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**Accessibility, Urban Design, and the Whole Journey
Experience of Visually Impaired People in London**

SBDP2

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Being a dissertation submitted to the faculty of The Built Environment as part of the requirements for the award of MSc Transport and City Planning at University College London:

I declare that this dissertation is entirely my own work and that ideas, data, and images, as well as direct quotations, drawn from elsewhere are identified and referenced.

Acknowledgments

Firstly, I'd like to express my sincere gratitude to Professor Robin Hickman for his supervision and invaluable guidance throughout the research process. His support has opened doors for me, which would otherwise have remained closed. I would also like to thank all my lecturers from The Bartlett School of Planning and the wider university for their willingness to discuss and share their work with me and for stimulating my interest in the subject matter of this dissertation. Studying under their tuition has left me both inspired and elevated to make meaningful contributions in my future career.

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Abstract

Despite emphasising the importance of building an inclusive city for all in the London Plan (2021), the capital's infrastructure, including the transport network, displays design elements that fall short of adequately meeting the needs of VIP. This failure signals an inadequate understanding of VIP user needs and, indeed, the wider spectrum of accessibility requirements of other groups. At present, however, not enough is known about the journey experience of VIP, nor is there appropriate emphasis being placed on this user group by the relevant design practitioners within Transport for London (TfL).

This research has demonstrated that the journey experience of VIP in London is fraught with barriers resulting from infrastructural design, operational practice, and a growing variety of design interventions introduced to meet wider societal goals. While it is acknowledged that VIP experience greater difficulty traveling in London when compared to those with full sight owing to the limitations imposed by their visual impairment, experiences brought about by design practice and the conscious prioritisation of certain user groups over others, exacerbates the already unequal experience of travel by this user group. This research has shown that exclusionary design practice is acutely experienced by VIP on London's streets, where a growing number of mixed-use spaces are being created in places where, previously, clear demarcation of space existed. Other interventions, such as continuous footways, and particularly, the expanding network of infrastructure to support personal mobility, all produce the unintended outcome of widening the equity gap between atypical bodies and VIP.

Chapter 1: Introduction

1.1 Background

London, the UK's largest and most populous city, is currently home to more than nine million people (GLAa, 2021). Of this number, 213 thousand people are affected by sight loss of varying severity (RNIB, 2021). Furthermore, forecast data from the London Assembly Health Committee (2017) estimates that by 2030 there will be an additional 74 thousand people living with sight loss in the capital. For visually impaired people (VIP) a range of daily activities present challenges not experienced by fully sighted people, while others, such as driving, are not possible at all. An accessible and inclusive urban environment that considers the needs of VIP is therefore a necessity for this group to undertake journeys, access opportunities and participate fully in society (Barnes, 2000, Church, et al., 2000; Low, et al., 2020). Given the difficulties VIP experience due to the nature of their condition, it is important that additional barriers are not created by inadequate or inconsistent design practice within the built environment that disable their journeys further. For VIP to embark on independent journeys, that do not involve reliance on others for assistance or on private vehicles to chauffeur them around, an accessible streetscape and public transport system are thus vital.

Despite emphasising the importance of building an inclusive city for all in the London Plan (2021), the capitals infrastructure, including the transport network, displays design elements that do not adequately meet the needs of VIP. This failure signals an inadequate consideration of VIP user needs within the wider spectrum of accessibility requirements. Additionally, not enough is known about the journey experience of VIP, nor is there appropriate emphasis being placed on this user group by the relevant design practitioners within Transport for London (TfL).

1.2 Research Focus

The purpose of this research is to gain insight into the journey experience of VIP living in London, identifying elements of the TfL network that present barriers to, or exclude, this user group. The outputs of the study will be a contemporary understanding of the

issues facing VIP journeys in London and a set of (re)design principles intended to guide practitioners at TfL towards making meaningful change through current and future projects.

1.3 Location of Research

The research will be undertaken in central London, where an identified route that includes various interventions and design elements that best represent a typical user journey will be investigated. Typical features include different forms of street crossings, shared spaces, and recent interventions aimed at offering healthier ways to travel. Use of the London Underground is incorporated to examine the accessibility of public transport and achieve maximum coverage of different modes used on in a typical journey.

1.4 Aims and Objectives

The overarching objective of this research is to gain insight into how VIP experience travel through London and identify how barriers to access can be overcome to improve journeys for this group. It is intended that a new set of design principles that improve these spaces and the journeys for VIP, as well as all users, will be created. This draws inspiration from both the concept of universal design (UD) and the rule of difference principle (Taylor, 2011), where directing resources towards areas most in need will ultimately enhance the overall experience for everyone. The interrogation of this research theme has been deconstructed into five research questions.

1.5 Research Questions

- 1. How does design and inconsistency of design impact on travel and what typical problems are experienced?**
- 2. How do visually impaired users experience an example station interchange?**

3. **How do visually impaired users experience different elements of street design?**
4. **What are the major similarities and differences in viewpoint and experience of design interventions between VIP and fully sighted users?**
5. **What should we do to improve design practice, (what is the set of design principles that help us improve these places)?**

1.6 Research Structure

Having set out the issue to be explored and the research questions, an in-depth examination of the existing literature follows in Chapter 2. Here, the intersection between the journey experience and disability is explored, as well as contemporary design concepts and current policy at work. Chapter 3, contains the methodology, informed by findings from the literature review, including consideration of research ethics. Chapter 4 presents the results of the study alongside detailed discussion of the findings, while Chapter 5 provides concluding remarks alongside policy implications and opportunities for further research.

Chapter 2: Literature Review

2.1 Introduction

The following literature review has been developed in line with the research objectives and will inform the methodology for this study. The review will be divided into four parts, addressing two key areas: the user experience of disabled people undertaking journeys, and principles of design that impact this group, paying particular attention, where possible, to VIP within the wider disability spectrum. Firstly, there will be a review of current knowledge on the whole journey experience of people with disabilities, identifying the key aspects of travel that present barriers to this user group. Next follows an analysis of how design consistency impacts the journeys of VIP, establishing the importance of predictability and to what extent VIP are considered by design practitioners during the planning process. The third section of the review will examine UD as a means of best practice around which better infrastructure can be created, while the final section will critique current policy pertaining to VIP that informs design practice in the U.K. and London.

2.2 The Door-to-Door Journey

The ability to travel independently along the whole journey chain is crucial for users with disabilities to participate fully in society and avoid social exclusion (Church et al., 2000; Lucas, et al., 2001; Mackett & Thoreau, 2015). However, despite ongoing efforts to make access to transport equitable, there still exists many disabling attributes along the journey chain that present disproportionate barriers to disabled users, including VIP (Šakaja, 2020). Problems experienced undertaking a door-to-door journey by this group include all manner of public realm, but typically lie with the disabling attributes contained within the architecture of public space, including the streetscape and transport infrastructure, in addition to encounters of ableism (Evans, 2009; Hales, 1996).

Traveling in London relies heavily on the ability to access visual information. However, the provision of signage and live travel information is largely biased towards fully sighted people that can receive and act accordingly to it in large numbers and from a

distance. Examples include street signs, building names, information display panels, and wayfinding signage at stations (Low, et al. 2020), all of which are vital for navigation but exclude VIP. Limiting outcomes for disabled users of public transport are reflected in studies, which have revealed people with disabilities make less journeys, traveling shorter distances, and by fewer modes than their able-bodied counterparts (Deka, 2014). Additionally, VIP have reported experiencing discrimination whilst traveling (Butler & Bowlby, 1997; Rickly, et al. 2021), detailing incomprehension of their needs from transport staff and other passengers.

While a large body of research pertaining to disabled people using public transport exists, the most recent publication on this topic by Park & Chowdhury (2022) notes that there is still little on the exploration of the whole journey experience. Moreover, even less granular research exists on specific sub-groups, whose experiences and needs vary considerably. Notably, the authors emphasise the importance of “bottom-up” policy implementation, urging engagement with the disabled community (p.182). At present, however, consultation with user groups like VIP within transport is currently lacking, as is representation of disabled people within public policy and law-making in the U.K. (Chaney, 2015).

The limited available literature on this theme signals the pressing need to both thoroughly understand the door-to-door journey experience of VIP and engage with this group to shape accessibility standards. Using the idiom that emerged from the works of Thomas Reid et al (1850, p.43), that “the strength of the chain is determined by that of the weakest links,” if just one link in the journey chain is broken for user groups like the visually impaired, the journey may not be possible to complete, discouraging travel to pursue activities outside the home. It is critical that engagement with groups like VIP takes place to fully understand and facilitate user needs, shape design practice, and ensure a robust, sustainable journey chain is created and maintained.

2.3 Consistency/Inconsistency

The degree to which VIP can confidently anticipate elements of their journey, particularly in unfamiliar places, has a significant effect on their experience (Shen, et

al. 2008). Interview-based studies have revealed a consensus among VIP that when traveling on foot, simple and relatively low-cost interventions, such as placing street signs at a readable height and painting the edge of all kerbs and steps would make significant gains in providing assurance and assisting navigation (Douglas, et al., 2006; Kitchin, 2001). Using public transport, VIP often encounter inconsistencies in available assistance and design variation among operators that creates complexity and unpredictability (Marin-Lamellet, et al. 2001; RNIB, 2009). This produces instances where one aspect of travel, such as taking a train, may be achievable for an individual, while navigating the interchange upon arrival is not. Design variation between modes and across operators, as well as the intermittent provision of inclusive design considerations, such as station announcements and tactile paving are thus essential grounding elements for VIP, providing reassurance and confidence (Crudden, et al. 2017; Low, et al. 2020).

Different forms of street crossings and the provision of accessibility design elements, such as activated crossing signals, creates inconsistency (Matthews, et al. 2014). This is compounded by shifting patterns of mobility and supporting infrastructure, as well as the increase in street art promoting social issues, new forms of crossings, and shared spaces (Smeds & Cavoli, 2021) raising safety concerns for VIP (Horrell & Jones, 2015). Little research exists regarding the effect of these phenomena and designs on the ability of VIP to travel safely and independently, though indications are that this user group are becoming increasingly marginalised, including guide dog owners (Childs, et al, 2010; O'Dell, 2021; O'Reilly, 2021). The consequences of design inconsistency are acutely experienced by VIP, hence the importance of simple standardised design elements of both the streetscape and transport infrastructure that ensure journeys are predictable, reliable, and familiar. Given the ongoing transformation of London's streetscape, there is a need to evaluate how contemporary design interventions have impacted the journey experience of VIP.

2.4 Universal Design

UD is an architectural principle that aims to create products and environments that are usable to everyone, going beyond merely facilitating access for those with specific user needs (Dolmage, 2017). The term is accredited to American architect Ronald L.

Mace, who introduced the concept in the 1970's, before becoming increasingly vocal on the subject after the introduction of the Americans with Disabilities Act (1990). Mace argued that many practitioners saw UD as making adaptations, that were often ill-considered, to comply with regulations rather than making honest attempts at improving the accessibility of buildings (Williamson, 2019). He contended that this reinforced the message that "people with disabilities were a marginal afterthought" (p.148) rather than considered in the planning stages. This notion that the built environment embodies social attitudes has been discussed by geographers, where conversations have generally agreed that, as the built environment is entirely constructed, societal values and norms are embedded within structures. It is therefore a statement about who is welcome and supposed to occupy space (Donald, 1992; Napolitano, 1995; Kitchin, 1998).

Today, it appears that the potential of UD is still largely misunderstood. UD often features in design discourse alongside discussions of adaptation and the inclusion of specific user groups, missing the wider potential to deliver places and services that better serve everyone (Null, 2013; Persson, et al, 2015). This inaccurate understanding of UD as a means of adaptation for the few suggests that the benefits of planning universally are yet to be unlocked. Indeed, economic appraisal of UD transport projects has shown the positive effect on both the user experience and profitability under cost-benefit analysis metrics (Odeck, et al., 2010). While a divergence in understanding of UD persists, the proper implementation of UD holds the power to reshape the built environment and communicate true inclusivity through the physical structures contained within cities.

2.5 Policy and Practice

The 1990's was a pivotal decade for disability legislation in the U.K. where the government soon followed the Americans with Disabilities Act (1990), introducing the Disability Discrimination Act (1995). The act made it illegal to discriminate against disabled people by refusing to provide, or by providing lesser, services, including public transport. In the proceeding decades, additional policies and guidance documents have been introduced, such as the Equality Act (2010), requiring transport to be accessible for all users. While the legislative framework has grown, however,

there has not been adequate recognition of the spectrum of user needs, such as of VIP. The current National Planning Policy Framework (p.32) requires that transport “address the needs of people with disabilities” (Ministry of Housing, Communities & Local Government 2021), while other industry standard guidance like Manual for Streets and The London Plan, feature only passing reference to visual impairment (Anon, 2007; GLAb, 2021). More specific guidance is available, for example in the Department for Transport’s Inclusive Mobility best practice guide (2021) or The British Standards Institution design guide (2018), however, these are non-prescriptive, open to interpretation, and difficult to challenge legally.

Blunt instrument policy and a lack of prescriptiveness has resulted in limited improvements made to London’s public transport and streetscape infrastructure for VIP. Indeed, ongoing changes demonstrate a preference for fully sighted people. This can be seen through the increased provision of infrastructure to support personal mobility, including cycle lanes, cycle hire options, and e-scooters, in addition to continuous footways and shared spaces. These transformations have added complexity, inconsistency, and unpredictability for VIP, contradicting guidance on keeping shared space between pedestrians and cyclists to a minimum (Department for Transport, 2021).

2.6 Research Gaps

Limited, and fragmented, research exists on the door-to-door journey of disabled people, particularly VIP. Additionally, not enough is known about how the inconsistency of design impacts the journeys of this group, indicating a clear need for a contemporary investigation that brings together these interest areas. By investigating the whole journey chain of VIP, a complete understanding of barriers can be obtained and a robust set of recommendations to practitioners and policymakers made. While it is understood that the standardisation of streets and transport provides reassurance and predictability to VIP, as well as other user groups, insufficient attempt has been made to steer design principles in this direction. Given the budgetary constraints of transport operators, utilising UD to form design recommendations and best practice holds the potential to deliver both financial benefit to transport operators, and all users.

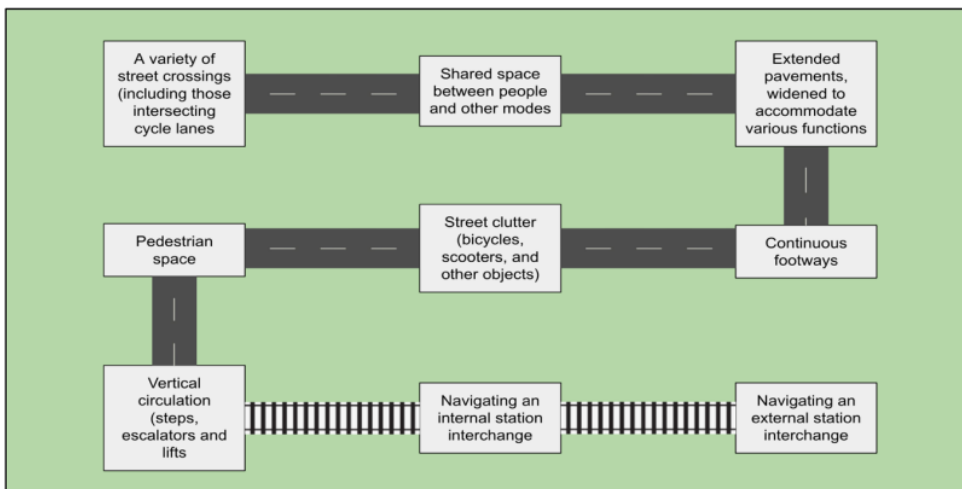
Chapter 3: Methodology

3.1 Overview

To investigate the research questions, a study was conducted using a qualitative mixed methods approach. The aim was to gain insight into individual experiences and opinions about a typical user journey containing common elements likely to pose challenges to VIP. Qualitative methods were selected due to the spectrum of sight capabilities of the participants, which impacted their perceptions, experiences, and responses. Acknowledging the inability of a single method to “capture the richness of human experience” (Eder & Fingerson, 2012, p.188) gathering data required the flexibility qualitative methods provide, allowing for exploration of issues and themes as they arose (Liamputtong, 2020).

3.2 Typical Journey Design

A field study was undertaken to construct a typical user journey in London containing common elements that represent inconsistency and unpredictability for VIP. Upon consideration of findings from previous studies, discussed in the literature review, in addition to current practice, the below infrastructural elements (**Figure.1**) were selected for investigation.



(Figure.1) Typical user journey elements

The field study of central London indicated the Bloomsbury area in the London Borough of Camden to fulfil the journey criteria. A suitable route was then mapped and refined to ensure the journey could be completed in a timely manner to avoid discouraging participation in the research. The resulting journey took approximately 90 minutes to complete. The route was divided into two parts, **Part-1** involving the use of the London Underground (**Figure.2**) and **Part-2** navigating the streetscape (**Figure.3**). Both stages of the study sought to answer **Q1**, **Q4** and **Q5** as overarching questions, while **Part-1** focussed specifically on public transport (**Q2**), and **Part-2** dealt with streetscape design (**Q3**). A step-by-step guide was created to ensure the continuity of each sample user journey, and interview questions relating to the identified points of interest were composed.

3.3 Journey on Public Transport (Part-1)



Figure.2 Part-1 of the sample user journey using public transport

3.3a Continuity Steps

1. Greet the participant at a location within King's Cross St. Pancras that suits their needs/capabilities and begin following signs to the London Underground

2. Board a Circle, Metropolitan, or Hammersmith & City Line train to Euston Square
3. Make the **external interchange** between Euston Square and Euston
4. Navigate to re-enter the Underground at Euston and board a southbound Victoria Line train, traveling one stop to Warren Street
5. Make the **internal interchange** at Warren Street for a southbound Northern Line train, traveling one stop to Godge Street

3.4 Walking the Streetscape (Part-2)

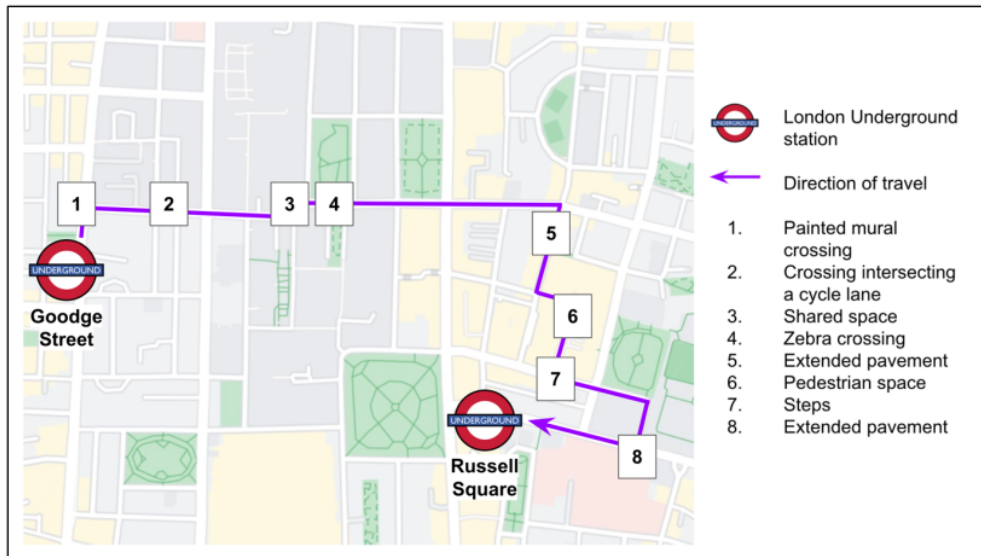


Figure.3 Part-2 of the sample user journey examining streetscape design

3.4a Continuity Steps

1. Walk north to the **potentially problematic street crossing** featuring a painted mural on Tottenham Court Road, cross and continue walking straight onto Torrington Place
2. Cross at the **informal crossing intersecting a cycle lane** at Huntley Street
3. Continue eastward towards Byng Place and pass through the **shared space**

4. Cross at the **zebra crossing intersecting a cycle lane** at the south entrance to Gordon Square and continue to Marchmont Street
5. Turn right onto Marchmont Street and proceed along the **extended pavement** to the Brunswick Centre
6. Turn left into the **pedestrian space** of the Brunswick Centre and proceed south to exit via the **steps**
7. Turn left on Bernard Street, becoming Brunswick Square and follow the road around to the **continuous footway** at the junction with Guilford Street
8. Escort, if necessary, the participant to the nearest Underground station (Russell Square) or other destination

3.5 Sample User Journeys

The empirical element of the study involved carrying out walk-along interviews with two groups (**Group-A** and **Group-B**) each comprised of five participants. **Group-A** consisted of fully sighted individuals, while **Group-B** was comprised of VIP. recruited via UCL's Access and Inclusion team and affiliations with previous research participants within the Faculty of Engineering Science. Participants were taken, individually, on the designed journey to avoid group bias in the walk-along interviews.

3.6 Walk-Along Interviews

Walk-along interviews were conducted at the numbered points of interest, with questions serving as prompts (**Appendix.1**). The walk-along interview method was deemed to be most appropriate to examine "how physical, social, and mental dimensions of place and space interact within and across time for individuals" (Carpiano, 2009, p.264) gathering live feedback on participant's experiences. The questions embedded within the walk-along interviews were constructed to answer each of the research questions whilst allowing participants to speak freely and more broadly. This method allowed for exploration of themes and issues raised by the participants (Blaxter, et al., 2010; Galletta & Cross, 2013).

Interviews were audio recorded, with voluntary permission obtained, and subsequently transcribed. The interview data was then analysed using a thematic coding scheme

on NVivo software (**Table.1**). To further mitigate against confounding variables, including group bias, response bias, participants were given opportunity to clarify and summarise their thoughts at the end of each journey segment. Participants were encouraged to reflect on the overall experience and provided time to speak freely on anything they felt was appropriate (Alshenqeeti, 2014).

3.7 Analysis Method

The data was thematically coded using NVivo, a qualitative analysis software used for “storing, managing, and analysing qualitative data” (Jackson & Bazeley, 2019, p.27). Codes were created based on a combination of the identified points of interest, themes raised by participants, and the overarching research questions. Interview responses were inductively analysed by coding references to gain insight into the overall text content and prominence of themes. Upon initial coding of broad themes, such as “Crossings” child codes were created in accordance with emerging responses and statements from the data, generating further granularity (Grbich, 2013; Miles & Huberman, 1994). Word frequency was also utilised to understand response difference between the two groups and provide further insight. The presentation of results in the following chapter combines relevant quotes from the interview transcripts with coding references, establishing prominent themes that seeks to develop “a framework of the underlying structure of experiences” (Thomas, 2006, p.237).

3.8 Statement of Research Ethics

Prior to carrying out the research, the relevant clearance was obtained from University College London (UCL) to ensure compliance with the university’s requirements on risks, ethics, and data protection. All participants consented to be part of the research and were provided with an overview of the study. Participants were also provided with copies of the study Information Sheet and Informed Consent. Alternative formats were available for the visually impaired participants, including large font and electronic copy. To guarantee the anonymity of the participants, no identifying personal data, such as their name, age or contact details was collected beyond their informed consent.

<p>Design Consistency and Inconsistency</p> <ul style="list-style-type: none"> • Aesthetics • Clutter • Steps • Tactile paving • Wayfinding 	<p>Station Interchange Design & Experience</p> <ul style="list-style-type: none"> • Horizontal and vertical circulation • Passenger interactions • Staff assistance • Station concourse 	<p>Street Design Elements & Experience</p> <ul style="list-style-type: none"> • Allocation of space • Crossings <ul style="list-style-type: none"> - Zebra - Painted mural - Intersecting cycle lane • Cyclists, vehicles, and e-scooters • Kerbs • Pavements <ul style="list-style-type: none"> - continuous footways - extended pavements • Pedestrian space • Shared space
<p>Experiences of Exclusion & Negative Feeling</p>	<p>Experiences of Inclusion & Positive Feeling</p>	<p>Suggestions for Improvement</p>

Table.1 NVivo analysis codes

Chapter 4: Results and Analysis

4.1 Overview

This chapter presents the key findings from the study, alongside interpretive discussion justified by qualitative analysis of the walk-along interviews and supportive statements. The research questions are dealt with in turn, beginning each section by restating the relevant question. Key themes derived from the data obtained from groups **A** and **B** are explored and complimented with noted observations from the field work and supporting data. Data is presented in the form of hierarchy charts, with the size of each category proportionate to the number of coding references received.

The below hierarchy chart (**Figure.4**) provides an overview of coding references (direct and aggregated) across groups **A** and **B**. To convey further insight, each research question is displayed with its associated hierarchy chart, where the findings are discussed at a more granular level.

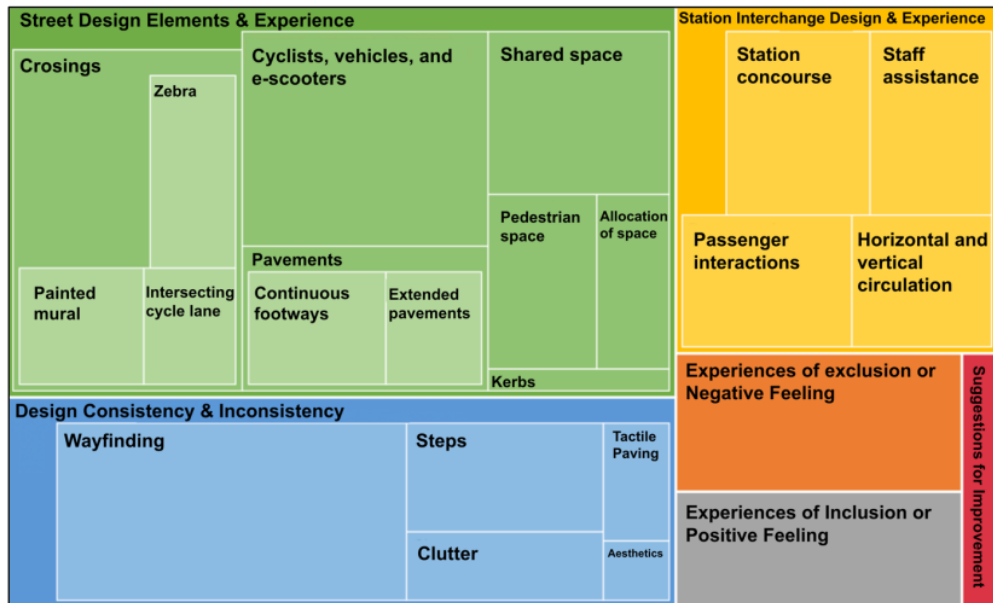


Figure.4 Codes by number of coding references (all participants)

4.2 Design Consistency/Inconsistency

QUESTION ONE: How does design and inconsistency of design impact on travel and what typical problems are experienced?

Design choices and inconsistency of design present throughout the sample user journey disproportionately impacted **Group-B**. As the sight capabilities of individuals within the group varied, reported experiences with consistency ranged significantly. Some members were able to make use of elements, such as signage and colour-coding, whilst others relied on other ways of navigation. The below hierarchy chart (**Figure.5**) displays the 33 aggregated coding references pertaining to **Q1**.

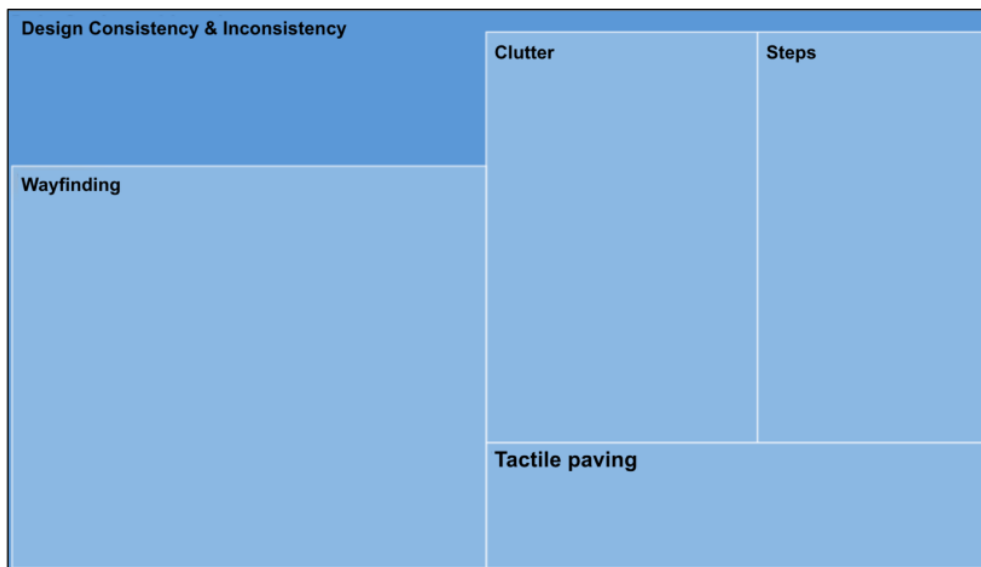


Figure.5 Design Consistency and Inconsistency codes by number of coding references (**Group-B** only)

4.2a Wayfinding

Wayfinding was the most problematic element of consistency (41% of coded references) with too much design variation leading to unpredictability, confusion, and safety concerns. Aesthetic design choices, such as the ceiling pattern at King's Cross station, tile patterns on platforms, and the painted mural crossing on Tottenham Court

Road were identified as key causes (**Participant-B1**). The size, contrast, and placement of signage was also reported to be an important element of inconsistency that can facilitate or impede independent navigation (**Participant-B1,B2**).

4.2b Clutter

“All the trees, benches, dining tables, signs, and things like that are a whole new set of obstacles to work around.” (**Participant-B3**)

While objects, such as seating, bins, and information points, are important infrastructural elements of London Underground stations, commercial activities found in stations and the street have led to what can be generally referred to as clutter for VIP (**Photo.1**). The mobile nature of objects like menu signs, informal seating, and vendors represent a growing number of objects of unpredictability and inconsistency that also serves limited purpose for VIP. This problem was observed to be significantly more problematic in **Part-2** of the journey where the sporadic dispersal and amount of clutter necessitated careful negotiation for **Group-B**.

“Street clutter is a real pain, there’s so much more of it now too.” (**Participant-B4**)



Photo.1 Unconfined activities in public space creates obstacles for VIP

4.2c Tactile Paving and Steps

The inconsistent and incorrect provision of tactile paving was raised by all of **Group-B**. Concerns were voiced regarding tactile paving at crossings in terms of intermittent availability, incorrect colour-coding, and length.

“Often the kerb drops down and it’s significantly longer than the small strip of tactile. That’s an endemic problem.” (Participant-B5)

The steps encountered in the study were of unequal depth and of varying numbered groupings owing to the accessibility ramp being built into the design (**Photo.2**). Tactile paving was also not provided at the bottom of the steps, prompting discussion regarding the need for both the standardisation and enforcement of regulations around tactile paving, in addition to the prominence of these problems.



Photo.2 Inconsistency in the design of steps is anxiety producing and can be dangerous for VIP

The demarcation and reallocation of space on London’s streets has also contributed to experiences of inconsistency for VIP undertaking journeys. Recent changes to how public space is allocated and used was reported to be problematic as the boundaries and associated signalling safety indicators VIP rely on have been ignored and, at

times, removed. New design elements, such as extended pavements, continuous footways, shared spaces, and painted mural crossings, which will be discussed in more detail later, have contributed to experiences of inconsistency for VIP.

4.3 Station Interchange

QUESTION TWO: How do visually impaired users experience an example station interchange?

The hierarchy chart below (**Figure.6**) displays the results gathered from **Group-B** regarding questions pertaining to **Q2** (2 direct and 27 aggregated coding references).

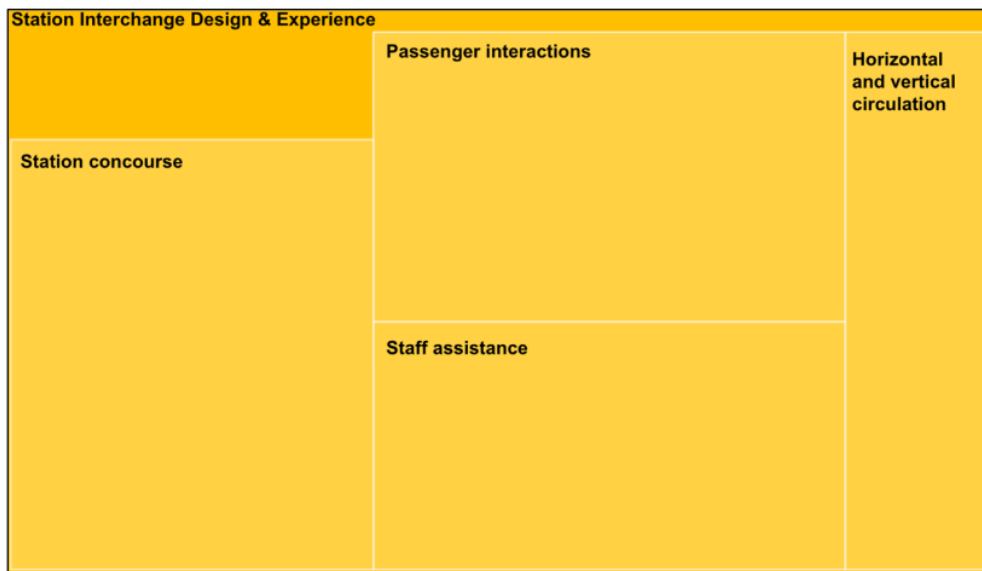


Figure.6 Station Interchange Design and Experience codes by number of coding references (**Group-B** only)

4.3a Station Concourse

The most identified element within the sample station interchange was the concourse (8 direct coding references). **Part-1** began at King's Cross Station, where the first walk-along interview question inquired about initial impressions, to which two main responses were given, the size of the space and the lack of contrasting colour

(**Photo.3**). 60% of the **Group-B** referred to the vastness of the open concourse and the navigational difficulties this presented.

“It’s like a desert for me walking into a wide-open space like this” (**Participant-B3**)



Photo.3 the absence of tactile paving and clear building lines on concourses makes navigation extremely difficult for VIP

Visual contrast was identified, giving reference to the grey colour scheme and chrome fixtures. **Participant-B1** explained their practiced strategy of walking the outside perimeter of King’s Cross Station before entering at the last possible moment to reduce exposure to these challenges. **Participant-B2** discussed the internal structural support pillars that were also poorly contrasted to the floor, suggesting “a black ring or something, around head height” to help distinguish them. **Participant-B2** also recounted a previous incident where they were hospitalised after colliding with a similar pillar.

4.3b Staff Assistance

Accessing assistance from staff was generally described as scarce and increasingly difficult to find. Comment was also made regarding the lack of integration between

assistive services offered by transport operators that creates delays at points of transition. Three participants received staff assistance from their arrival platform to the starting point of the sample user journey.

4.3c Passenger Interactions

Two overall commonalities emerged regarding experiences with other passengers, with a general theme of positive interactions present. Firstly, there appears to be an unfounded assumption by fully sighted people that visually impaired people are lost and in need of assistance. **Participant-B3** and **B5** commented how they'd actually assisted others with directions several times, owing to their acute awareness of their surroundings, involving the memorisation of station layouts and services. Second, personal safety was raised, with **participant B1** and **B2** recounting instances where members of the public accidentally collided with them, breaking their canes. Drunkenness was also brought up, where experiences ranged from positive to more negative. However, these instances were reported to be concerning owing to the increased vulnerability VIP experience.

4.3d Horizontal and Vertical Access

Group-B expressed a preference for steps and escalators when making an internal station interchange, with several justifications given. **Participant-B2** explained they were dissuaded from using lifts because of the buttons, whereas **participant-B5** spoke of their intention to both assert independence and take advantage of the physical exercise steps provide. **Participant-B4** favoured steps and escalators for their reliability and predictability, and **participant-B1** avoided escalators and lifts as a means of circumventing crowds.

4.4 Streetscape Design

QUESTION THREE: How do visually impaired users experience different elements of street design?

The below hierarchy chart (**Figure.7**) displays the 53 aggregated coding references in reference to **Q3**. Owing to the open-system nature of London’s streetscape, a wider variety of design practice and modes were available for examination, evoking a greater number of responses.

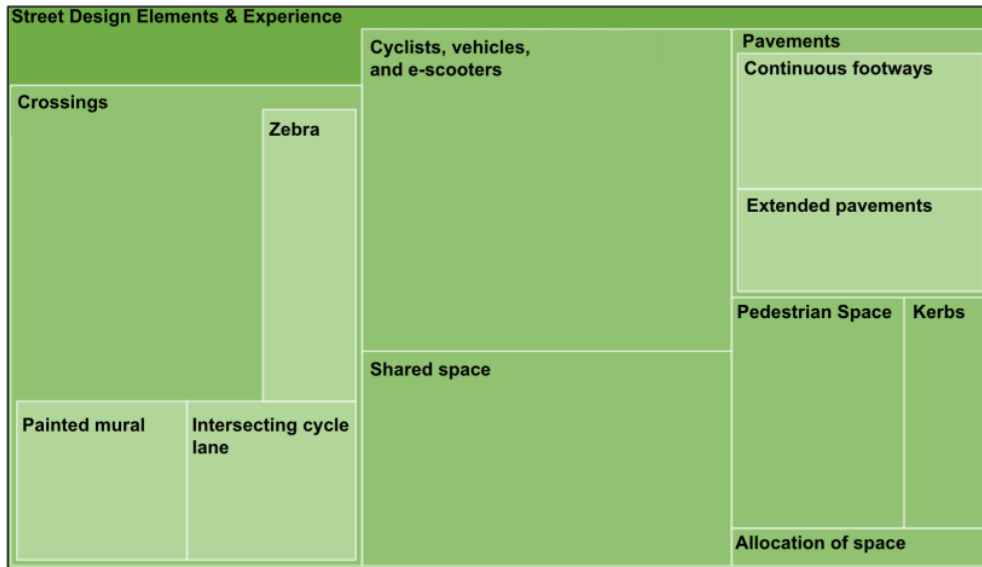


Figure.7 Street Design codes by number of coding references (**Group-B**)

4.4a Crossings

As a sub-parent code, Crossings received 8 direct and 17 aggregated coding references from **Group-B**. The consensus among the participants was that controlled crossings were the safest and most assuring form of street crossing (80% preference). Zebra crossings were the next preference, though this form of crossing relies upon the individual having some sight to be able to identify them, as well as the moving traffic. Painted mural crossings were discussed as one was encountered (**Photo.4**) where feedback was not positive.

“These crossings represent safety to visually impaired people and when they do this it robs you of your independence. These things erode your confidence.” (**Participant-B1**)



Photo.4 artistic designs add colour and interest to the street but are confusing to VIP that rely on standardised, recognisable elements to identify safe passage across roads

Discussing the informal crossing intersecting a cycle lane (**Photo.5**), all of **Group-B** expressed safety concerns, in addition to the absence of signage informing them they are about to pass through a cycle lane.

*"When I'm crossing a cycle superhighway in my area, I just think "is this going to be the moment where I'm struck, because I have no confidence they will stop."
(Participant-B5)*

*"I'd have to be running really late to feel brave enough to attempt that. It's just too dangerous."
(Participant-B1)*



Photo.5 There are currently no signalling elements that inform VIP they are crossing a cycle lane

4.4b Cyclists, Vehicles and E-Scooters

Interactions with transport modes received strong opinion from **Group-B**, although even when crossing major roads little comment was made about motorists, except for the noise. Instead, bicycles and e-scooter users were identified as the major safety concern. The main issue relating to safe passage across the road was the prevalence of cyclists and e-scooter users traveling at high speed whilst ignoring the traffic signals. This was witnessed first-hand during the study, where a cyclist ignored the red light at the pedestrian crossing on Euston Road, almost running into a member of the public. **Participant-B3** also described the problem of not knowing where to quickly and safely move to when cyclists approach at speed.

Unique to bicycles and e-scooters as forms of mobility are their lack of confinement to the roadway, breaching the relative safety provided by the pavement (**Photo.6,7**). During the study. these modes were observed using the pavement on several occasions where behaviour is actively encouraged through the provision of docking stations, bike racks, and dock-less forms of personal mobility that are designed to be left anywhere.



Photo.6 Dock-less bikes and scooters left on the footway create further obstacles for VIP

“Before the e-scooters came in, the pavement was a relatively safe place to be but now it’s not” (Participant-B1).

Objections to the behaviour and lack of regulation enforcement of cyclists and e-scooter users extended beyond the streetscape. Upon discussion of the pedestrian space in **Part-2** of the sample user journey, **participant-B1** stated that they still had to be on guard for cyclists in such places, as well as in parks, even those where cycling is not permitted.

“When I did my cane training, I was taught that the pavement was a safe space, but now it’s become a lane for bikes and scooters.” (Participant-B3)



Photo.7 without confidence in pedestrian space, the journeys of VIP become increasingly unsafe

4.4c Shared Spaces

A consensus amongst **Group-B** was that shared spaces were unsafe for them. The shared space visited (**Photo.8**) prompted participants **B2** and **B4** to refer to Exhibition Road as another shared space in London they find dangerous. The objections can be summarised into two interconnected themes, navigation, and safety. Architects have made a conscious effort to fuse different uses of the space, removing the usual building lines and demarcation of space. For VIP, this produces a wide-open area that increases risk to their personal safety as vehicles, those traveling by means of personal mobility, street clutter, and pedestrians are combined.

“There’s nothing left to delineate between safe and unsafe space. Even guide dogs are confused by these places. All the elements I’d use to navigate have been removed. People like me are left extremely vulnerable and without the ability to navigate.”
(Participant-B3)



Photo.8 VIP are taught to navigate independently by following common elements of the streetscape. Removal of such elements renders the space inaccessible and potentially dangerous.

"They're a terrible idea. More space for people instead of cars is ok, but don't mix it all up together." (**Participant-B4**)

This finding stands in direct contrast to the intended purpose of shared spaces and streetscape design practice which often favours this type of intervention. This form of design that requires eye contact between users to safely negotiate the space, points to the prominence of ableism in planning that fails to consider the outcome designs have for different groups.

4.4d Continuous Footways

All of **Group-B** voiced concerns about continuous footways as a form of street intervention, with two main justifications given. Firstly, safety was, again, cited as the main apprehension because signalling elements, like tactile, which would indicate they are crossing a road is no longer present. By removing signalling tactile from these forms of intervention, the choice and even the knowledge that the user is in the road has been removed (**Photo.9**). Second was the trepidation of placing personal safety in the hands of road users, trusting in their adherence to the highway code.

“The streetscape has forced me to completely delegate my safety to the goodwill of car drivers, who may or may not choose to stop when they come around the corner.”

(Participant-B5)



Photo.9 Continuous footways provide a false sense of security to pedestrians and exclude VIP through the removal of tactile markings

4.4e Pedestrian Space

Generally positive experiences were reported with pedestrian space. The reduction in noise (60%) was cited as a key reason for this, as was the removal of the safety threat traffic poses (40%). However, the need to remain alert for cyclists and e-scooter users was mentioned (**Participant-B1**), given the previously discussed disregard for the highway code observed and reported during the study.

4.5 Difference of Viewpoint

QUESTION FOUR: What are the major similarities and differences in viewpoint and experience of design interventions between VIP and fully sighted users?

Conducting the study with a control group of fully sighted participants (**Group-A**) created the opportunity to identify points of convergence and divergence on aspects of the sample user journey. This research question was intended to pinpoint where focusing efforts on redesign can benefit more users, leading to the creation of new design practice that simplifies and improves the journey experience for everyone.

4.5.1 Themes of Convergence

4.5.1a Safety

Several points of converging opinion were revealed through the study, the most prevalent relating to personal mobility. Of the 25 aggregated coding references, only 2 spoke positively of these modes, while the rest focused on the improper behaviour of cyclists and e-scooter users, the lack of regulation enforcement or accountability, and above all, the threat these modes pose to personal safety. Another prevalent theme was the obstruction caused by the abandonment of dock-less bicycles and e-scooters on footways.

“Sometimes cyclists ride on the pavement and they come so quickly they claim it as their own private road.” (Participant-A5)

The data shows that these modes are improperly used by enough people that the experiences of both user groups within this study were negatively impacted. Of the aforementioned 25 coding references, 9 (36%) referred to concerns around the speed of these modes, while 11 (44%) made reference to their infringement on pedestrian space. Combined, these two factors contributed heavily to safety concerns in both groups.

Both groups shared safety concerns regarding intoxicated passengers (40% of all participants) and a lack of staff assistance (60% of all participants). These two factors were often discussed in relation to one another during the walk-along interviews. Additionally, staff assistance was discussed in relation to poor knowledge and disappointing customer service.

4.5.1b Wayfinding

Wayfinding received 32 total coding references. This was another area where the fully sighted group also experienced problems. **Group-A** was diverse in its members, consisting of London residents, international students, and international visitors, resulting in varied knowledge levels of the city. Navigating the external interchange from Euston Square to Euston was complicated and confusing to both groups (**Photo.10**). Similar comments were made regarding the complexity of the route and insufficient signage to confidently make the interchange.



Photo.10 Continued signage is required to provide reassurance and guide passengers

4.5.1c Shared Spaces

There was a degree of consensus between both groups that shared spaces fail to fulfil their intended purpose, though **Group-A** found them aesthetically pleasing and interesting. **Group-A** spoke of feeling vulnerable to vehicles and cyclists that failed to yield to pedestrians (**Participant-A1**), explaining that the spaces elicit the opposite response than intended by creating a heightened state of alertness for pedestrians while transport modes continue as normal. Variations of “danger” and “confusion” were present amongst both groups of participants, as well as discussion of the ideological

nature of shared spaces, which was reported not to be the actual experience of using them.

4.5.1d Continuous Footways

80% of participants across both groups felt negatively about continuous footways, citing similar reasons and experiences. **Group-A** felt that this form of streetscape intervention was confusing and unsafe, recounting instances where cyclists and vehicles failed to yield to them. Additionally, **Group-A** spoke of the deceptiveness of the design, that provides a false sense of security of a pavement, whilst presenting all the dangers of the road. Combined with the decreased awareness created, all users face an increased safety risk.

"I've been walking across these before, looking at my phone or talking with a friend and not even realised I'm in the road. It's just not clear or safe." (Participant-A1)

While **Group-B** criticised continuous footways for their lack of tactile and "demarcation of space," resulting in reduced awareness of their surroundings and increased exposure to danger (**Participant-B2,B3,B5**), **Group-A** referred to the misleading message the design communicates. The study showed that the majority of participants found continuous footways to have a negative impact on their journeys.

4.5.2 Themes of Divergence

Areas where the two groups diverged were broader, thematically speaking, in comparison to where they converged, which could be more closely linked to design elements investigated during the sample user journey. Examining these key areas of divergence, however, exposes the experiential differences of travel, going beyond the impact of the physical elements of the built environment to the mindset and subtle messaging communicated through design.

4.5.2a Satisfaction with Travel

Throughout the process of observing both groups undertaking the sample user journey and conducting the walk-along interviews, a clear distinction emerged between how **Group-A** perceived and experienced travel when compared to **Group-B**. **Group-A** reported more feelings of inclusivity and that “a lot of thought about accessibility” has been put into London’s transport infrastructure” (**Participant-A4**). Despite cohesion between the two groups on several negative issues the most prominent adjectives used by **Group-A** were “brilliant, amazing, great,” and “exciting,” when describing their overall experiences with the sample user journey. Frequently used adjectives by **Group-B**, however, were “hard, vulnerable, awful, inconsistent” and “disorientating” often complimented with personal accounts and examples where their journeys have been challenging. This stark contrast in emotive language employed by the participants demonstrates the cumulative impact of frustration and hardship experienced by **Group-B**, which seemingly had less effect, or was mitigated by other factors of travel for **Group-A**.

4.5.2b Attitudes Towards Travel

When planning and undertaking a journey, **Group-A** reported selecting modes, like the bus, for the aesthetic quality and enjoyment they provide over practicality (**Participant-A1,A4,A5**). Instances where negative feelings were expressed towards part of the sample user journey were generally on the grounds of noise and feelings of vulnerability, rather than physical barriers. Travel preferences were connected to elements of beautification and pleasure and less direct or longer journeys were explained as being sometimes taken as a matter of choice than necessity. However, **Group-B**’s attitudes towards travel differed from that of **Group-A**, where considerations of whether the journey was essential, the route familiar, and reachable via a trusted route, were among questions to examine prior to attempting travel.

“Travel for me is very goal-oriented and there’s no fun in a lot of it. It’s constant questions, considerations, and challenges, every step of the way. It saps the joy out of what many people do, going places to check them out, to relax etcetera.”
(**Participant-B5**)

4.5.2c Accessible Travel

Divergent opinion was also evident on the theme of accessibility, where the different needs of participants in **Group-B** meant planning their journey around what modes and services were useable to them. Buses received positive feedback from **Group-A**, but **Group-B** cited difficulties owing to the number of services that arrive at stops, challenges accessing live travel information on digital screens, and service variations that create a more open system than the predefined, navigable tunnels and platforms of the Underground (**Participants-B2,B4,B5**). As **Group-B** also reported their avoidance of complicated and dangerous spaces, such as busy street crossings, complex stations and shared spaces, an overall theme of limited access to the various travel options available to fully sighted people became apparent.

“The Underground is better than buses. You know when trains are coming and where to board. Buses are so unreliable, and you never know where it’ll pull up exactly. It’s too stressful trying to take the bus.” (Participant-B4).

The increased provision of personal mobility options and supporting infrastructure has created increased choice for fully sighted people. However, this has impeded accessibility for VIP, with none of **Group-B** reporting being able to cycle or ride an e-scooter. When considered alongside the infringements of cyclists and e-scooter users on the pavement and the reported issues taking buses, travel for VIP has become more problematic in recent years.

4.6 Design Practice Improvements

QUESTION FIVE: What should we do to improve design practice, (what is the set of design principles that help us improve these places)?

Based on the research findings, paying particular attention to intersecting issues between the two groups, the following tables (**Table.2,3**) provide design practice recommendations to practitioners at TfL. The intended purpose of the below redesign recommendations is to improve TfL’s services and the streetscape in ways that

generate universal benefit to all users, regardless of individual impairment, capability, or knowledge.

4.6.a Station Interchange Design Recommendations

Theme	Item	Recommendation	Justification
Visual Contrast	Station interiors	Improve visual contrast between concourse floors, pillars, and other permanent structures.	Clear distinction between structural elements in stations helps VIP navigate safely around station interchanges.
	Colour-coding	Expansion of colour-coding in accordance with the Underground lines into leading tunnels, handrails, and platforms.	Many VIP use subtle cues, beyond signage, to navigate. The Underground colour-coding was praised by both groups in the study as a particularly useful method of wayfinding. Expansion of this branding would further guide and reassure passengers.
Wayfinding	Signage	Increase provision of illuminated signage, placed at a readable height.	Simple, easy-to-read signage organises and guides commuters, simplifying often complicated station interchanges. Illuminated signage draws attention, guides, and remains readable in different lighting conditions.
	Escalators	Ensure all escalators are clearly marked with yellow lines at the top and bottom, and wayfinding signage is displayed above moving escalators.	Signage displayed on escalators allows passengers to determine their route whilst stationary to continue with confidence.
	External interchanges	Painted wayfinding lines (tactile) to guide passengers between stations.	Navigating external interchanges proved problematic to both groups in the study. Wayfinding provides reassurance and confirmation in these situations.
Audio Information	Station announcements	Minimise station announcements and ensure all messages are conveyed in clear spoken English. Remove all non-essential announcements.	Too many recorded announcements, especially those made by station staff, create noise pollution, and add to confusion for passengers. Keeping announcements to a minimum, delivering clear and simple travel information, maximises the benefit this form of assistance provides.

	Bus stop announcements	A bespoke technological solution of an augmented reality app, customisable by the user to receive real-time travel information, including which bus/train is arriving, guidance to board, and even where vacant seats are.	Without audio information, bus stops exclude VIP. Providing VIP the same real-time information fully sighted people rely on will remove the current exclusivity gap.
Staff	Guiding services	Integrate guiding services between service operators within TfL fare zones.	Delays are caused for VIP when they are only taken part of their journey before having to wait while assistance is transferred. This disrupts the journey chain for VIP.
	Deployment	A simple technological solution of an app/online service alerting staff to the arrival of a registered VIP. The user can then request assistance or guiding through the station.	A lack of staff availability was highlighted by both groups within the study. Staff presence provides reassurance of safety, especially late at night and enables passengers to seek assistance.
Safety	Platform edge doors	Implement platform edge door across the Underground network.	Platform edge doors increase safety for VIP, and all other users. Track related accidents will be eliminated by the addition of this feature.
	Station clutter	Partition off retail clutter and other non-essential services on station concourses.	VIP find station concourses challenging to navigate, particularly with the range of retail services, non-essential seating, and temporary installations. Physically separating the functionality of these spaces will simplify these complex spaces.

Table.2 Station Interchange Design Recommendations

4.6b Streetscape Design Recommendations

Theme	Item	Recommendation	Justification
Standardisation of Streetscape Elements	Crossings	Reduce the number of different street crossing types.	Too many forms of street crossing currently exist, with both groups in this study reporting lacking the knowledge of what procedure to follow at each type encountered. Reducing the number of crossing types, empowers users and helps VIP to confidently crossroads.
	Extended pavements	Standardise extended pavements in accordance with original paving.	Extensions paved differently send confusing message to pedestrians, especially VIP and those unfamiliar with the city. Standardising these intervention assures pedestrians of their right of way.
	Continuous footways	Remove all continuous footways and replace, where necessary with an appropriate crossing.	Continuous footways increase danger to pedestrians by providing a false sense of security.
	Tactile Paving	Ensure tactile paving is provided at all road crossings, as well as at the top and bottom of all steps.	Incorrect implementation and failure in the provision of tactile paving were observed and reported in the study. This form of wayfinding is critical for VIP.
Street Clutter	Dock-less bicycles and e-scooters	Remove dock-less bicycles and e-scooters.	These modes create street clutter for pedestrians and are particularly problematic for VIP. Their dock-less nature also encourages infringement onto the pavement.
	Pillars and posts	Remove remaining pillars and posts when pavements are extended.	Remaining bollards, signposts and other kerbside structures cause obstruction to people using mobility aids, and VIP. Removal or relocation of these objects maximises the benefit of an extended pavement.
	Outdoor Dining	Partition off all outdoor eating and drinking areas.	By clearly segregating these spaces, simpler, unobstructed streets are produced.

Policy	Personal Mobility	Regulate, license, and enforce current laws pertaining to personal mobility modes in the same manner as motorists.	This study has definitively shown that many users of these modes infringe upon the pavement at will and break the law at will. Regulation and accountability are crucial for this form of mobility to ensure pedestrian safety is not compromised.
	Tactile Paving	Enforce current requirements for tactile paving.	Many failures in the provision of tactile paving exist. The proper provision would assure VIP of their routes.
Demarcation of Space	Shared Spaces	Remove shared spaces.	Clear understanding of public space is fundamental to user safety. No circumstances should intentionally be created to blend modes and make ambiguous spaces where vehicles, personal mobility modes, and pedestrians are combined.

Table.3 Streetscape Design Recommendations

Chapter 5: Discussion of Findings and Conclusion

5.1 Research Overview

This research has investigated the journey experience of visually impaired people living in London in order to pinpoint areas of current design practice that present barriers to, and exclude, this group. First, a travel route was created that included a variety of London Underground services, station interchanges, and streetscape interventions that represented a typical user journey. Then the route was explored, on a one-to-one basis, with participants that formed two groups, fully sighted users (**Group-A**), and VIP (**Group-B**). Using walk-along interviews and participant observation, the study found that VIP experience travel differently to those with full sight. Indeed, the study revealed that VIP encounter considerably more barriers to travel, where both policy and design practice have produced disproportionately negative outcomes for this group. However, several commonalities were identified between the two groups. Within the Underground, low staff numbers and the quality of assistance was evident, as were issues with effective wayfinding. Analysis revealed that London's streetscape presented a greater number of barriers to both groups compared to the Underground, which was largely attributed to the multiplicity of transport modes intersecting space and the complexity of different forms of street crossings and traffic calming measures.

5.2 The Visually Impaired Journey Experience

To date, studies relating to the journey experiences of people on the disability spectrum have been both broad and narrow. As outlined earlier, much of the current policy regarding accessibility within the built environment, including public transport, for people with disabilities has considered disabled people as a homogenised group, leading to assumptions about user needs and generalised statements on facilitating access. Additionally, with an insufficient amount of research into the door-to-door journey for disabled transport users and studies examining the whole journey chain, an insufficient understanding of the journey experience of VIP persists (Park & Chowdhury, 2022).

This research has demonstrated that the journey experience of VIP in London is fraught with barriers resulting from infrastructural design, operational practice, and a growing variety of design interventions introduced to meet wider societal goals, such as democratising space and reducing emissions from travel. While it is acknowledged that VIP experience greater difficulty with travel when compared to those with full sight owing to limitations imposed by their visual impairment, experiences brought about by design practice and the conscious prioritisation of certain user groups over others exacerbates the unequal landscape of access for this user group. This research has shown that exclusionary design practice is acutely experienced by VIP on London's streets, where a growing number of mixed-use spaces are being created in places where, previously, clear demarcation of space existed. Interventions, such as shared spaces, continuous footways, and, particularly, the expanding network of infrastructure to support personal mobility, all produce the unintended outcome of widening the equity gap between the fully abled individuals and VIP. This finding underscores the importance of designing inclusively, considering all user groups, as asserted by Napolitano (1995, p.33) where "inclusive design will send positive messages to disabled people, messages which tell them: 'you are important'; 'we want you here'; and 'welcome'" rather than the opposite sentiment, regardless of whether intended or not. Ultimately, the research has shown that there is currently a tension between the desire for particular forms of design practice, driven by social policy, and VIP accessibility needs. The journey experience of VIP is still limited by design practice, despite legislative mandates and efforts by TfL to the contrary, again demonstrating the need to reconsider how current and future design interventions impact all user groups.

Finally, it is important to consider how complexity, particularly with street interventions, is experienced by all users. As was raised by both groups in this study, too many variations of street crossing, among other interventions require adequate knowledge to use safely. The average person is not an urban planner, nor a transport professional, and does not have the knowledge, nor the intention to stay abreast of new interventions, associated procedures, and laws. This was the sentiment of international visitors that took part in this study, as well as locals, who expressed frustration with the seemingly endless forms of crossings and the lack of clarity over

what procedure was required to use them. This, again, alludes to a real need for the simplification of London's transport network and supporting infrastructure.

5.3 Universal Problems and Solutions

The study revealed several areas of convergence between the two user groups that undertook the sample user journey. Though justification varied, for example, both groups found signage to be problematic within the Underground, the fully sighted users raised issues with accuracy of the content and VIP expressed desires for it to be larger and illuminated, similar elements posed problems to both user groups. Approaching identified areas of convergence; shared spaces, street crossings, negative interactions with personal mobility, staff assistance, and station announcements (outlined in section 5.5.2.1) through the lens of UD presents significant improvement opportunities. Seeking solutions through UD as a means of addressing problem areas, solutions can be provided that remove barriers for everyone. By designing in this way, retroactive redesigning of existing infrastructure can be improved, and future development can be created in a way that is truly inclusive, sustainable, and cost effective to TfL.

5.4 Policy Implications

The current level of accessibility across the TfL network indicates insufficient understanding and focus on the needs of VIP, in addition to a lack of representation of people on the disability spectrum at the policy making level. The findings of the study illustrate well the sentiments of Donald (1992), Napolitano (1995) and Kitchin (1998) three decades ago, that the built environment is the manifestation of societal values, communicating who it is for and what is normal. London's ongoing streetscape interventions geared towards facilitating specific forms of personal mobility to the detriment of VIP and, more widely, the right of pedestrians to safe use and fair access to the pavement, signals both the need for engagement with all user groups in policy making. At present, it appears that a narrative to promote cycling and e-scooters within TfL, in congruence with local councils and the Greater London Authority, has been established, exposing the political landscape of transport planning in operation (Jacobs, 2006), that has created a hierarchy of user prioritisation. It is important that

engagement, as recommended by Park & Chowdhury (2022) with user groups like VIP takes place in the form of bottom-up policy consultation, prior to the enactment of interventions. This will ensure that future development moves away from the current ableist state of hegemonic design practice that has delivered streets and infrastructure shaped from an elitist urban design perspective.

At present, the streetscape in London remains largely shaped to serve the dominance of private vehicles but is undergoing redevelopment to also provide space for cycling and e-scooter users. It is therefore suggested that, owing to the findings of the study concerning cyclists and e-scooter users, that discussion of these forms of personal mobility appear alongside those of vehicles and the roadway, redefining pedestrians as separate from these facilitated/automated modes that mobilise the user to achieve increased speeds. In this sense, fair and equal access to the streetscape depends upon the robust testing, insuring, and regulation of those operating means of travel. The use of bicycles and scooters must be restricted to the roadway and designated lanes, and these modes must undergo the same regulation and penalties for improper use as vehicles.

Finally, it is crucial that inclusive policy, at all levels, evolves beyond its current state where largely nonprescriptive statements preclude accessible journeys for the visually impaired. To achieve this, discussion must be stirred back towards physical accessibility of the built environment, and away from subjective aesthetics and social discourse. For example, street crossings would be made genuinely inclusive if clearly painted and with the appropriate tactile markings, as opposed to being used as a kind of urban canvas upon which social issues are reflected in the form of painted murals. Additionally, it is recommended that quantifiable thresholds and measurable accessibility levels, framed within UD principles, are agreed at the national level, creating a more prescriptive environment within transport planning.

5.5 Limitations and Opportunities

This study has gained insight into the challenges faced by visually impaired people undertaking journeys in London. It has demonstrated what can be learned from investigating travel behaviours and experiences of VIP outside of focusing on single

modes, examined in isolation from the whole journey chain. The study could be expanded further to include a greater number of both participants and the modes investigated in the sample user journey. In pursuit of establishing a UD framework, an expanded study would also benefit from the inclusion of more user groups, such as the elderly, people who do not speak English, and those traveling with young children. The sample user journey did not include the use of a bus to maintain as short a sample user journey as possible so as not to dissuade participants from taking part. The more frequent and reliable nature of the Underground also made it preferred mode to include. However, experiences with buses were frequently brought up by participants during the study, revealing the systematic way in which VIP undertake journeys, strongly preferring the continuity and better predictability of the Underground over the complexity of using TfL's bus service. This suggests that including buses in future studies would be insightful in expanding the knowledge in the door-to-door journeys of VIP.

Practical employment of these research findings and design recommendations could take the form of an interactive workshop with design consultants and intervention teams at TfL, local borough councils, and the Department for Transport. A lack of understanding of VIP user needs has been discussed at length in this research, which suggests there is an urgent need to enter into an ongoing dialogue with practitioners and policy makers regarding facilitating accessibility to transport.

Further research opportunities exist measuring the impact of new indoor wayfinding technologies, such as Waymap, which is currently undergoing trials in cities around the world (Whitfield, 2021). Other forms of station navigation technology are currently being trialled on public transport in several countries and have shown promising results (Ko & Kim, 2017; Kuriakose, et al, 2022). Investigation into these kinds of technologies, under a UD framework for transport projects, holds the potential to improve the journey experience for all users and empower the spectrum of differently abled people.

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Appendix.1

Walk-along Interview Questions

Public Transport Design / Station Interchanges

1. What is your impression as you enter the station, are there any problems that stand out?
2. How did you experience navigating through the station to the underground platform?
3. How do you find signage in stations? Could it be improved?
4. Do you feel able to navigate this external interchange? Why or why not?
5. How was the experience crossing Euston Road and making this interchange?
6. Which method works best for you when making internal interchanges: steps, escalator, or lift? And how did you find this internal interchange?
7. Which forms of information are most useful to you? Static signs, display panels, audio announcements or anything else?
8. Do you have any comment to make regarding staff assistance?
9. How do you find commuting with other passengers?
10. Overall, how inclusive do you find stations and public transport in London? Do you enjoy these spaces, and do you have any additional comments on how to improve them?

Streetscape Design

1. What do you think of these murals on crossings?
2. How do you feel about crossing a cycle lane? What are your overall impressions of bicycles and e-scooters?
3. What are your thoughts on these shared spaces between people and other modes? Do they feel safe and designed inclusively?
4. Does this form of crossing (zebra) feel safer to cross a cycle lane than the previous one? What would be the ideal form of street crossing for you?
5. Widened pavements are becoming more common, what is your experience using them?
6. How do you feel the space is divided up amongst modes?
7. How does your experience of this pedestrianised space differ from walking on the street?
8. How could steps be improved?
9. What are your impressions of continuous footways? Could they be improved?
10. Overall, how inclusive would you say streets in London are? Do you enjoy these spaces, and do you have any additional comments on how to improve them?

RISK ASSESSMENT FORM FIELD / LOCATION WORK



DEPARTMENT/SECTION: BARTLETT SCHOOL OF PLANNING

LOCATION(S): LONDON, ENGLAND

PERSONS COVERED BY THE RISK ASSESSMENT: Craig Smith

BRIEF DESCRIPTION OF FIELDWORK (including geographic location):

Observational research conducted in central London. A group of participants will be taken on a pre-determined route to observe what elements of street design and transport interchanges pose barriers to their journey.

COVID-19 RELATED GENERIC RISK ASSESSMENT STATEMENT:

Coronavirus disease (COVID-19) is an infectious disease caused by coronavirus SARS-CoV-2. The virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Droplets fall on people in the vicinity and can be directly inhaled or picked up on the hands and transferred when someone touches their face. This risk assessment documents key risks associated fieldwork during a pandemic, but it is not exhaustive and will not be able to cover all known risks, globally. This assessment outlines principles adopted by UCL at an institutional level and it is necessarily general. Please use the open text box 'Other' to indicate any contingent risk factors and control measures you might encounter during the course of your dissertation research and writing.

Please refer to the Dissertation in Planning Guidance Document (available on Moodle) to help you complete this form.

Hazard 1: Risk of Covid -19 infection during research related travel and research related interactions with others (when face-to-face is possible and/or unavoidable)

Risk Level - Medium /Moderate

Existing Advisable Control Measures: Do not travel if you are unwell, particularly if you have COVID-19 symptoms. Self-isolate in line with NHS (or country-specific) guidance.

Avoid travelling and face-to-face interactions; if you need to travel and meet with others:

- If possible, avoid using public transport and cycle or walk instead.
- If you need to use public transport travel in off-peak times and follow transport provider's and governmental guidelines.
- Maintain (2 metre) social distancing where possible and where 2 metre social distancing is not achievable, wear face covering.
- Wear face covering at all times in enclosed or indoor spaces.
- Use hand sanitiser prior to and after journey.
- Avoid consuming food or drinks, if possible, during journey.
- Avoid, if possible, interchanges when travelling - choose direct route.

- Face away from other persons. If you have to face a person ensure that the duration is as short as possible.
- Do not share any items i.e. stationary, tablets, laptops etc. If items need to be shared use disinfectant wipes to disinfect items prior to and after sharing.
- If meeting in a group for research purposes ensure you are following current country specific guidance on face-to-face meetings (i.e rule of 6 etc.)
- If and when possible meet outside and when not possible meet in venues with good ventilation (e.g. open a window)
- If you feel unwell during or after a meeting with others, inform others you have interacted with, self-isolate and get tested for Covid-19
- Avoid high noise areas as this mean the need to shout which increases risk of aerosol transmission of the virus.
- Follow one way circulation systems, if in place. Make sure to check before you visit a building.
- Always read and follow the visitors policy for the organisation you will be visiting.
- Flush toilets with toilet lid closed.
- 'Other' Control Measures you will take (specify):

NOTE: The hazards and existing control measures above pertain to Covid-19 infection risks only. More generalised health and safety risk may exist due to remote field work activities and these are outlined in your Dissertation in Planning Guidance document. Please consider these as possible 'risk' factors in completing the remainder of this standard form. For more information also see: [Guidance Framework for Fieldwork in Taught and MRes Programmes, 2021-22](#)

Consider, in turn, each hazard (white on black). If **NO** hazard exists select **NO** and move to next hazard section.

If a hazard does exist select **YES** and assess the risks that could arise from that hazard in the risk assessment box.

Where risks are identified that are not adequately controlled they must be brought to the attention of your Departmental Management who should put temporary control measures in place or stop the work. Detail such risks in the final section.

ENVIRONMENT

The environment always represents a safety hazard. Use space below to identify and assess any risks associated with this hazard

e.g. location, climate, terrain, neighbourhood, in outside organizations, pollution, animals.

Usual risk of participants getting lost and a risk of being a victim of crime.

Medium risk

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

work abroad incorporates Foreign Office advice

<input type="checkbox"/>	only accredited centres are used for rural field work
X	participants will wear appropriate clothing and footwear for the specified environment
X	refuge is available
<input type="checkbox"/>	work in outside organisations is subject to their having satisfactory H&S procedures in place
X	OTHER CONTROL MEASURES: Adequate supervision will be in place to mitigate the above risk factors and ensure the safety of the participants remains paramount throughout.

EMERGENCIES

Where emergencies may arise use space below to identify and assess any risks

e.g. fire, accidents

Risk of harm from tripping, falling, or collisions with people and vehicles.

Medium risk

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

<input type="checkbox"/>	participants have registered with LOCATE at http://www.fco.gov.uk/en/travel-and-living-abroad/
X	contact numbers for emergency services are known to all participants
X	participants have means of contacting emergency services
X	a plan for rescue has been formulated, all parties understand the procedure
X	the plan for rescue /emergency has a reciprocal element
X	OTHER CONTROL MEASURES: supervisors of the field work will be equipped with phones to contact emergency services and emergency contacts of the participants.

EQUIPMENT

Is equipment used?

NO

If 'No' move to next hazard
If 'Yes' use space below to identify and assess any risks

e.g. clothing, outboard motors.

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

<input type="checkbox"/>	the departmental written Arrangement for equipment is followed
<input type="checkbox"/>	participants have been provided with any necessary equipment appropriate for the work
<input type="checkbox"/>	all equipment has been inspected, before issue, by a competent person
<input type="checkbox"/>	all users have been advised of correct use

special equipment is only issued to persons trained in its use by a competent person
OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

LONE WORKING

Is lone working
a possibility?

NO

If 'No' move to next hazard
If 'Yes' use space below to identify and assess
any
risks

*e.g. alone or in isolation
lone interviews.*

**CONTROL
MEASURES**

Indicate which procedures are in place to control the identified risk

the departmental written Arrangement for lone/out of hours working for field work is followed
lone or isolated working is not allowed
location, route and expected time of return of lone workers is logged daily before work commences
all workers have the means of raising an alarm in the event of an emergency, e.g. phone, flare,
whistle
all workers are fully familiar with emergency procedures
OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

ILL HEALTH

e.g. accident, illness, personal attack, special personal considerations or vulnerabilities.

The possibility of ill health always represents a safety hazard. Use space below to identify and assess any risks associated with this Hazard.

Injury

- As the field work requires walking, and takes place near traffic, there is a small chance asthma may be aggravated in a sufferer.
- Other conditions requiring medication
- Those requiring regular medication may need to administer during the field work

Medium risk

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

- | | |
|---|---|
| X | all participants have had the necessary inoculations/ carry appropriate prophylactics |
| X | participants have been advised of the physical demands of the research and are deemed to be physically suited |
| X | participants have been adequate advice on harmful plants, animals and substances they may encounter |
| X | participants who require medication should carry sufficient medication for their needs |
| X | OTHER CONTROL MEASURES: the opportunity for rest breaks will be provided, and any participants requiring assistance with medication will be identified prior to commencement of the field work. |

TRANSPORT

e.g. hired vehicles

Will transport be required

NO

YES

X

Move to next hazard

Use space below to identify and assess any risks

The field work will require participants to use public transport for a small portion of the pre-determined route. Potential hazards include, tripping, falling, platform boundaries, and approaching vehicles.

Medium risk

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

- | | |
|---|---|
| X | only public transport will be used |
| | the vehicle will be hired from a reputable supplier |
| | transport must be properly maintained in compliance with relevant national regulations |
| | drivers comply with UCL Policy on Drivers http://www.ucl.ac.uk/hr/docs/college_drivers.php |
| | drivers have been trained and hold the appropriate licence |
| | there will be more than one driver to prevent driver/operator fatigue, and there will be adequate rest periods |
| | sufficient spare parts carried to meet foreseeable emergencies |
| X | OTHER CONTROL MEASURES: supervisors will take care to ensure that none of the above identified risks impact the participants. |

DEALING WITH THE PUBLIC

Will people be dealing with public

NO

If 'No' move to next hazard
If 'Yes' use space below to identify and assess any risks

e.g. interviews, observing

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

- all participants are trained in interviewing techniques
- advice and support from local groups has been sought
- participants do not wear clothes that might cause offence or attract unwanted attention
- interviews are conducted at neutral locations or where neither party could be at risk
- OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

FIELDWORK 3

May 2010

WORKING ON OR NEAR WATER

Will people work on or near water?

NO

If 'No' move to next hazard
If 'Yes' use space below to identify and assess any risks

e.g. rivers, marshland, sea.

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

- lone working on or near water will not be allowed
- coastguard information is understood; all work takes place outside those times when tides could prove a threat
- all participants are competent swimmers
- participants always wear adequate protective equipment, e.g. buoyancy aids, wellingtons
- boat is operated by a competent person
- all boats are equipped with an alternative means of propulsion e.g. oars

participants have received any appropriate inoculations
 OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

MANUAL HANDLING (MH)	Do MH activities	NO	If 'No' move to next hazard
	take place?	<input type="checkbox"/>	If 'Yes' use space below to identify and assess any risks

e.g. lifting, carrying, moving large or heavy equipment, physical unsuitability for the task.

CONTROL MEASURES **Indicate which procedures are in place to control the identified risk**

- the departmental written Arrangement for MH is followed
- the supervisor has attended a MH risk assessment course
- all tasks are within reasonable limits, persons physically unsuited to the MH task are prohibited from such activities
- all persons performing MH tasks are adequately trained
- equipment components will be assembled on site
- any MH task outside the competence of staff will be done by contractors
- OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

SUBSTANCES

Will participants work with substances

NO

If 'No' move to next hazard
If 'Yes' use space below to identify and assess any risks

e.g. plants, chemical, biohazard, waste

CONTROL MEASURES

Indicate which procedures are in place to control the identified risk

the departmental written Arrangements for dealing with hazardous substances and waste are followed
 all participants are given information, training and protective equipment for hazardous substances they may encounter
 participants who have allergies have advised the leader of this and carry sufficient medication for their needs
 waste is disposed of in a responsible manner
 suitable containers are provided for hazardous waste
 OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

OTHER HAZARDS

Have you identified any other hazards?

NO

If 'No' move to next section
If 'Yes' use space below to identify and assess any risks

i.e. any other hazards must be noted and assessed here.

Hazard: _____
Risk: is the

CONTROL MEASURES

Give details of control measures in place to control the identified risks

Have you identified any risks that are not adequately controlled?

NO X
 YES
 S

Move to Declaration
Use space below to identify the risk and what action was taken

DECLARATION

The work will be reassessed whenever there is a significant change and at least annually. Those participating in the work have read the assessment.

Select the appropriate statement:

I the undersigned have assessed the activity and associated risks and declare that there is no significant residual risk
 risk

I the undersigned have assessed the activity and associated risks and declare that the risk will be controlled by the method(s) listed above

NOTE: No additional risk issues identified

Professor Robin Hickman
1st April 2022

Copy of Ethical Clearance questionnaire responses

It is important for you to include all relevant information about your research in this form, so that your supervisor can give you the best advice on how to proceed with your research.

You are advised to read though the relevant sections of [UCL's Research Integrity guidance](#) to learn more about your ethical obligations.

Submission Details

1. Name of programme of study: MSc [Transport and City Planning](#)

2. Please indicate the type of research work you are doing (Delete that which do not apply):
 - o [Dissertation in Planning \(MSc\)](#)

3. Please provide the current working title of your research:
[Accessibility, urban design, and the whole journey experience of visually impaired people in London](#)

4. Please indicate your supervisor's name:
Professor Robin Hickman

Research Details

5. Please indicate here which data collection methods you expect to use. (Tick all that apply/or delete those which do not apply.)
 - o [Interviews](#)
 - o [Questionnaires \(including oral questions\)](#)
 - o [Observation / participant observation](#)
 - o [Audio-visual recordings \(including photographs\)](#)
 - o [Advisory/consultation groups](#)

6. Please indicate where your research will take place (delete that which does not apply):
[UK only](#)

7. Does your project involve the recruitment of participants?
[Yes](#)

Appropriate Safeguard, Data Storage and Security

8. Will your research involve the collection and/or use of personal data?

Personal data is data which relates to a living individual who can be identified from that data or from the data and other information that is either currently held, or will be held by the data controller (you, as the researcher).

This includes:

- Any expression of opinion about the individual and any intentions of the data controller or any other person toward the individual.

- Combinations of data which may reveal identifiable data, such as names, email/postal addresses, date of birth, ethnicity, descriptions of health diagnosis or conditions, computer IP address (of relating to a device with a single user).

No

9. Is your research using or collecting:

- special category data as defined by the General Data Protection Regulation*, and/or
- data which might be considered sensitive in some countries, cultures or contexts?

*Examples of special category data are data:

- which reveals racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership;
- concerning health (the physical or mental health of a person, including the provision of health care services);
- concerning sex life or sexual orientation;
- genetic or biometric data processed to uniquely identify a natural person.

No

10. Do you confirm that all personal data will be stored and processed in compliance with the General Data Protection Regulation (GDPR 2018)? (Choose one only, delete that which does not apply)

- I will not be working with any personal data

11. I confirm that:

- The information in this form is accurate to the best of my knowledge.
- I will continue to reflect on and update these ethical considerations in consultation with my supervisor.

Yes

FINAL GRADE

GENERAL COMMENTS

/100

Instructor

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