spaces. Many of the results affirm previously devised conclusions, particularly regarding the localisation of UGS usage, regularity, and the perception of accessibility. However, there are some key considerations which can be distilled from this study:

- The need for different *types* of features to be included in UGS, especially those which provide for social interaction and leisure outside of vigorous exercise. Most users surveyed perceive these facilities as influential to their UGS usage, re-iterating the importance of developing and maintaining a variety of UGS types, as claimed across the existing literature on UGS, which appeal to a diverse range of users and support both physical and mental wellbeing (Lee et al., 2015; Kleinschroth et al., 2024; Aelbrecht & Stevens, 2015).
- The importance of encouraging and facilitating walkability, active travel (i.e. cycle routes) and public transport, rather than car dependency, in determining the accessibility of UGS, and thus the potential for green spaces to meaningfully improve urban health.

- For Birmingham, the East side of the city is lacking in local access to high quality UGS (see Figure 4). Future planning policy could account for this a range of ways, whether that be through the development of new, 'high quality' green spaces in this area, re-vitalising existing green spaces to a higher standard, and increasing and encouraging the use of active travel routes to other high quality UGS in central Birmingham.

Additionally, the randomly sampled survey method applied is a useful suggestion for further studies aiming to include and value the perceptions of users in the assessment of UGS quality and accessibility, which Buckland & Pojani (2023) acknowledge could be an integral part of assessing the environmental and social justice of a given city. It is important to also acknowledge the specificity of these results, and that whilst this methodology represents a valid contribution to the understanding of the perceived accessibility and quality of Birmingham's UGS, the suggestions given here cannot necessarily be extrapolated into other contexts without first considering the green space needs and perceptions of that city's residents.

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## **Appendices**

### **Appendix 1 – Full breakdown of the adapted POSDAT framework**

#### **Public Open Space Desktop Auditing Tool - Adapted for use in Birmingham, England.**

##### **1. What type of activities is the space designed for?**

Tennis	No = 0	Yes = 1
Football	No = 0	Yes = 1
Netball/ Basketball	No = 0	Yes = 1
Cricket	No = 0	Yes = 1
Fitness	No = 0	Yes = 1
Hockey	No = 0	Yes = 1
Athletics	No = 0	Yes = 1
Rugby	No = 0	Yes = 1
Skating	No = 0	Yes = 1

##### **2. Is there a water feature present?**

Lake/ Pond	No = 0	Yes = 1
Water Feature	No = 0	Yes = 1
Stream/ Canal	No = 0	Yes = 1
Natural Wetlands/ Bog	No = 0	Yes = 1

##### **3. Which, if any, of the following features are present?**

Wildlife	No = 0	Yes = 1
Flowers & Planters	No = 0	Yes = 1
No flora/ fauna	No = 0	Yes = -1

##### **4. Estimate the approximate number of trees present.**

No trees	= 0
1-50 trees	= 1
50-100 trees	= 2
More than 100 trees	= 3

##### **5. Are there disabled-access walking paths within or around the UGS?**

No = -1	Yes = 1
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##### **6. Is there an enclosed children's playground in the UGS?**

No Playground = -1	Not enclosed, but equipment is there = 1	Yes = 2
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Jay Chambers

**7. Are dogs allowed in the UGS?**

No/ No Information = 0	Yes = 1
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**8. Which of the following amenities are present?**

Seating	No = 0	Yes = 1
Tables	No = 0	Yes = 1
Café or Food Kiosk	No = 0	Yes = 1
Publicly accessible toilets	No = 0	Yes = 1
Public art	No = 0	Yes = 1
Car parking facilities	No = 0	Yes = 1

**9. Is there access to public transport, within one block, of the UGS?**

No = -1	Yes = 1
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**10. Where is lighting located?**

Around activity space, if any	No/ No Activity Space = 0	Yes = 1
Around the playground, if any	No/ No Playground = 0	Yes = 1
Along the paths	No = 0	Yes = 1
Perimeter, all/ some sides	No = 0	Yes = 1
Random throughout UGS	No = 0	Yes = 1
No lighting within the UGS	Yes = -1	

UGS Quality Score: \_\_\_\_ / 34

## Appendix 2 – Full breakdown of survey questions, with brief justification of each.

Table 2: Survey Questions with justifications for their inclusion, based on how each question aims to confirm or challenge assertions in the existing literature. (Author's own creation, 2024)

Survey Question	Justification
1. Please state your postcode in the box below.	This question aims to distil a 'catchment area' of responses to the survey at each site, to consider how relevant Buckland & Pojani (2023)'s dependence upon walkability is, when considering the accessibility of each UGS.
2. Which mode(s) of transport did you use to get to this urban green space today?	As mentioned in Buckland & Pojani (2023)'s report, UGS walkability, defined as being 300m from the resident's home by the UN, is considered a major indicator of UGS usage. Hence, this question aims to test this assumption with respondents and consider if the availability of other transport modes may improve users' perception of UGS accessibility in their area.
3. Roughly how long did it take you to get here today?	This aims to challenge or confirm the assumption that the closer the UGS, the more accessible it should be (Buitelaar & Cozzolino, 2017). Also, the <i>actual</i> travel times of users is not possible to gain from the adaptation of the POSDAT assessment (Edwards et al., 2013).
4. Is travel time a major barrier for you to use this green space?	As mentioned in the literature, UGS accessibility is usually defined as being related to distance/ time metrics (Huang et al., 2023; Buckland & Pojani, 2023). Hence, this question aims to distil users' perceptions of how relevant this aspect of accessibility is, and will be considered in the context of responses to other questions in the survey, which consider the relevance of factors like the availability of public transport (Question 2, 5, 7) and the perceived quality of the UGS (Question 5, 6, 9, and the 'objective' quality measured by the adaptation of POSDAT).
5. Please rank each aspect of green spaces, from 5th to 1st, of how important they are to influencing your usage of green spaces.	The options given here are drawn from the features identified as indicators of UGS quality in the adapted POSDAT. Given that the 5 UGS to be surveyed have already been 'highly rated' by the POS desktop audit, this question aims to draw comparisons between the users' perceptions of the importance of these features, and the way in which these features are valued by the supposed 'objective' assessments distilled by POSDAT.
6. Which of the following common urban green space	As mentioned in the literature, the quality of UGS may be an important factor determining levels of usage and hence, accessibility for users (Mears et al., 2019). This question asks for users' perceptions of how

facilities appeal to you?	'appealing' some of these commonly identified features are, to consider how this might impact their usage levels (as determined in Question 8).
7. Do you think this urban green space is easily accessible?	As identified by Buckland & Pojani (2023), a key aspect missing from their assessment of UGS accessibility in Birmingham is how the users perceive it. Hence, this question addresses that gap by asking for respondents to state if they 'agree'- with the POSDAT assessment of that UGS' accessibility- or if they do not, to provide a brief justification for such.
8. How often do you use this urban green space?	Users' levels of UGS usage might be affected by their perception of the space's quality, as acknowledged in the literature (Luo et al., 2021). Hence, this question considers if the responses to Question 7 may correlate to respondents reporting higher or lower levels of usage.
9. Do you consider this green space to be the closest green space to your home?	This question aims to challenge the presumption across the literature that users may be unwilling to travel further to a 'high quality' UGS if their local space does not have the capacity for health-benefitting upgrades (Hughes, 2020; Buckland & Pojani, 2023; Anguelovski, et al., 2022). Also, the responses given for this question may inform the implications of the overall results, to consider how planners may seek to improve more UGS across the city which currently have a lower assessed 'quality', according to the adapted POSDAT.