June 2024

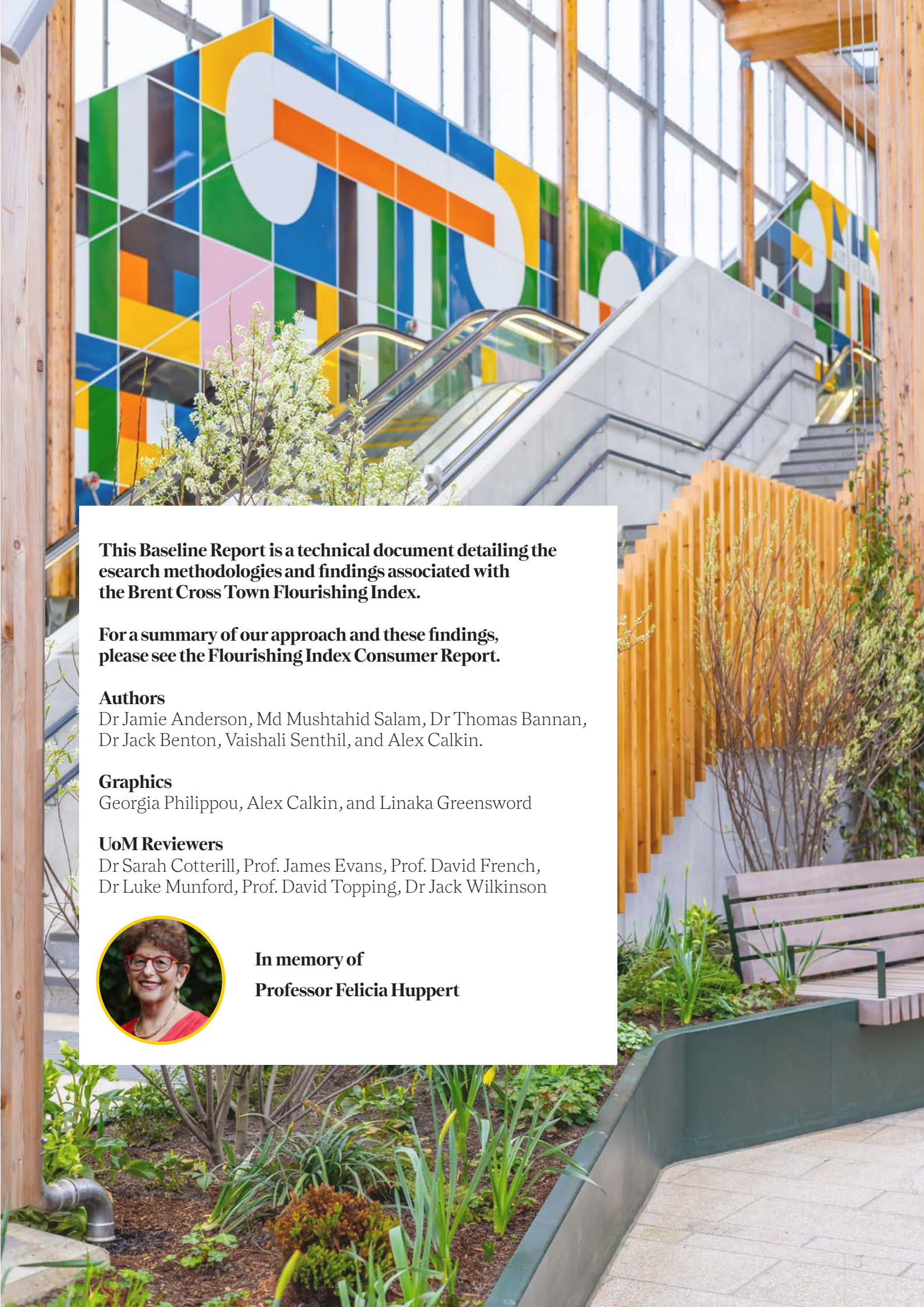
Brent Cross Town

Flourishing Index Baseline Report

MANCHESTER 1824
The University of Manchester

BURO HAPPOLD

Contents



This Baseline Report is a technical document detailing the esearch methodologies and findings associated with the Brent Cross Town Flourishing Index.

For a summary of our approach and these findings, please see the Flourishing Index Consumer Report.

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In memory of

Professor Felicia Huppert

Executive Summary

A new approach to regeneration evaluation

The Brent Cross Town baseline report presents innovative wellbeing research undertaken between January 2021 and January 2022, in partnership with a public-private Joint Venture between Related Argent and Barnet Council. The work was led by The University of Manchester (UoM) and Buro Happold, drawing on transdisciplinary and mixed-method approaches. All data was collected prior to the delivery of the major Brent Cross Town delivery stages, from local people who already live in the Brent Cross area. The vast majority of local people are expected to remain in the area as the regeneration project is built and managed into the future.

In 2021, following recommendations set out within an overarching Brent Cross Town sustainability strategy, the pledge on the opposite page was made.

In response to this pledge, two main aims were pursued involving:

- Rapid co-definition of a new Flourishing Index, that is based on the latest science and representative of local voices and circumstances – balancing democratic and technocratic inputs.
- A first round of baseline data capture before January 2022, using a mixed-methods approach, drawing upon vanguard analogue and digital sensor and data technologies.

Pledge #2:

We will make **a town where all can flourish**

We're creating a new way to measure how well the people at Brent Cross Town are doing, and in turn how well we're doing, evolving the focus of wellbeing from 'me' to 'us'. A Flourishing Index for all.

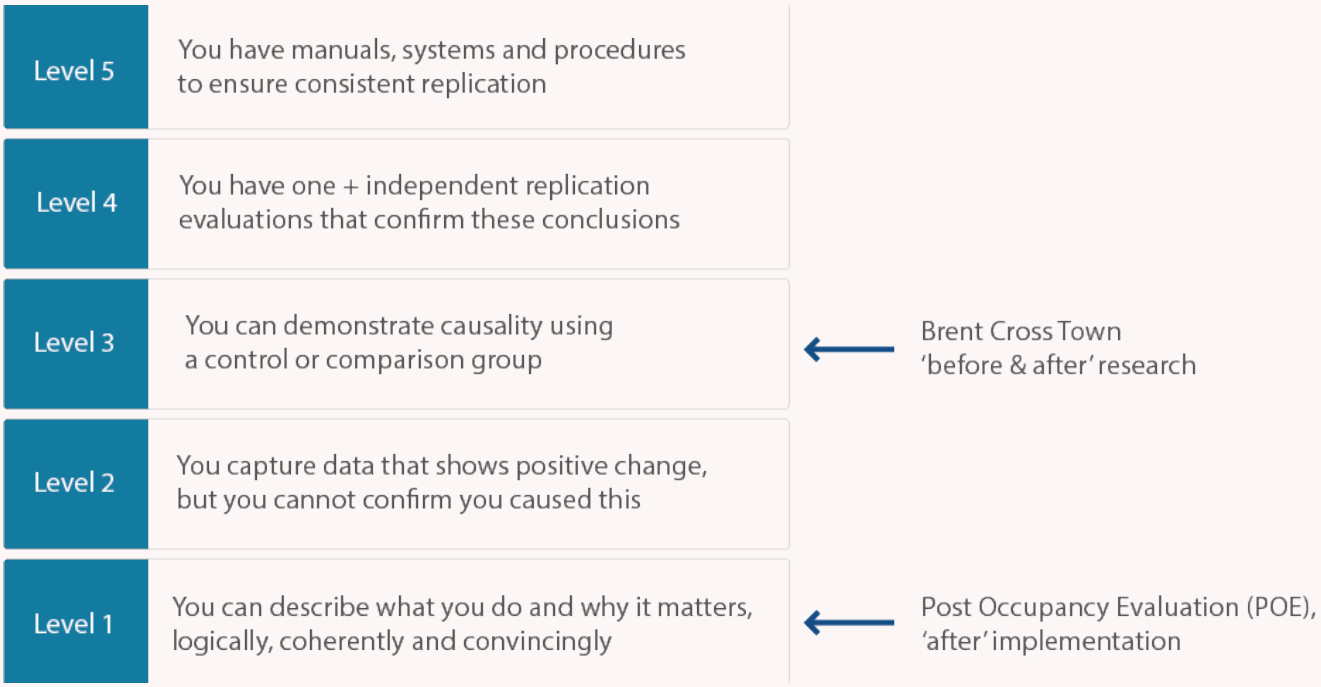
Nick Searl,
Senior Partner, Related Argent

As well as public and private partners, the work involved the general public, a wide variety of academic disciplines, and third sector organisations. This has culminated in a co-created and context-aware index, for which an initial baseline has been collected.

Contrary to tradition and in line with innovative wellbeing research emerging in the UK, the index focusses on self-reported experienced or 'internal' wellbeing. This helps to reduce a reliance on external objective measures (e.g., GDP) that do not always correspond closely with how people are feeling and functioning.

In addition, the bespoke and robust baseline offers a rare and invaluable basis for long-term evaluation as Brent Cross Town is built out and managed into the future. In accordance with the diagram below adopted from a prominent innovation foundation (Nesta), this work aspires to Level Three evidence, providing an objective opportunity to quantify subsequent impact of the development of Brent Cross Town, in comparison to matched groups[1].

This is very rarely achieved within urban regeneration and the built environment, where Post Occupancy Evaluation (POE) is usually the aspiration, not 'before and after' analysis.



Approach

The diverse research team used a mixed-methods approach, in order to understand a variety of potential outcomes and types of impact. This unique combination of expertise covered the methods outlined below. For each primary dataset captured, a matched UK or European comparison was sought. All the primary research conducted was approved by UoM ethics committee and was GDPR compliant.

Online discussion groups

In line with best practice guidance, five online discussion groups were carried out with modestly-sized but representative groups of local community members and stakeholders. Attendees were asked to articulate health and wellbeing in their own words, reflect on key research questions that should be addressed, and the acceptability of data collection methods.

Theory of Change and index selection

Drawing on the discussion group insights and input from experts, a Theory of Change mapped potential pathways joining desired outcomes with key causes, in turn underpinning the selection of relevant and robust index measures – creating the Brent Cross Town Flourishing Index.

Intercept and online survey

Face-to-face and online surveys were conducted with more than 1,500 local people, using a quota approach to align representation to the local area. Approximately one-third of the questions asked about personal wellbeing, i.e., measuring life going well for 'me'. One third asked about social wellbeing, i.e., life going well for 'us'.

The remainder measured key wellbeing 'proxies' or key causes of sustained wellbeing, such as connecting with others and satisfaction with important areas of life, e.g., income satisfaction.

The intercept questionnaire was undertaken in public spaces, usually in the vicinity of community hubs, such as local newsagents or GP surgeries. A subsequent online survey provided further opportunity for participation.

Routine data collation

Most questionnaire items were chosen, in part, so that Brent Cross could be compared to other groups. This involved accessing several national survey datasets, carried out at varying intervals. For some of these, the most recent iterations are temporarily unavailable. Care was taken to match participants, comparing 'apples with apples, rather than pineapples'.

Air pollution monitoring.

Access to fresh air was deemed of critical importance to the local community. As a first step toward bolstering existing local measures, the research team undertook bespoke monitoring inside and outside Claremont Primary school using sensor-based technologies

Behaviour observations

Within strategically important locations, two methods of observation were undertaken to understand the prevalence of key wellbeing behaviours.

A manual approach was used to count more than 4,500 people, recording levels of physical activity (Be Active), social interaction (Connect) and people being aware of their environment (Take Notice). An automated sensor-based approach also counted more than 330,000 instances of Be Active activity (cyclists and pedestrians).

Findings and interpretation

Survey insights

When approaching Brent Cross participants, the intercept survey field researchers used visual information to strive for a balance of sex, age and ethnicity. However, despite this, to varying degrees, the local socio-demographic profile of the local area is underrepresented, in particular, by non-white people, older people (>65) and unemployed people. In addition, whilst children and teenagers are represented in the behaviour and air quality research, they did not participate in the survey work.

With these issues in mind, the findings resonate with the key messages raised by the community within the discussion groups - highlighting both wellbeing strengths and weaknesses within the local area.

On the one hand, from an asset and strengths perspective, at the time of collection, the community has overall relatively high average baseline, for several areas of both individual and social wellbeing.

In terms of the positive individual wellbeing findings, half these measures (SWEMWBS and wellbeing functioning) were found to score relatively highly amongst Brent Cross participants, compared to English and European groups.

Positive results were also found for several areas of social wellbeing. A sense of belonging was found to be strong, as well as how well people perceive the local community to be functioning.

These positive findings may, in part, be explained by partial under representation of key groups, such as unemployed persons. The timing of the study is an important consideration, as people 'bounced back', re-connecting with civil liberties in the summer – post COVID Roadmap ending. It is possible that the use of face-to-face survey techniques, contrasted with online data collection used within national surveys, may have created a Social Desirability Bias – whereby some participants provide answers they believe the researcher wants to hear.

In particular, within the SWEMWBS measure, a sense of optimism was particularly high; a potential reaction to the situational context.

The pandemic may also have impacted how much people pulled together, in turn increasing a sense of belonging in Brent Cross. It remains to be seen whether these levels remain stable, or fluctuate - up or down.

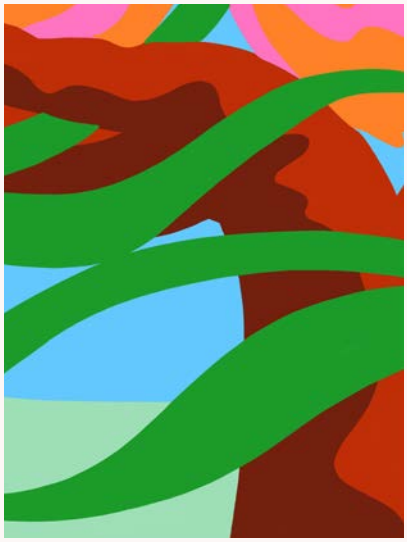
© Liudi Ming

Summary of individual and social wellbeing findings

OUTCOME TYPE	MEASURE	COMPARISON	BX POSITIVE*	BX NEGATIVE	UNFAIR DISTRIBUTION
Individual wellbeing	SWEMWBS	England**	X		X
	Worthwhile lives			X	X
	General happiness	UK & Europe		X	X
	Wellbeing functioning		X		X
Social wellbeing	Belonging	England*	X		X
	NOURISH – functionings	Manchester and Salford	X		
	NOURISH - feelings		X		
	Loneliness	England**		X	X

* BX positive represents a score that was found to be higher, or stronger, in Brent Cross, than the comparison group(s). Negative denotes a lower/weaker score in Brent Cross.

** Both matched and unmatched England groups



On the other hand, from a deficit standpoint, there are areas of local experienced wellbeing that represent a relatively low baseline and present key opportunities for the Brent Cross Town regeneration to target. Negative individual wellbeing findings showed a sense of living a worthwhile life (an important measure of psychological functioning) was lower in Brent Cross than in England. In addition, general happiness (an overall measure of positive emotion) was found to be lower in Brent Cross than in the UK and most other European countries, except Hungary – one of the lowest recorded measures in Europe.

Negative social wellbeing insights were also found. A sense of loneliness was reported as almost 10% higher than matched comparison groups, which unlikely to be explained by the pandemic, as the Brent Cross participants were compared to a wave of the UK COVID Social Study - that coincided with the Brent Cross survey. In general, as indicated within far-right column of the table on page 14, evidence of unfair distribution of wellbeing amongst the local population was found. In particular, individual wellbeing was lowest amongst the unemployed, long-term sick or disabled, persons without qualifications, and people between 18-34 years old.

The findings may, in part, be explained by the 'proxy' measures that are key in causing wellbeing. The survey found that local Brent Cross participants were substantially more likely to stop to talk to neighbours and slightly more people referred to a greater occurrence of exchanging favours compared to England. The former finding (more informal socialising) supports the higher sense of belonging observed and the latter (lower prevalence of instrumental support) may help explain the higher level of loneliness reported.

As summarised in the table on page 13, Brent Cross participants were less likely to have been actively involved in groups, clubs, or organisations in the past 12 months. Job and neighbourhood satisfaction were both found to be low, echoing the thoughts of local community and stakeholder discussion group participants. Participants referred to the lack of meaningful and diverse local job opportunities, and poor local provision of opportunities for young people.

Reported satisfaction with household income was slightly higher than in the UK but with room for considerable improvement. The amount of leisure time available to participants was found to be higher than in England. It is likely that this may be explained by timing, as the national dataset was collected pre-pandemic.

Conversely, the Brent Cross participants may have benefited, as a result of the pandemic, from increased ability to work from home and therefore improved leisure time. Taken together, as key causes of wellbeing, the proxy measures are likely to help explain both the individual and social wellbeing findings.

Summary of key wellbeing proxy findings

WELLBEING PROXY MEASURE	COMPARISON	BX POSITIVE	BX NEGATIVE	UNFAIR DISTRIBUTION
Connect with neighbours	England*	X		X
Support neighbours		X		X
Group participation			X	
Job satisfaction			X	
Neighbourhood satisfaction			X	
Income satisfaction		X		
Amount of leisure time		X		

* Both matched and unmatched England groups

Observed behaviours

More than 4,500 manually conducted observations were made in three strategic locations at Clitterhouse Playing Fields, demonstrating considerable scope to support additional wellbeing activities. On average, almost half as many people used the play area, compared to a matched comparison site. Furthermore, the average number of people (per hour) using the playing fields to Be Active, Connect and Take Notice was between 10-20% lower in two of the three sites. This was most notable for the existing play area, which represents low standard equipment and siting. In general, fewer women and girls, than men and boys, were observed using both Clitterhouse Playing Fields and the comparison spaces. In line with the poor quality of provision, fewer children and teenagers were observed used the play area, although it is not clear whether this activity has been displaced to the new nearby Exploratory play area. Taken together with the survey question regarding group participation, these findings highlight a low baseline locally, providing considerable scope for Project Play to support many more wellbeing activities and stronger equity between men, women, boys and girls.

The automated sensor counts collected during a 10-week period (approximately 330,000) showed the highest pedestrian and cyclists counts per hour along Claremont Road, followed by (in order of magnitude) Marble Drive, Tilling Road, Geron Way and Brent Terrace. These represent intuitive insights for key north-west and east-west directions through the area, corresponding with their status within the local highway network i.e. A, B and C roads.

Table 1.1: Summary of manual behaviour observation findings

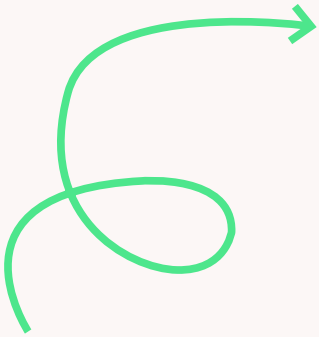
OUTCOME MEASURE	COMPARISON	BX HIGHER	BX LOWER	UNFAIR DISTRIBUTION
General usage	Matched sites		X	X
Be Active (MOHAWk)			X	X
Connect (MOHAWk)			X	X
Take Notice (MOHAWk)			X	X

Air quality

A limited number of air quality measurements were made for both particulate matter and gaseous pollutants associated with ill-health, cognitive impairment, and wellbeing at Claremont Primary School. Measurements were made both directly outside of the school and within a classroom. The composition of PM2.5 includes contributions from both local and regional sources. In the South East in particular, this can include contributions from continental outflow.

The outside measurements at the school show comparable levels of NOx and PM2.5 with other comparable monitoring sites in London. The measurements in this study show significantly lower concentrations of PM inside of Claremont Primary School in comparison to those made directly outside of the school.

Fortunately, indoor air quality (PM2.5) at Claremont Primary School was found to meet a new WHO target and the same was found for outdoor air quality. Although better understanding the contributions to measured PM2.5 would require knowledge about their chemical composition and e.g. back trajectory analysis, in principle, it is important that, at a minimum, these baselines are maintained and do not deteriorate over time.



Next steps

As recognised by the community within the group discussion sessions, the Brent Cross area presents wellbeing strengths and weaknesses. The findings demonstrate positive insights, whereby wellbeing should be treated as an important resource to be protected, but also drawn on and leveraged, to create highly desired change going forward. Whilst from a deficit standpoint, there are several areas of local experienced wellbeing that represent a relatively low baseline and key causes of wellbeing that are, at present, insufficient - presenting key opportunities for the Brent Cross Town regeneration to focus on.

The new index and initial baseline findings help provide a robust basis for setting salient targets within the Brent Cross Town Social Value strategy. The findings will help define interventions that impact the general local population and to 'level-up' potential discrepancies between groups.

They demonstrate the pertinence of inclusive employment and education interventions, and the relevance of the forthcoming Project Play, covering changes at Clitterhouse Playing Fields but also indoor and programmatic components.

We have reviewed our methodology and identified areas where the index can be made more robust; this should improve the index's ability to attract funding and sustain the data collection exercise over the coming years. Drawing on the further support of a fully funded ESRC PhD (MS), it may be possible to utilise the initial baseline data to capture the impact of the opening of Claremont Park and the new transport hub, concentrating on likely changes to local walking and cycling patterns.

Moreover, key next steps require research scoping work. This would involve liaison with potential alternative funders. Key considerations include aligning funder remit with varying aspects of Brent Cross Town regeneration, and in light of timeline, lowering emphasis on the impact of new park and public transport hub. It will also be important to a) liaise with key relevant independent organisations, b) co-interpret the baseline findings with the local Brent Cross community and, c) where necessary, explore collaboration with relevant London based researchers.

Initial industry and policy response to the Brent Cross Town Flourishing Index has been highly positive, with key institutions, investors, developers, and policy makers expressing interest. As highlighted by the Urban Land Institute, UN Habitat, and UK Green Building Council, this study potentially represents an industry first, considering the combination of participants involved and datasets generated, as well as the outputs and outcomes. Targeted and general audience dissemination regarding best practice approaches and initial baseline findings is being programmed to maintain momentum and maximise impact.

Acknowledgements

A key principle of the Flourishing Index research partnership was to balance democratic and technocratic input, bringing together numerous individuals and groups together, spanning various sectors and disciplines.

The authors extend their warmest thanks to the local participants of the online workshop and the surveys. An Appendix note will be shared as part of planned publications.

The public-private partnership leveraged UK Research Council and match funding, therefore creating MA and PhD opportunities. In return, this ensured knowledge exchange was facilitated with a reciprocal, rather than commercial, agreement.

We would like to thank the following experts who supported the index construction: Mark Fabian and Anna Alexandrova (Bennet Institute), Saffron Woodcraft and Ben Anderson (UCL Institute for Global Prosperity), Joanne Smithson and Nancy Hey (UK What Works Wellbeing Centre), Kai Ruggeri (Columbia University), Felicia Huppert (University of Sydney) and Sarah Stewart-Brown (Warwick University).

Finally, we would also like to thank Aishwarya Sankar, Liudi Ming, and BEAM for their support with data collection.

ACRONYMS

APS	Annual Population Survey	**NOURISH**	Neighbourhood flOURISHing
BXT	Brent Cross Town	**NIHR**	National Institute of Health Research
CLS	Community Life Survey	**ONS**	Office for National Statistics
CPF	Clitterhouse Playing Fields	**SWB**	Subjective Wellbeing
GDPR	General Data Protection Regualtion	**TOC**	Theory of Change
GIS	Geographical information Systems	**UKHLS**	UK Understanding Society Longitudinal Study
MOHAWK	Method for Observing pHysical Activity and Wellbeing		

1 Introduction

1.1 Research aims and questions

The main aims of the initial Flourishing Index research are to undertake:

- Rapid co-definition of a new Index, that has an academic core but is also representative of local voices and contextual circumstance;
- First round of baseline data capture before January 2022, using a mixed-methods approach, drawing upon van-guard analogue and digital sensor and data technologies.

The key research questions underpinning the above aims are:

- What do the local community and stakeholders understand about the terms health and wellbeing? How do these definitions compare to the consensus within the academic community?
- What do the local community and stakeholders perceive as the key things that need to change locally, and should therefore be included within an index?
- Based on local and expert input, eligibility for Research Council funding and the context of the Brent Cross Town regeneration context, which measures should be included within a baseline capturing bespoke dataset, prior to the first major phases of delivery?
- Using both bespoke and routinely collected data, what is the baseline for local people currently living in Brent Cross Town area, compared to matched groups of people?

1.2 Partnership overview

The baseline research involved a transdisciplinary partnership between the Joint Venture partners (Related Argent and Barnet Council), academic researchers, the local Brent Cross community (living within both Barnet and Brent Borough boundaries) and several stakeholders. Within the Joint Venture partnership, contributions were made from multiple areas of the council and business, including public health, Geographical Information Systems (GIS), community liaison, Project Play, etc.

Buro Happold and UoM's inter-disciplinary research team and advisors span backgrounds in geography, town planning, atmospheric sciences, neuroscience, psychology, health economics and statistics. For further details regarding the industry, government, community and academic contributors and their input, please refer to the Appendix.

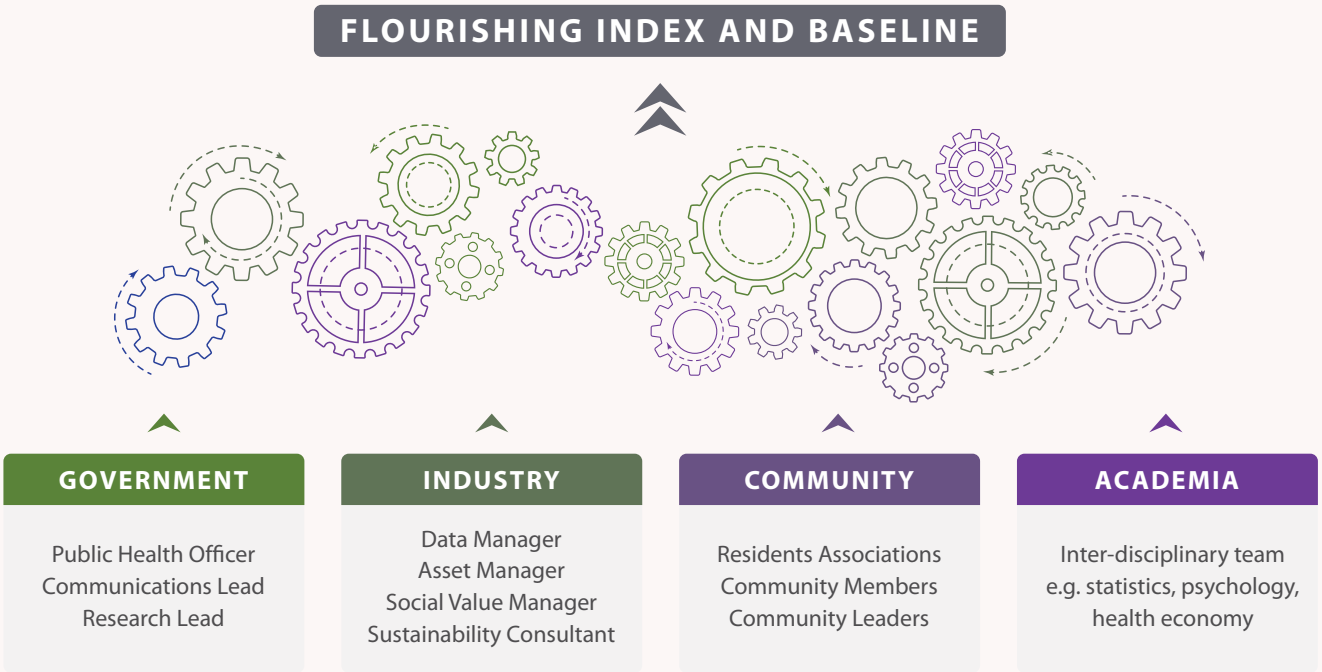


Figure 1.1:

Diagram capturing transdisciplinary partnership approach underpinning the Flourishing Index project

1.3 Methods summary

In order to generate a rich and representative understanding of wellbeing, the research team used an innovative mixed-methods approach, including online discussion groups, Theory of Change (ToC) development, intercept and online surveys, direct and automated behaviour observations and air pollution monitoring.

For each primary dataset, a matched UK or European comparison was sought. All the primary research was approved by UoM Proportionate University Research Ethics Committee and was GDPR compliant.

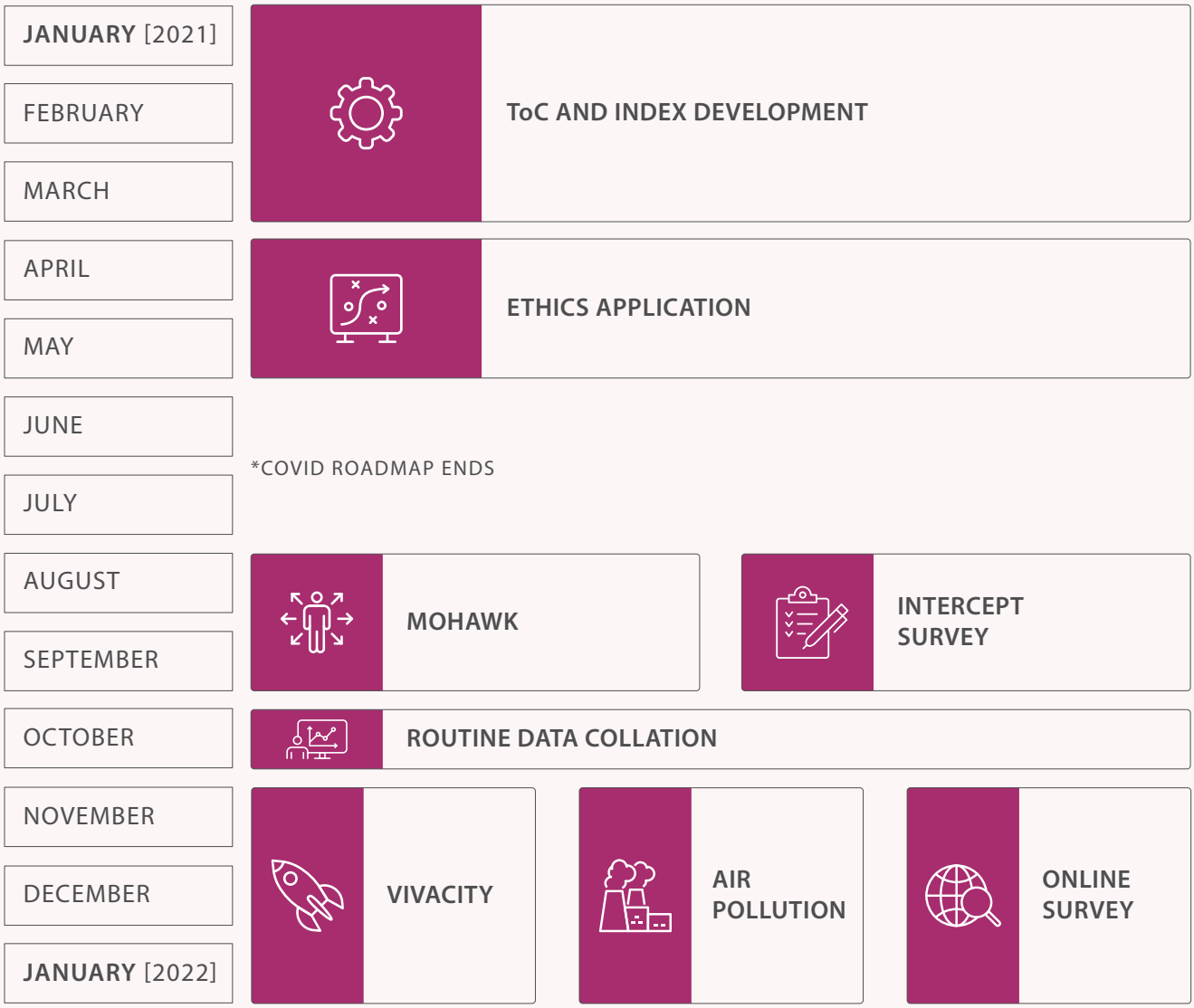


Figure 1.2:

Timeline of methods and data collection between January 2021 and January 2022

1.3.1 Online discussion groups

This work was based on the UK What Works Centre for Wellbeing[2] and the National Institute for Health's public engagement guidance[3].

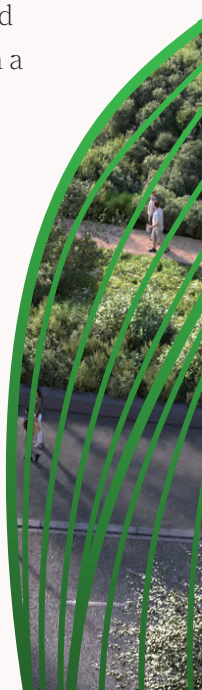
Five online discussion groups were led jointly by UoM and Buro Happold, with a modest but representative group of local community members. This focused on grass-roots definitions of health and wellbeing, and the priorities for change locally. The community members and leaders were recruited using word-of-mouth, leaflets, adverts and via email - bringing together a variety of people covering Cricklewood, Clitterhouse road area, the Whitefield Estate, Brent Cross Terrace and the Golders Green Estate.

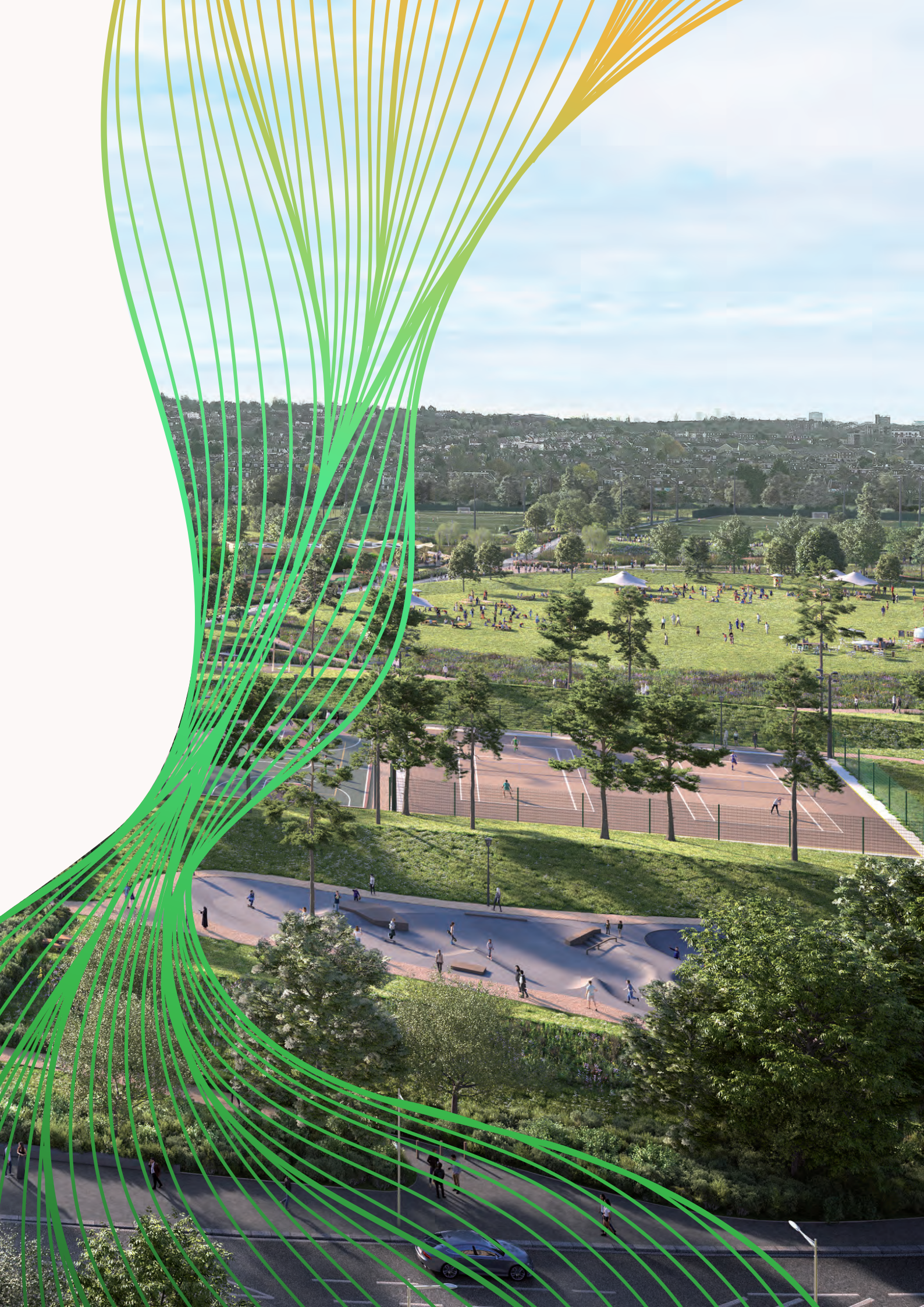
The lively discussions were held entirely online due to COVID restrictions and each session was approximately one hour long. The community members participated in two 1-hour sessions, whereas the community leaders joined a single 1-hour session.

During the sessions the following questions were posed:

- What would it mean for you to be 'healthy' and 'well'?
- What are the key things that need to change locally?
- Now that we have a list of changes that are important, would you prioritise some above others?
- Do you consider the mixed-methods approaches, described by UoM, suitable to capture change locally?

The first session concentrated on the first two questions, whereas the second session focussed on the latter questions, moving into what tangible change the participants would like the research to capture and the acceptability of proposed methods. The workshops provided valuable insight which are summarised within a separate Discussion Groups Summary Report.





Theory of Change and index selection

The findings of the discussion groups, together with previous desktop baseline and a rapid review of relevant literature, underpinned a first draft Theory of Change. In turn, the ToC informed the selection of outcomes and outcome measures used to collect the bespoke baseline data – the Flourishing Index. Both the ToC and index represent first iterations that are expected to evolve and adapt over the next 10-15 years, as Brent Cross Town is built out and managed via innovative governance practices that respond to a dynamic context and masterplan.

The ToC Figure 1.3 shows a conceptual model that links early Brent Cross Town inputs and activities (interventions) to a chain of intended outputs and observed outcomes. This model was used to guide a first set of baseline measures, informing the evaluation of the effectiveness of Brent Cross Town into the future. In terms of early Brent Cross Town regeneration, the ToC concentrates on the provision of a new transport hub and employment provision.

In line with mandate from the local community, local government and scientific literature, the outcomes selected cover 'experienced' wellbeing (i.e. what an individual feels in themselves), sometimes referred to as Subjective Wellbeing (SWB), and a range of factors that are shown to contribute to individual wellbeing SWB. The latter are sometime referred to as 'proxies' – as shown along the causal pathways preceding the outcomes.

The SWB outcomes cover hedonic (feeling good) and eudaimonic (functioning effectively) concepts of wellbeing and the realisation of both personal and interpersonal potential i.e. life going well for 'me' and for 'us'. Several of the proxies were raised as important to the local community during the online discussion groups and others are evidenced in literature, including key wellbeing behaviours (e.g. Be Active, Connect and Take Notice), [4] and satisfaction with key aspects of life – such as income, jobs, and housing.[5]

Working with input from international experts (please refer to Appendix for further detail), the research team identified a set of robust data collection outcome measures that:

1. Capture intended outcome changes outlined within the ToC that cannot be adequately captured using routinely collected data, and;
2. Allow comparison, where possible, to recent national and regional data, and matched groups.

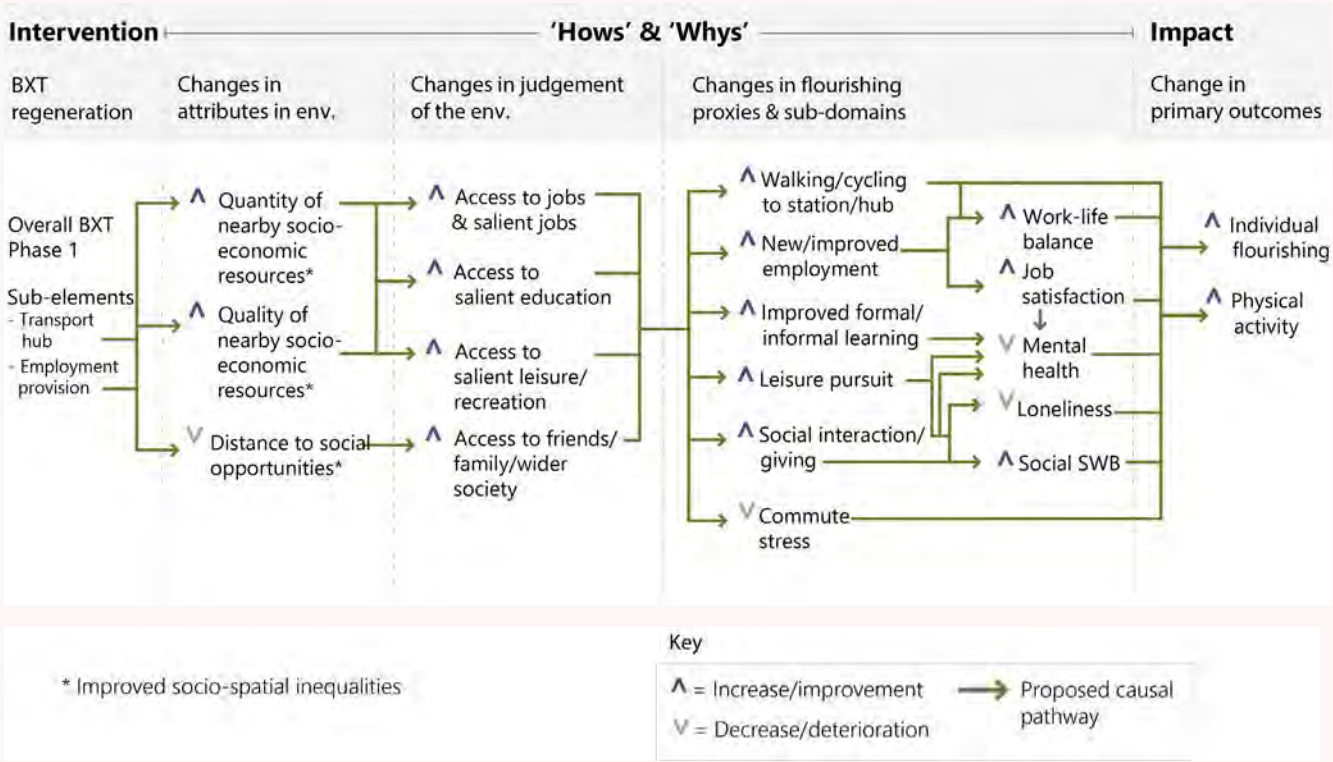


Figure 1.3:

ToC diagram showing how early regeneration (transport hub and employment) may lead to positive wellbeing and physical activity impact amongst local people

1.4 Intercepts and online survey

Twenty-five validated measures from three national UK surveys (Understanding Society, Community Life Survey, and the Annual Population Survey), the European Social Survey (ESS), the COVID-19 Social Study and a new UoM measure of local social wellbeing (NOURISH: Neighbourhood flOURISHing) were pulled together as a 5-10 minute survey.

Approximately one-third of the questions asked about personal wellbeing, measuring life going well for 'me', using the Short Warwick-Edinburgh Wellbeing Scale (SWEMWBS). This comprises seven short questions that measure how well each participant is feeling (hedonic wellbeing) and how well they perceive themselves to be functioning (eudaimonic wellbeing). Five additional measures of individual wellbeing were taken from the ESS, covering dimensions not covered by SWEMWBS, across 22 European countries (please refer to Appendix for further detail). The higher the score provided by the participant, the higher their own individual experienced or Subjective Wellbeing.

The next third asked about experienced social wellbeing, or life going well for 'us'. Unlike individual wellbeing, this type of wellbeing is 'interpersonal', as it helps capture how well life is going for groups and between people – going beyond 'me' scores - pulled together as an average. For example, a participant may have expressed high level of personal happiness in the previous section but, when thinking about the local community they live in, the same participant may report low feelings of respect and belonging. For these outcomes, this person therefore would have high individual wellbeing but low social wellbeing, at the same time.

The final third of survey questions measured key wellbeing 'proxies' of sustained wellbeing. These include key behaviours such as Be Active, Connect and satisfaction with several key areas of life, such as income satisfaction. These are key causes of wellbeing and can help explain local patterns of individual and social wellbeing.

The survey was deployed in the field and online. In the field, a quota-based sampling technique was used to help ensure that the intercept survey findings are as representative of the local area as feasibly possible.

This helped ensure the representation of gender, age groups and ethnicities reflected Ward-level socio- demographics. Trained field data collectors approached local people in outdoor public spaces: usually members of the public on foot and in the vicinity of a neighbourhood hub – such a newsagent, or local pharmacy.

Each of these locations were located within a 10-minute cycling isochrone, straddling the Midland Main Line railway, the North Circular, and Barnet and Brent borough boundaries (Figure 2.1 in Section 2).

When a member of the public confirmed that they lived locally and were willing to participate, the field researcher would guide the participant through the questions, using a digital tablet to enter the participants responses on their behalf.

Between July 26th – September 3rd 2021, the intercept survey was carried out with more than 1,500 local residents. A slightly longer online version of the survey was also circulated between November 2021 and February 2022, to provide further opportunity for local people to participate.

All survey data was cleaned and comparison datasets were gathered. With the exception of the NOURISH data, dataset access was limited to pre-COVID results from national surveys released by October 2021.

The Brent Cross survey data was collected following the end of most COVID restrictions and as life was so different under the restrictions, care was taken to only use survey data collected prior to March 2020 – before the first lockdown. In the future, the research team would choose to compare to the closest year and month, which may be different to the ones used in this report.

The Brent Cross dataset was then compared to the national datasets using R statistics software. The number of missing survey answers varied but was generally low.

Where missing answers occurred, imputation techniques were used to generate average scores to be included in the main analyses. A propensity score matching procedure was used to match Brent Cross participants to UK comparators on key socio- demographic variables, including household income, age, education, and gender (refer to Appendix for more detail). In light of smaller sample sizes, comparisons made to European datasets involved matching only for household income – a key covariate.

Finally, a series of descriptive statistics were presented to understand local patterning of wellbeing, compared to meaningful comparators.

1.5 Behaviour observations

The way we behave can be very important to our experienced wellbeing. Behaviour observations were conducted using two different tools: MOHAWk (Method for Observing pHysical Activity and Wellbeing) and Vivacity sensors.

MOHAWk is a systematic observation tool for assessing level of public space usage, three levels of physical activity (Sedentary, Walking, Vigorous) and two other behaviours important for wellbeing (Take Notice: taking notice of the environment and Connect: social interactions) in urban spaces[5].

Observations were conducted at baseline (pre-intervention) during July 2021 in three sites on Clitterhouse Playing Fields, where multiple substantive infrastructural and programmatic Project Play interventions will take place between 2023 and 2025.

MOHAWk observations were conducted during four hour-long observation periods (10.30am, 12.30pm, 4pm, 6pm) on four days (including Saturday) at each site, providing a total of 16 hours of observations for each site.

In order to compare to behaviour trends, where an intervention was not planned, data was also collected in three matched comparison sites (Comparison Sites 1A, 2A and 3A). For further details on these sites, please refer to the Appendix.

The comparison sites were matched to the intervention sites on correlates of physical activity at the neighbourhood (e.g. population density) and site (e.g. lighting) levels. For further details regarding this process, please refer to the Appendix.

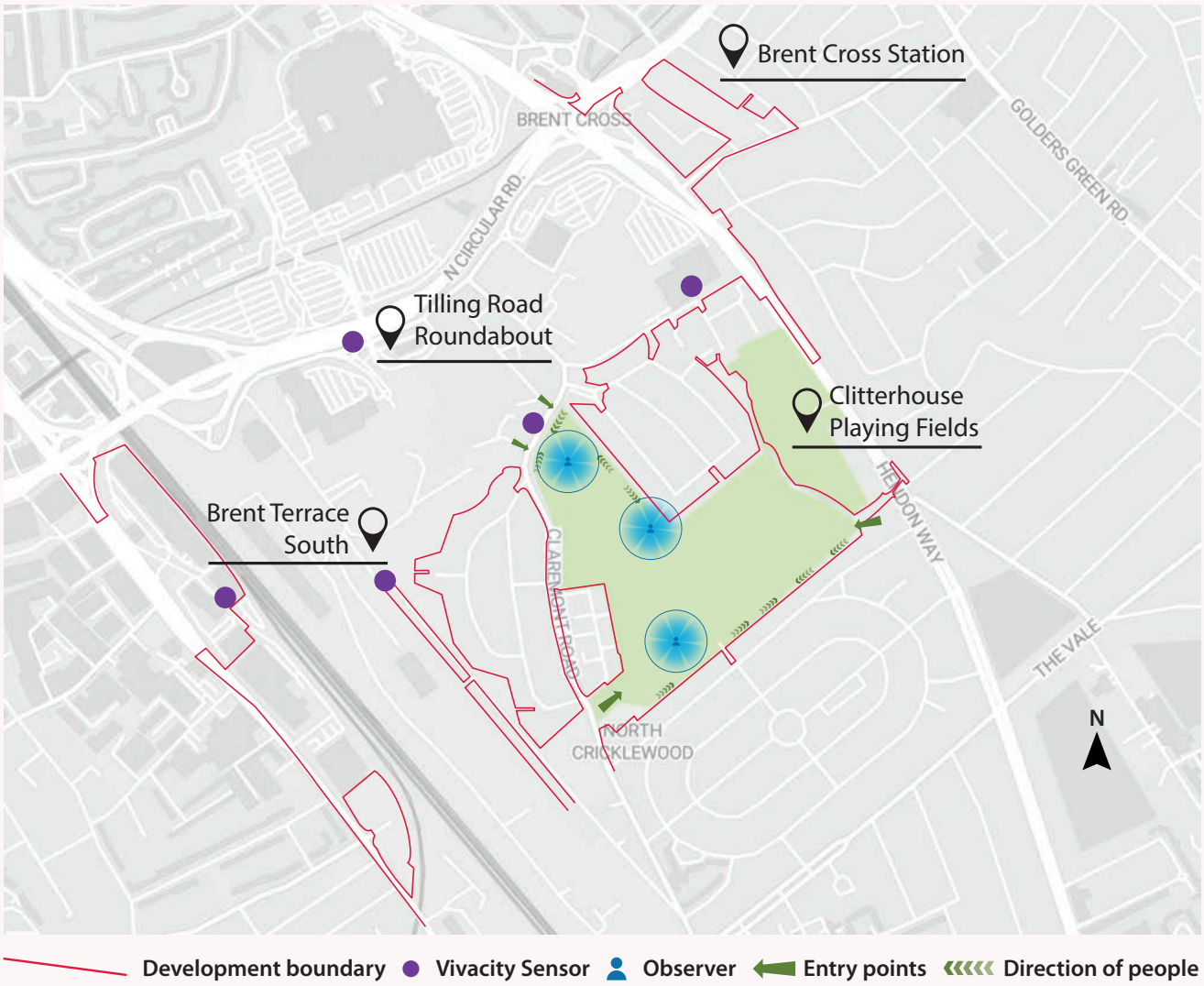
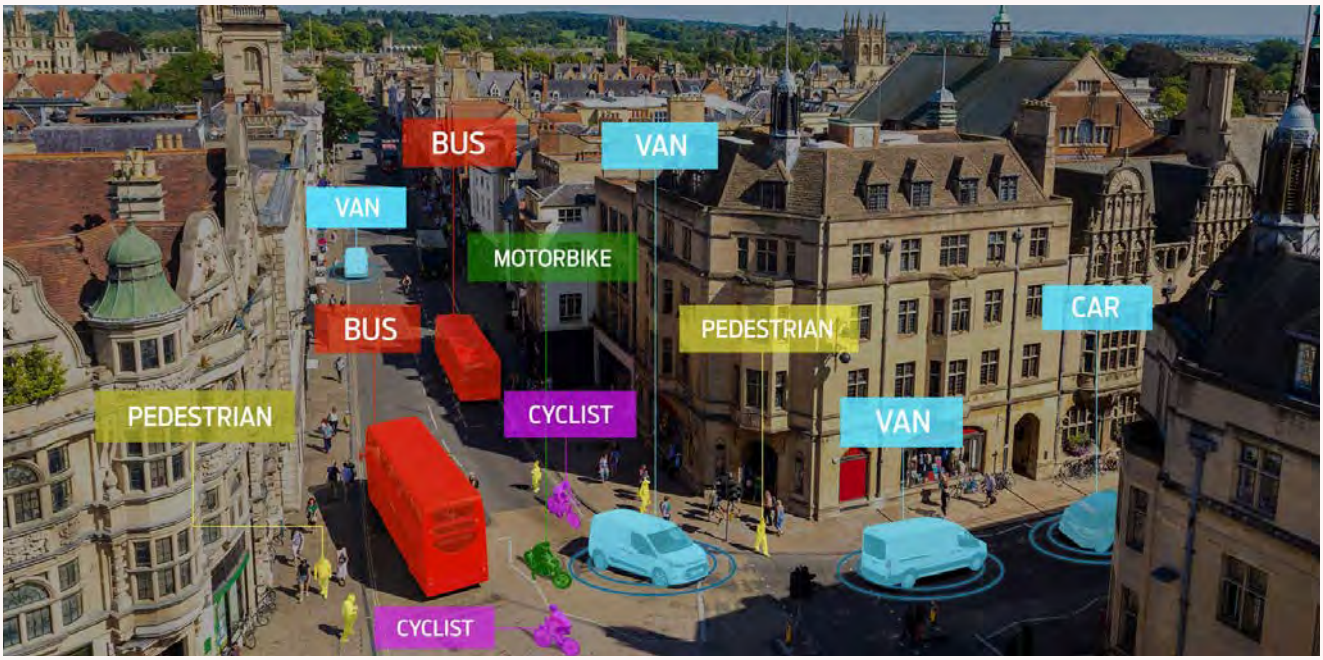


Figure 1.4:

Plan showing three MOHAWk and five Vivacity sensor data collection locations at Clitterhouse Playing Fields



Vivacity sensors use neural network-based computer vision sensor technology, representing a powerful tool for behaviour data collection.

The sensors use Artificial Intelligence and Machine Learning to capture anonymous traffic counts in real-time across a selected 'count line', trained from millions of examples of road users. These counts cover up to 32 different modes of transport however, the focus of this baseline are pedestrians and cyclists. Vivacity sensors do not extract or record any socio-demographic information from the street scenes that are measured.

Working with Barnet Council and a street furniture contractor, the research team identified five strategically important locations for the collection of data. These locations cover key east-west and north-south routes that are likely to be impacted by the delivery of Brent Cross Town.

Figure 1.4 show the locations of Clitterhouse Playing Fields MOHAWk data collection locations. For further location information (Vivacity, comparison site etc) please refer to the Appendix. The Vivacity baseline dataset covers between November 2021, when calibration of the sensors was completed, and the end of January 2022. During this 10- week period, more than 330,000 thousand observations were made across the five locations.

1.6 Air pollution monitoring

Air quality in a specific location is a very complex result of local and regional emissions, meteorology, and atmospheric process that chemically and physically transforms pollutants.

There are now a number of sensor-based air quality monitoring approaches that, in the last five years have seen a massive upsurge in use given their ability to be used in large numbers in small locations. Air pollution sensors offer significant potential to improve both our understanding of, and ability to improve, urban air quality.

Traditional specialist sites and monitoring networks typically make measurements using reference-grade equipment, over a small number of locations. In contrast, the monitoring at Brent Cross used low-cost sensors, which allow for spatially dense observations that can capture the spatial heterogeneity of air pollution.

These sensors therefore have the potential to provide the granularity of data needed to understand the effect of local interventions.

Long-term assessment of commercial air pollution sensor technologies against reference grade instrumentation is seen as essential prior to sensible use of these technologies in monitoring experiments.

UoM completed these assessments at the NERC Air Quality Supersite prior to this work. Based on the results of this work, AiRSense units were deployed both inside and outside of Claremont Primary School for period of 4 months. Comparisons with data over this period are compared to other local measurement sites.

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2 Research Findings

2.1 Survey

2.1.1 Overview

In July and August 2021, more than 1,500 local participants, aged 18 years old and above, agreed to take part in the short intercept survey comprising of 30 questions (please refer to Appendix for further details). A further 69 participants took part in the online survey.

All intercept surveys were fully completed and most participants attempted to answer questions, rather than selecting 'don't know'. The online survey was fully completed by 43 (63%) of participants.

Sixty percent of the sample agreed to share a full postcode, or a partial three-digit postcode. The full postcodes are mapped in Figure 2.1 whereby, the larger the circle, the more participants from this postcode location.

The majority of these people live within the 10-minute cycling distance, isochrone boundary envisaged as 'local', for the purposes of this research. 58% of these participants expressed an interest to be entered into a prize draw and/ or be kept informed of the research findings.

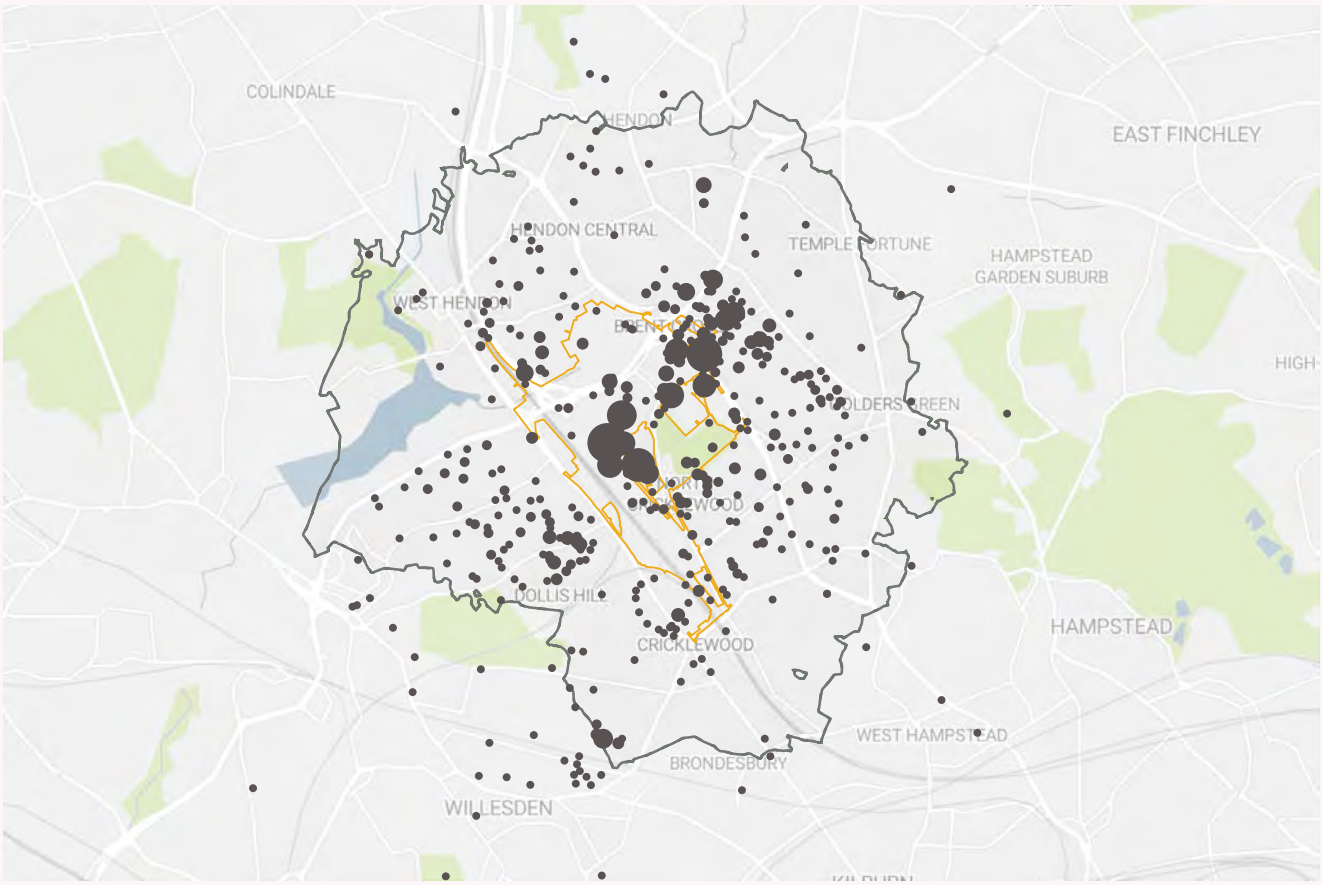


Figure 2.1:

Map of full postcodes shared by intercept survey participants with 10-minute cycling distance from future high-street and development/regeneration boundary

2.1.2 Participant demographics

Table 2.1 compares a summary of the key socio-demographics of the Brent Cross Town sample, with averages taken from the local wards covering the areas that participants live in. The ward information is based largely on 2011 Census information (to be superseded later in 2022) and all wards reside within both Barnet and Brent Borough Council boundaries, covering Golders Green, Childs Hill, West Hendon, and Dollis Hill (for more detailed socio- demographic breakdowns, please refer to Appendix).

Table 2.1 shows that the Brent Cross sample is reasonably similar, when compared to 2011 Census information. However, as indicated with the third column, several groups are under-represented. In particular, older persons (65+), those not in work, single and, ethnic minorities (excluding white minorities), and those who did not pursue degree educations, could be better represented.

Persons who thought to be under 18 years of age were not approached as part of the survey and therefore are not represented within the following survey findings.

Table 2.1: Baseline intercept and online survey participants socio-demographics

INDICATOR	BRENT CROSS SAMPLE	LOCAL WARD AVERAGE*	DIFFERENCE
WOMEN	55%	50%	+5%
ETHNIC MINORITIES	36%	44%	-8%
WORKING AGE BRACKET (16-64)	82%	65%	+17%
MARRIED	54%	64%	-10%
EMPLOYED (FTE OR PT)	60%	48%	+12%
DEGREE EDUCATED	48%	41%	+7%
FAITH STATED/ EXPRESSED	45%	88%	-33%

* Data source: Census 2011

2.1.3 The positive wellbeing findings

The wellbeing survey carried out in August 2021 revealed positive and negative insights regarding the wellbeing of the local community. We will start by setting out the positives.

Individual wellbeing

Within the following charts, the higher the score provided by the local survey participant, the higher their own individual experienced wellbeing.

Within the following charts, the higher the score provided by the local survey participant, the higher their own individual experienced wellbeing.

Figure 2.2 shows an average SWEMWBS measure of 25.21, for individual wellbeing. This is approximately three points higher in the Brent Cross, compared to both the matched (22.29) and England groups (22.33). Previous research in the UK shows the top 15% of scores range from 27.5-35.0[6] and therefore the Brent Cross sample (25.21) was just under the top range, at the time of collection.

This may in part be explained by a post-COVID restrictions 'bounce back' effect, the differing modes of data collection used (intercept vs. online) and, as outlined within the previous section, the under-representation of some local groups, such as the unemployed, non-white persons and those with lower levels of education.

In terms of data collection mode, the Brent Cross participant responses were only collected face-to-face, which can be subject to a Social Desirability Bias[7], whereas the Understanding Society survey is almost entirely online – without the presence of an interviewer. It is also possible that the Brent Cross participants' higher reported personal wellbeing is related to the end of the UK COVID Roadmap, involving the re-instating of most civil liberties, coinciding with summer, both eagerly anticipated by the British public.

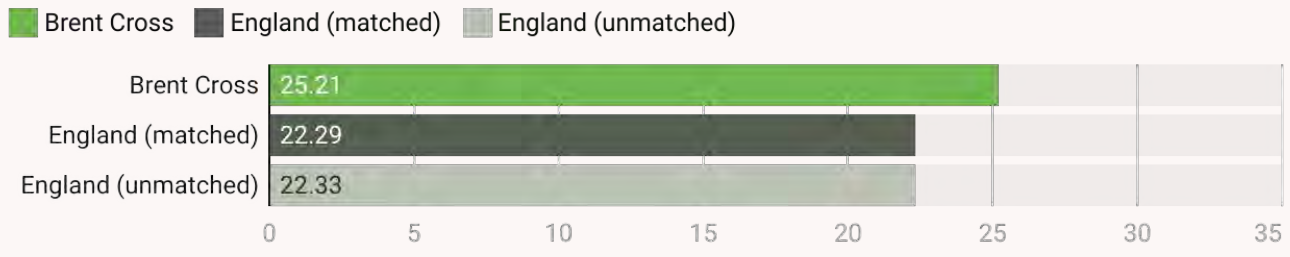
Overall SWEMWBS score

Figure 2.3 shows that, at the time of collection, the Brent Cross participants were higher on all sub-dimensions, contributing to the overall SWEMWBS score. Most notably, the overall score is partly due to high reported optimism about the future. The lowest score in the Brent Cross sample is for calmness, which is consistent with European-wide research that shows that people in the UK have the amongst the lowest levels of calmness in Europe.

As set out within the earlier methods (Section 2), four additional ESS measures of individual wellbeing functioning (eudaimonia) were also collected. These measures were collected in 2011-12, approximately 10 years before the Brent Cross intercept survey and are presented here as a single overall average score of 4.18.

This finding echoes the SWEMWBS insight but, in this case, the Brent Cross score is higher than all the other European scores, including the 3.87 average score for UK. This is unusual as, in the past, countries such as Denmark and Norway are typically higher than in the UK.

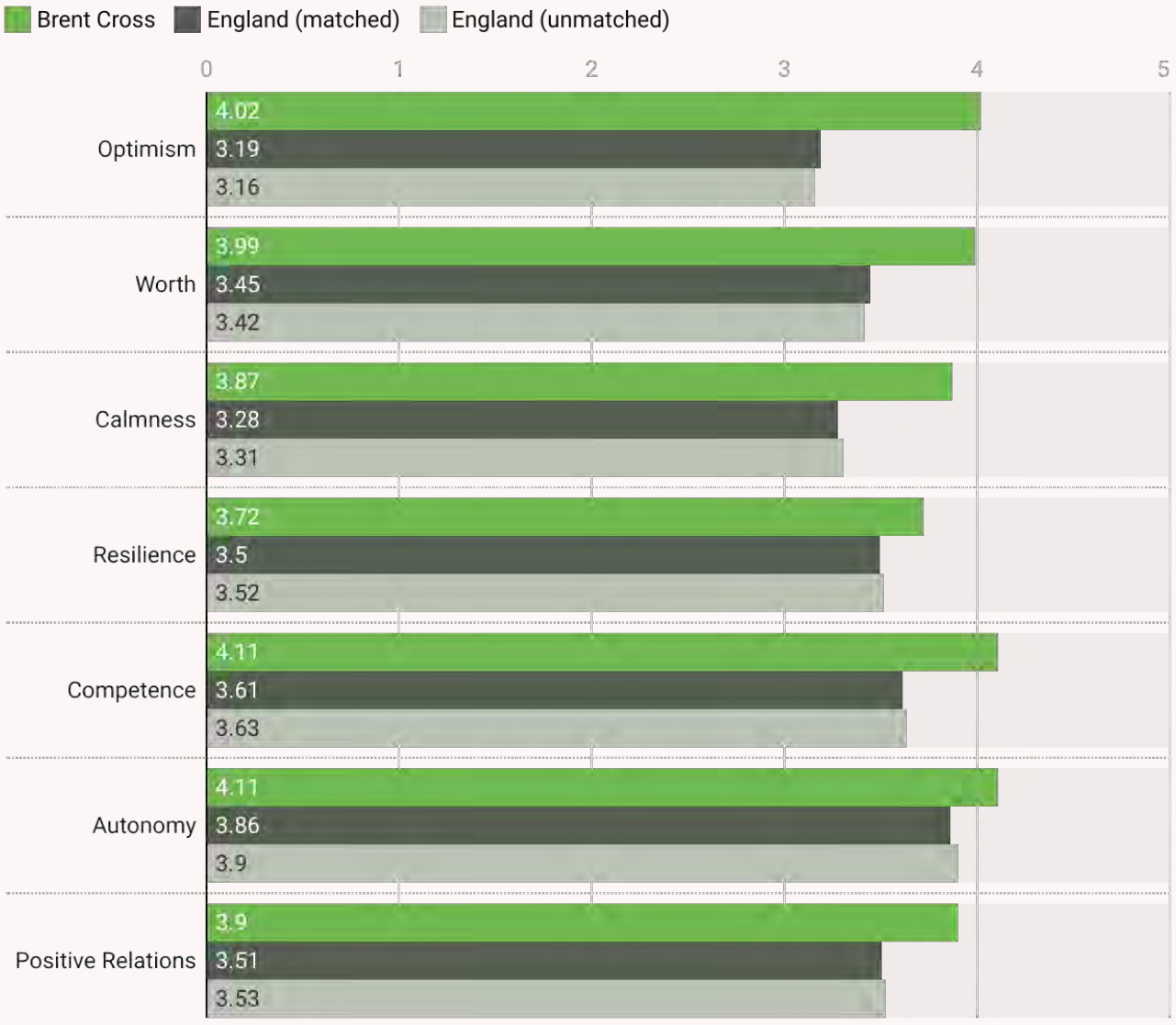
As with the SWEMWBS scores, these high scores may also be explained by the different modes of data collection and a COVID bounce-back effect. The latter may be amplified by the fact that the data was collected almost 10 years earlier, within a different temporal context. Despite these explanations, at the time of collection, these findings reinforce that local people reported high levels of individual wellbeing, to be protected into the future and providing good foundations from which to build upon.



UKHLS Wave 10

Figure 2.2: Average SWEMWBS scores amongst local BX participants at baseline, compared to matched and English population samples

Average SWEMWBS sub-dimensions



UKHLS Wave 10

Figure 2.3:

Average SWEMWBS sub-dimension scores, amongst local BXT participants at baseline and compared to matched and English population samples

Social wellbeing

Experienced social wellbeing was also measured within the survey data collection. This involves going beyond life going well for 'me' i.e. I feel calm, to capture how well life is going for 'us' i.e. our community feels safe.

Using a question from the UK Community Life Survey, participants were also asked how strongly they feel they belong to their immediate neighbourhood.

Figure 2.4 shows that 37% of Brent Cross participants felt they 'very strongly' belong to their local area, compared to 19% of participants within the matched and England cohorts. This represents a clear indication that a large proportion of local people have a powerful attachment to their local community, a key strength to be maintained and cultivated further into the future.

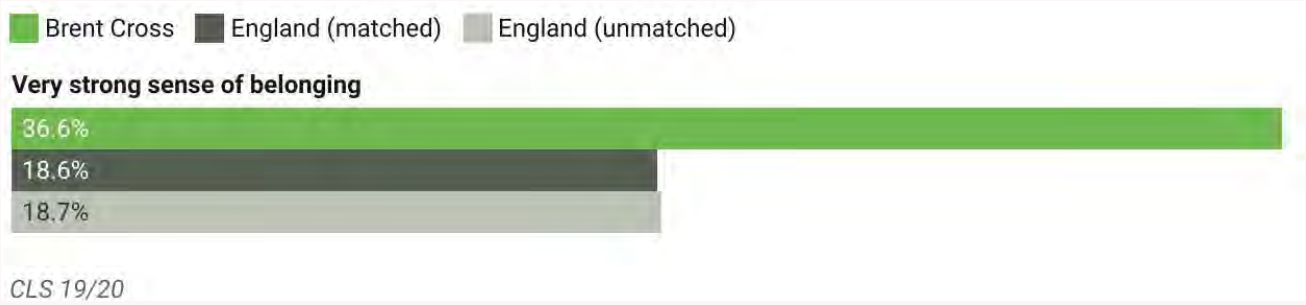


Figure 2.4:

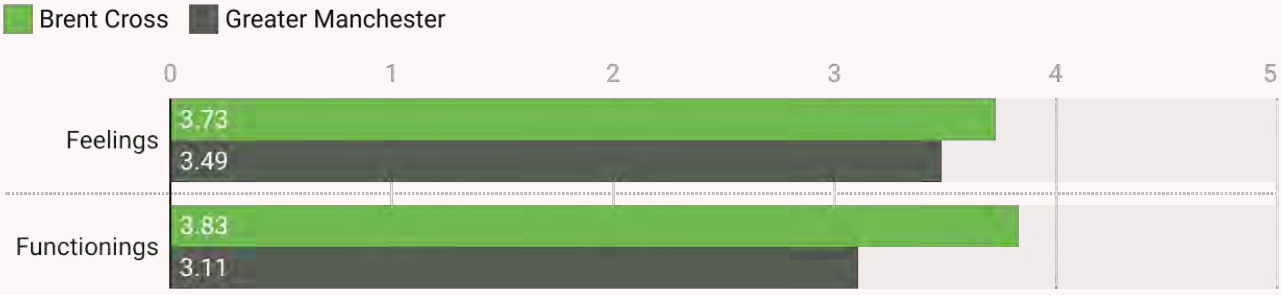
Percentage of local BX participants very strongly belonging to their local area, compared to matched CL sample

Figure 2.5 presents overall average scores for the two NOURISH categories of social wellbeing: feelings (safety, trust and respect) and functionings (celebration, participation and social autonomy). The comparison data was collected in Greater Manchester (Manchester and Salford) in 2019 and again in 2021, using the same intercept survey mode of collection and in areas of deprivation, albeit more deprived.

This shows that overall reported social feelings and functionings were higher in Brent Cross than in the Greater Manchester comparison groups. This is most notable for the social functionings score of 3.83 in Brent Cross compared to an average of 3.11 in Greater Manchester.

Given that half of the comparison data was collected in 2019, these differences may in part be explained by timing but, also higher levels of deprivation experienced by the Greater Manchester sample. Nonetheless, these findings may, in part, explain the strong sense of belonging described above (Figure 2.4).

Average combined NOURISH feelings and functionings



GrowGreen Survey

Figure 2.5:

Overall average reported feelings and functionings amongst local BX participants at baseline, compared to matched area in Greater Manchester

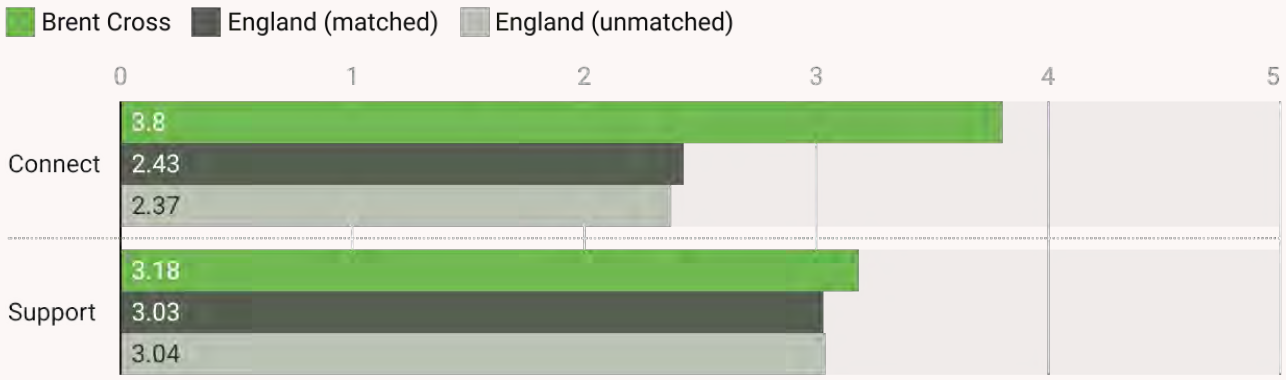
The higher belonging and NOURISH scores shown in Figures 2.4 and 2.5 may also be explained by the number of people in Brent Cross, who say they stop and talk to their neighbours, connecting with others, as shown in Figure 2.6. However, the Brent Cross participants are compared to national data collected between January 2017 and May 2019.

Given the contrast in timing, the differences show here may reflect a positive effect of the COVID-19 pandemic, whereby people were prompted to speak to their neighbours more regularly.

Until another wave of data is collected, it is not clear whether these reported levels will be sustained.

Figure 2.6 also shows the answers to a second question that measured local support, asking if participants 'borrow things and exchange favours' with neighbours. Unlike the first 'connect' measure, this is only slightly higher in Brent Cross. This suggests that although people are highly likely to stop and talk to their neighbours, they are not necessarily much more likely to provide instrumental support. This provides indication of an opportunity to support more altruistic activities locally, such as volunteering.

Connect and support behaviours



UKHLS W 9

Figure 2.6:

Reported connect and support activities amongst local BX participants at baseline, compared to matched and England samples

2.1.4 The negative wellbeing findings

Individual wellbeing

A measure of 'the activities we do in life being worthwhile' was used and compared to a ONS dataset collected in 2019 with more than 150,000 English participants. This covers an important individual functioning (eudaimonic) sub-dimension not captured within SWEMWBS, on a scale of 0-10.

Figure 2.7 departs from the pattern exhibited within the SWEMWBS findings. Local participants in the survey reported a lower average (7.66), compared to the matched (7.93) and England (7.91) comparator groups. From a deficiency perspective, improving how worthwhile people perceive their lives to be presents an opportunity for improvement – unpacked further within the following 'making sense' section.

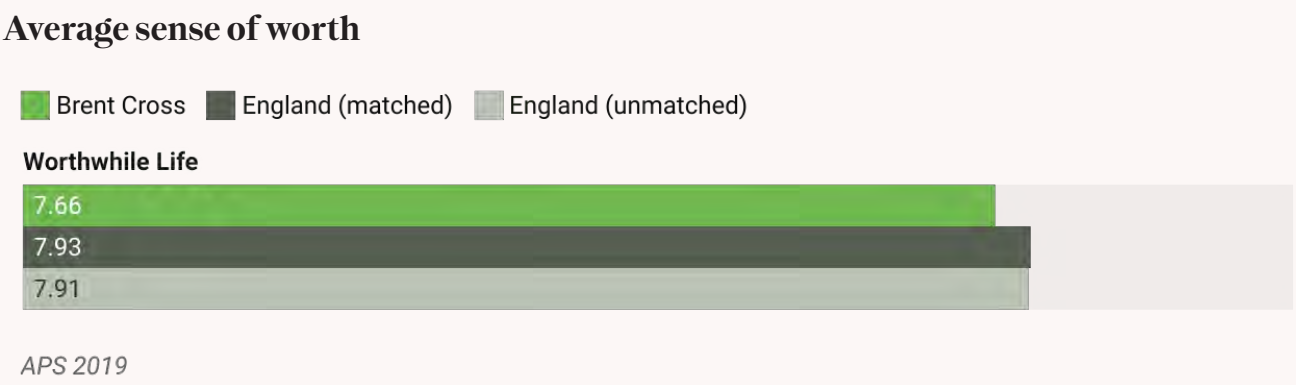


Figure 2.7:

Bar charts depicting overall average sense of purpose amongst local BX participants at baseline

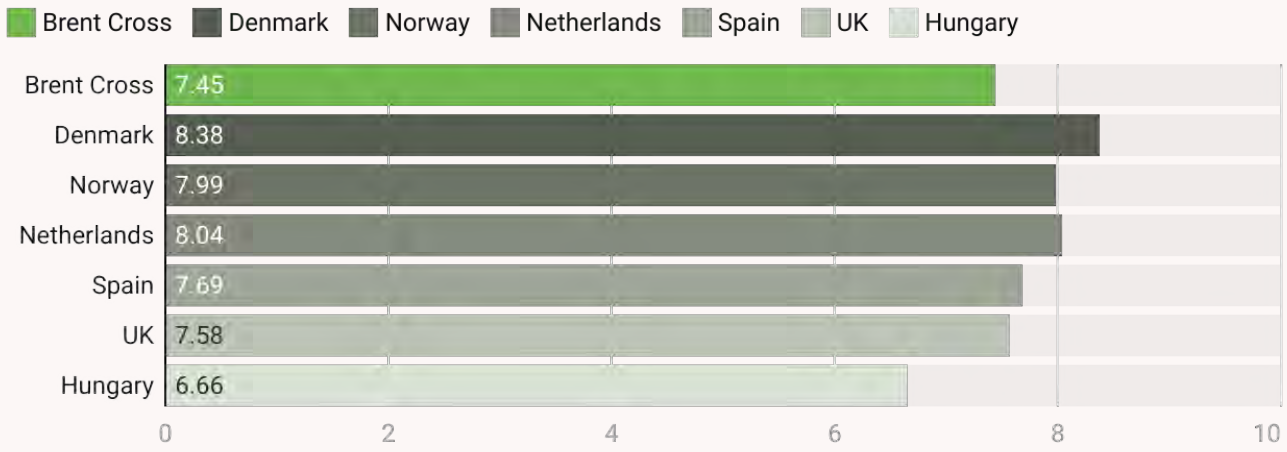
Figure 2.8 compares national European scores to the UK and five other countries, for general happiness – a measures of positive emotion, or hedonic wellbeing. Previously these countries have been shown to have the highest (Denmark) and the lowest (Hungary) wellbeing in Europe.

The other countries (Norway, Netherlands, Spain) are typically spread out – between Denmark and Hungary and the 17 other countries who participated in the ESS.

This shows that Brent Cross participants report an average of 7.45, a lower level of general happiness than the UK and all the other four countries, except for Hungary, as reported in 2018-19.

Although the previous section reported good scores for wellbeing functioning, the same is not replicated for positive emotion. This pattern has been found at the national level in France, where people report strong eudaimonic but relatively low hedonic wellbeing.[8]

Average general happiness



ESS 9 and 6

Figure 2.8:

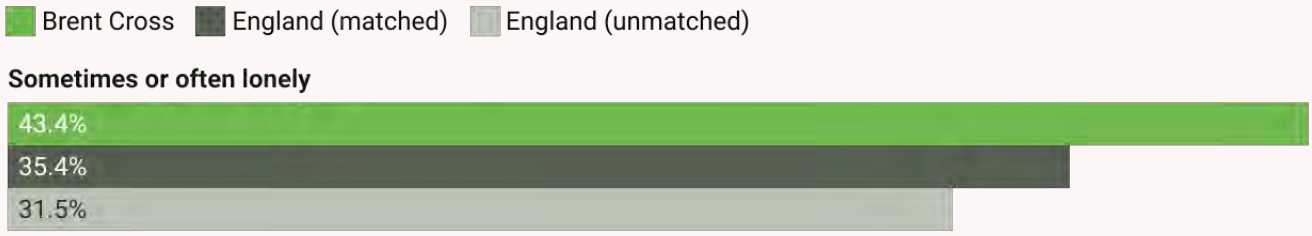
General average happiness amongst local BX participants at baseline, compared the UK and five European countries

Social wellbeing

Contrary to the positive social wellbeing findings outlined earlier, Figure 2.9 shows that 43.4% of the Brent Cross participants reported feeling lonely some of the time or often, compared to 34.6% in the matched control group and 31.3% of general UK population.

Loneliness shows strong links to premature death and this finding cannot be explained by the impact of COVID, highlighting this as a key outcome to improve in Brent Cross.

Self-reported loneliness



US COVID-19 survey Wave 9

Figure 2.9:

Loneliness experienced amongst local BX participants at baseline, compared to matched UKHLS sample

Distribution of wellbeing

A key cross-cutting negative finding is that, for several survey measures, wellbeing is not evenly, or fairly distributed across the local population. This is mirrored in the national survey data with a couple of exceptions.

Figure 2.10 shows a key example of how individual wellbeing (SWEMWBS) is unevenly distributed. Although the groups were relatively small, wellbeing is found to score lowest amongst the unemployed (64 respondents), long- term sick or disabled (20 respondents), broadly replicating the UK comparison groups. These scores were 22.18 and 19.19 respectively, compared to an average 25.21 across the wider Brent Cross population. This same pattern of unjust distribution was also apparent for the other individual measures of wellbeing – for worthwhile lives and general happiness (please refer to Appendix for further details).

A consistent negative finding across the individual wellbeing measures was found for both level of education and age. On average, those with degrees (461 respondents) have the highest scores, contrasted with those persons with no qualification (19 respondents), who had the lowest wellbeing matching national trends. Comparing wellbeing scores across age groups generally resembles national patterning (please refer to Appendix for further details) however, they are consistently lower for Brent Cross participants between the ages of 25-34 years old (264 respondents).

Unemployed Brent Cross participants (64) reported average sense of worth of 6.69, considerably lower than an average of 7.82 – reported by employed persons. This is a consistent and common wellbeing finding.[9]

In terms of social wellbeing, negative evidence was also found for instrumental social support, as measured with reference to exchanging favours.

Ethnic minorities (498 respondents) and those identifying as Sikh (23) were less likely to receive this type of support, contrasting with white groups.

Finally, the percentage of local people reporting loneliness was highest among younger age groups however, as found with individual wellbeing, the highest prevalence of loneliness (58.4%) was reported amongst the 25-34 year olds – 12% higher than more than comparison groups.

Average SWEMWEBS

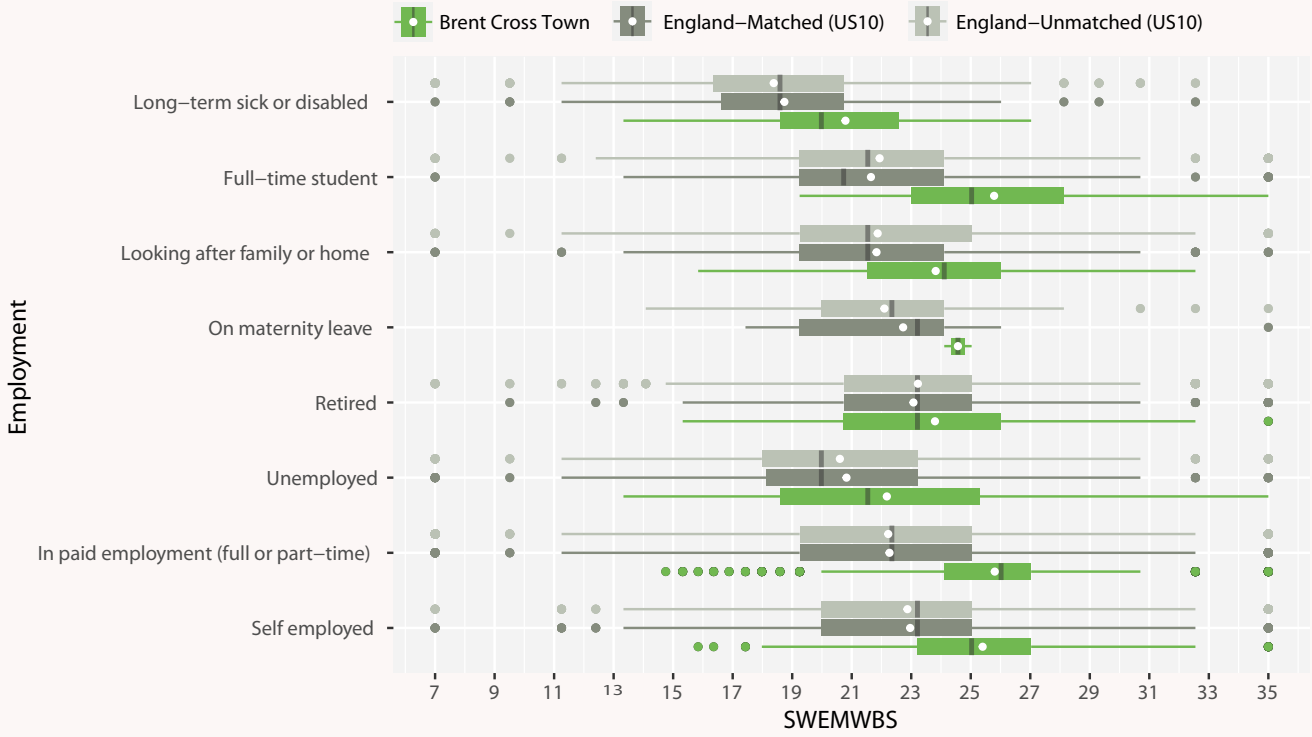


Figure 2.10:

Box-plot comparing the distribution of overall average SWEMWEBS amongst local BX participants at baseline, compared to matched and England comparators

2.1.5 Starting to make sense of the findings

As outlined above, the positive Brent Cross wellbeing findings may, in part, be explained by a COVID bounce back effect, differing modes of data collection and the underrepresentation of some key local groups. However, it is also possible that the high individual and social wellbeing scores are mutually reinforcing. For example, increased superficial contact with neighbours may have increased during the pandemic. In turn, this may have improve individual wellbeing dimensions, such as a sense of calmness and/or usefulness. This can create a virtuous circle, whereby the individual wellbeing feeds back, reinforcing the social wellbeing even further[10].

The negative findings, where Brent Cross was found to be lower than national averages, can be partly explained by some of the inequalities described. For example, overall averages of general happiness and a sense worth are brought down by the lower scores amongst 25-34 age category.

In regard to social wellbeing, the lower scores shown for ethnic minority people also partly explain the differences with the national data.

Figure 2.11:

Proportion of participants stating active involvement one or more group, club or organisation over the past year

Group participation and satisfaction with key areas of life may also help illuminate negative findings.

For example, survey participants were asked whether they had been actively involved in groups, clubs or organisations in the past 12 months. Figure 2.11 shows that 66.7% of Brent Cross participants were involved with at least one activity over the past year, which was approximately 5-7% lower than observed within the matched or general England groups (73.1% and 71.6% respectively). This finding fits with community and stakeholder comments raised within the discussion groups that, currently, there are not enough meaningful activities locally.

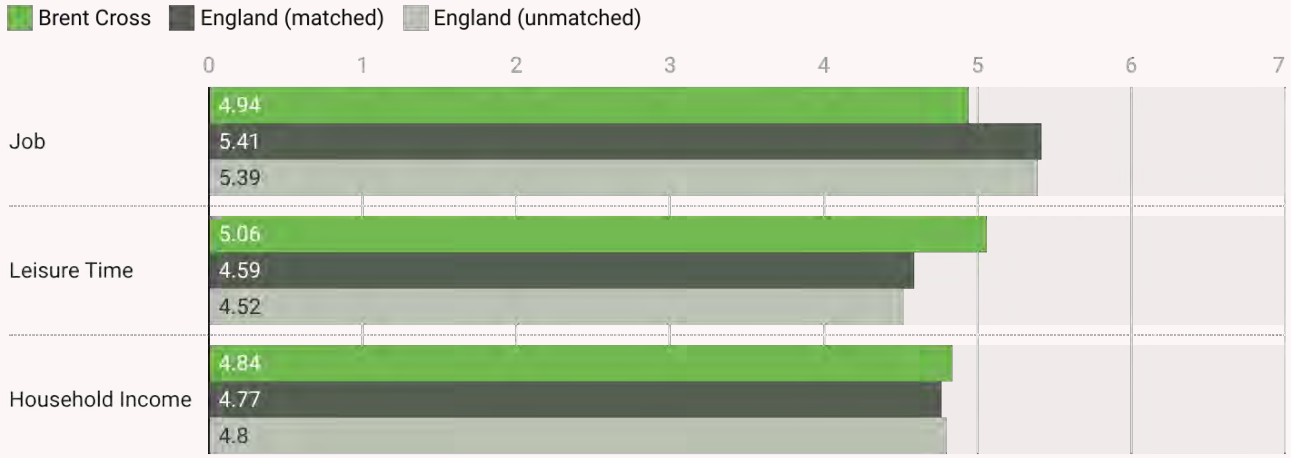
In turn, the lower participation may contribute to the lower Brent Cross general happiness, sense of worth and loneliness scores[11].

Job satisfaction is linked to a sense of worth, general happiness and loneliness[12] but was found to be lower in the Brent Cross area (Figure 2.12 on following page). This resonates with the findings of earlier online discussion groups with local community members, who talked about the lack of varied and meaningful employment locally.

Figure 2.12 shows average satisfaction with household income to be 4.84, similar to England but still low, considering a maximum score of 7. The leisure time score of 5.06 is higher and may reflect participants working increasingly from home, reducing commutes and providing more free time and flexibility.

Finally, Figure 2.13 (following page) shows the proportion of respondents who are satisfied with their neighbourhood. This was approximately 12% lower than for people surveyed accross England, which fits with dissatisfaction expressed within the community disscussion groups, and may help explain some of the lower individual wellbeing scores.

Satisfaction with Job, Leisure Time, Household Income and House/Flat

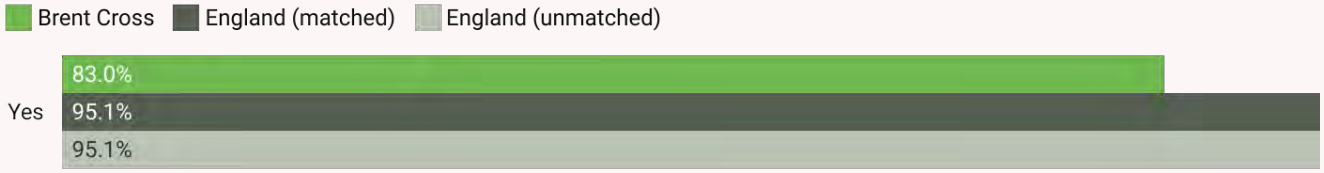


UKHLS Wave 11

Figure 2.12:

Job, leisure time and household income satisfaction amongst local BX participants at baseline, compared to matched and England group

Satisfaction with neighbour



UKHLS Wave 6

Figure 2.13:

Neighbourhood satisfaction reported amongst local BX participants at baseline, compared to matched and England groups

2.2 Behaviour observations

2.2.1 MOHAWk

Participant demographics

More than four-and-half thousand observations were conducted at baseline during July 2021. Table 2.2 (following page) displays a breakdown of demographics for all observed participants (n=4,533), including estimated sex, age group and ethnicity.

As shown in Figure 2.14, in contrast to the intercept survey sample, there were a higher proportion of men and boys (56-52%) than women and girls (44-48%) observerd accross the sites. Most participants were adults (64%). There was a slightly higher proportion of white (51%) participants, which corresponds with the demographics of the Wards within the Brent Cross area (Section 2). .

In the most part, participants were similar at each paired intervention and control site in terms of estimated sex, age group and ethnicity, although there were some exceptions. For example, Control Site 2A had an unusually high proportion of ethnic minority (excluding white minorities) participants (71%) compared to its respective matched intervention site (43%). A contributory factor to this is likely to be that this area has a higher proportion of ethnic minority people in the local population. This control site also had a much higher proportion of children (35%) compared to its respective matched intervention site (15%). This may be because of a new Exploratory play area that was recently built nearby, so the number of children (and people in general) at this control site could be inflated as a result of people passing through to access the new play area.

Comparison of sex of users observed in three Clitterhouse Playing Fields sites

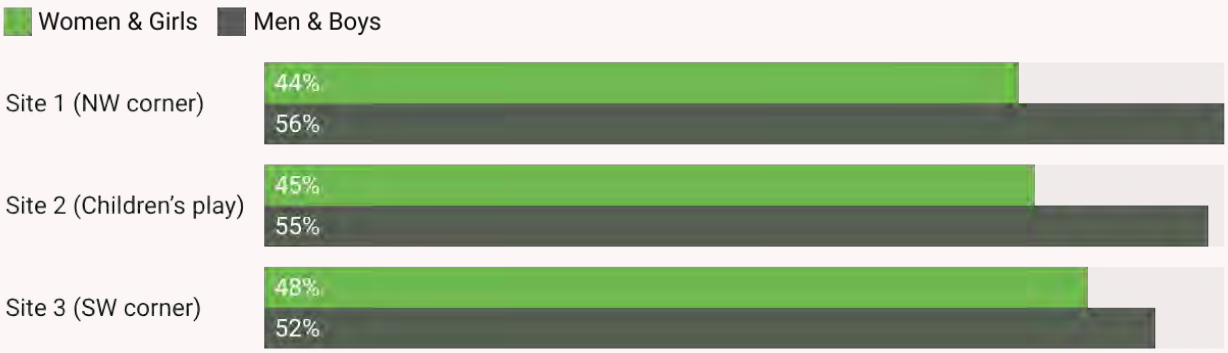


Figure 2.14:

Observed estimated sex of users of Clitterhouse Playing Fields

Table 2.2: Baseline counts for observed gender, age group and ethnicity. Total count (%, proportion)

SITE	SEX	AGE GROUP				ETHNICITY
	WOMEN & GIRLS	CHILDREN & INFANTS	TEEN	ADULT	OLDER ADULT	ETHNIC MINORITY
SITE 1 (NW CORNER)	368 (43.9%)	104 (12.1%)	60 (7%)	656 (76.5%)	38 (44.3%)	424 (51%)
COMPARISON SITE (1A -PARK SIDE)	323 (44.3%)	86 (11.5%)	53 (7.1%)	520 (69.6%)	88 (11.8%)	306 (41.8%)
SITE 2 (CHILDREN'S PLAY)	184 (45.2%)	74 (17.7%)	35 (8.4%)	276 (65.9%)	34 (8.1%)	176 (43.3%)
COMPARISON SITE (2A - GIBBONS)	369 (50.3%)	284 (37.7%)	64 (8.5%)	366 (48.7%)	38 (5.1%)	518 (71.3%)
SITE 3 (SW CORNER)	343 (47.7%)	97 (13.1%)	82 (11.1%)	494 (66.6%)	69 (9.3%)	312 (43.3%)
COMPARISON SITE (3A BPF)	389 (45.9%)	193 (22.1%)	83 (9.5%)	506 (57.8%)	93 (10.6%)	335 (39.6%)
COMBINED TOTAL	1976 (46.2%)	838 (18.6%)	377 (8.6%)	2818 (64.1%)	360 (8.2%)	2071 (48.6%)

Average number of people observed per hour

Table 2.3 displays a breakdown of the average number of people observed per hour at each site.

Sites 1 and 3 are relatively closely matched to each of its respective control sites in terms of baseline footfall, whereas footfall at Site 2 is less closely matched with its respective control site.

This may be because intervention site 2 is of poor quality at baseline, which could explain the comparatively low number of people using this site. It was not possible to find a control site with a comparable level low quality children's play provision.

However, this will not undermine the rigour of future evaluation because proposed 'differences in differences' techniques will account for these discrepancies at baseline.

Given the relatively low baseline counts at Site 2, should children's play provision be re-provided at Clitterhouse Playing Fields, we expect a high increase in usage at follow-up post-intervention.

Table 2.3: Baseline data for the average number of people observed per hour at each site

SITE	AVERAGE NUMBER OF PEOPLE PER HOUR (TOTAL COUNT)
Intervention site 1 (NW corner)	53.63 (858)
Comparison site 1A (Park Side)	46.69 (747)
Intervention site 2 (Children's play)	26.19 (419)
Comparison site 2A (Gibbons Recreation children's play)	49.63 (794)
Intervention site 3 (SW corner)	52.50 (840)
Comparison site 3A (Barnet Playing Fields)	54.69 (875)

Table 2.4 displays a breakdown of the average count of each behaviour per hour at each site.

As expected, most of the counts of wellbeing behaviours correspond to the total number of people observed in each site. This is most evident intervention Site 2 and control Site 2A where differences in wellbeing behaviours correspond to the differences in footfall identified in the previous section.

Nonetheless, there are some noteworthy observations. Control Site 2A seems to have a higher proportion of people engaging in vigorous physical activity (e.g. running, cycling) compared to the proportion of people walking, in relation to intervention Site 2.

.

Table 2.4: Baseline data for each of the 3 Ways to wellbeing. Average count per hour (total count)

SITE	BE ACTIVE			CONNECT	TAKE NOTICE
	SEDENTARY	WALKING	VIGOROUS		
INTERVENTION SITE 1 (NW CORNER)	6.56 (105)	46.38 (742)	5.88 (94)	20.13 (322)	6.5 (104)
COMPARISON SITE 1A (PARK SIDE)	2.88 (46)	35.44 (567)	7.81 (125)	16.81 (269)	3.56 (57)
INTERVENTION SITE 2 (CHILDREN'S PLAY)	3.19 (51)	24.81 (397)	7 (112)	13.31 (213)	3.38 (54)
COMPARISON SITE 2A (GIBBONS)	9.38 (150)	29.75 (476)	17.06 (273)	29.06 (465)	9.88 (158)
INTERVENTION SITE 3 (SW CORNER)	9.63 (154)	32.75 (524)	9.5 (152)	25.44 (407)	9.44 (151)
COMPARISON SITE 3A (BPF)	4.75 (76)	39.13 (626)	11.56 (185)	28.75 (460)	5 (80)

This is most likely a result of a higher number of children using this site (due to the presence of high-quality equipment) and therefore reflects vigorous physical activity from play. This may also explain the comparatively high counts of Connect and Take Notice behaviours at this site.

Another interesting finding at baseline is that there are nearly double the number of Take Notice behaviours at Intervention Site 3 compared to control Site 3A, despite similar total numbers of people at each site.

This could be explained by adjacent community events that coincided with observations at Clitterhouse Community Farm, which may have increased the number of people using the benches at this site (as indicated by the comparatively high number of sedentary behaviours observed at this site).

Wellbeing activities observed in intervention and comparison sites at baseline

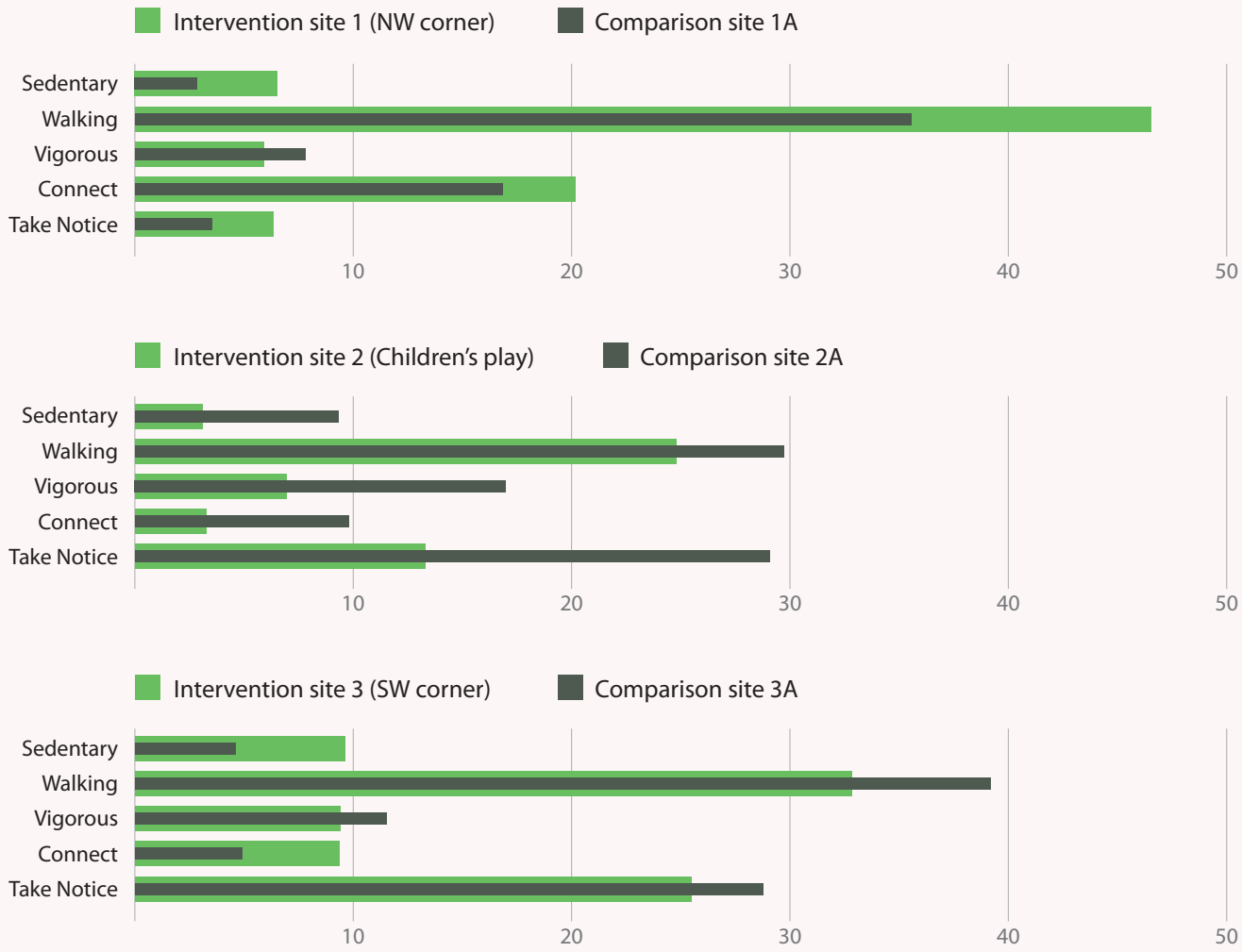


Figure 2.15:

Bar charts showing Be Active (sedentary, walking, vigorous), Connect and Take Notice total counts at baseline, compared to matched control sites

Summary

The MOHAWk observations have shown that, at baseline, use of the control sites tended to be generally higher than the intervention sites, especially at sites 2/2A. We attribute this largely to the low quality of the intervention spaces, which was hard to match this at other sites, particularly the children's play area (Site 2).

Nonetheless, when comparing to previous studies using the same methods, the sites are generally closely matched on key characteristics (e.g. population density, levels of deprivation) and participant demographics (estimated sex, age group, ethnicity).

Any discrepancies at baseline will be controlled for in the analyses, as the main purpose of the control sites is to assess for general trends in outdoor activity over time, to increase confidence that any observed changes can be attributed to the interventions, rather than some other confounding factor.

These methods are significantly more robust compared with previous research, which often fails to include control sites, or uses very poorly matched controls.

2.2.2 Vivacity Sensors

Be Active public space usage

Table 2.5 shows over the 10-week period, Claremont Road has the highest average pedestrian and cyclists counts per hour, representing people moving primarily in east- west directions along pavements and on the road. Marble Drive has the next highest pedestrian and cycling counts, capturing east-west movement between Claremont Road and Hendon Way. Tilling Road has the third highest pedestrian counts but the lowest cyclist counts. This represents pedestrians moving in an east-west direction, as well as north-south direction as people cross over the North Circular via the bridge at Templehof Avenue.

Geron Way has the fourth highest pedestrian and cyclist counts and it is likely that this represents people visiting the adjacent trampoline centre and large shopping stores, such as Decathalon, Argos and Homesense. Brent Terrace exhibited the lowest pedestrian and cyclist average counts. The overall counts at Brent Terrace are likely to be explained, in part, by the temporary closure of a public path linking north and south portions of Brent Terrace, at the start of January 2022.

Table 2.5: Average number of people Vivacity counts per hour at each site per hour (and total count across 10 weeks)

SITE	BE ACTIVE	
	PEDESTRIANS	CYCLING
SITE 1: GERON WAY	20.6 (45,417)	0.6 (1,334)
SITE 2: BRENT TERRACE	1.7 (3,657)	0.1 (270)
SITE 3: TILLING ROAD	36.4 (80,258)	0.06 (125)
SITE 4: CLAREMONT ROAD	45.4 (100,179)	3.5 (7,614)
SITE 5: MARBLE DRIVE	40.9 (90,461)	1.3 (2,863)

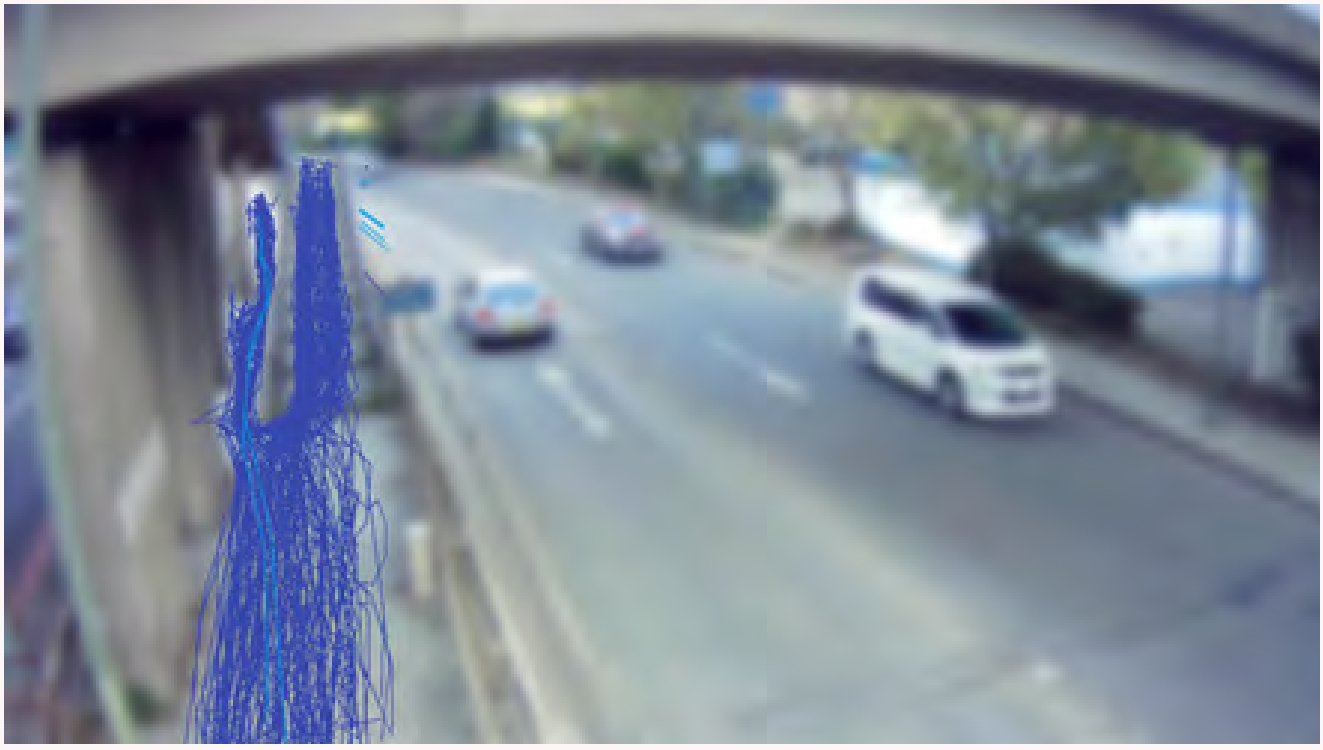


Figure 2.16:

Site 3 (Tilling Road) two-hour example of pedestrian (dark blue) and cyclist (light blue) tracks

2.3 Air quality

2.3.1 Importance and measurements of air quality

Reactive trace gases comprise a very small proportion of the air we breathe (0.1%) but have a considerable effect on the atmosphere.

Some trace gases are greenhouse gasses and contribute to climate change, while others affect atmospheric chemistry (e.g., nitrogen dioxide (NO2), ozone (O3)). Trace gases can can also negatively impact human health. Measurements of trace gases such as NO2 and O3 are important for understanding and predicting urban air quality.

Particulate matter (PM) encompasses a wide range of pollutants of varying composition and size. Some of these particles are natural while some are anthropogenic (man-made) and can be directly emitted from areas such as transport, construction, industry and agriculture. Some particles are formed from secondary processes as a result of complex reactions between chemicals, like the pollutants emitted from power plants, industries and automobiles

There are also natural sources of PM such as ust, sea salt and pollens. PM10 are particles with diameters that are 10 micrometers and smaller; and PM2.5 are fine inhalable particles, with diameters that are 2.5 micrometers and smaller.

Air pollution sensors offer significant potential to improve both our understanding of, and ability to improve, urban air quality. The sensors are therefore an ideal tool to understand air quality changes localised areas such as this.

Differences in the time series of each pollutant at each site over time relate to multiple factors including, emissions in close proximity to the site, background and regional pollution concentrations, meteorology, including wind speed and direction and the dispersion of pollutants.

For this study Claremont Primary School had an air quality monitor situated both inside and outside of the school and data was collected from the 26th of October 2021 – 14th of February 2022.

2.3.2 Statistical analysis of air quality observations and comparison to similar sites

For each pollutant measured the average value observed during the measurement period is given in Table 2.6. Given the limited number of measurements presented here, it is appropriate to compare the measurements that were made in Claremont Primary to other comparable sites in London, to see if this is an area of particular concern relative to other sites in the same time period. This analysis was completed by taking the measurements from selected sites measured by the AURN network, from the date of installation to the end of the measurement period in February. The AURN Network is the UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives.

Each site is given a classification that defines the type of location from where the measurements are made. This includes Urban Background, Urban Traffic, Rural Background, Urban Industrial, Surburban Background, Suburban Industrial. Urban Background and Urban Traffic sites are used for comparison here. These sites are an excellent comparison to the measurements made in in this study.

For NO, the average values vary between 9 and 2 ppb across all sites, with NO_2 and O_3 varying between 7.5 to 18.9 and 12.1 to 19.4 respectively. The measurement site inside the school presents mean values of PM2.5 lower than the new WHO target of 5 µg m-3. Broadly the UK already meets the 2020 concentration limit of 20 µg m-3 and the measurements presented here are consistent with this conclusion.

Generally, the UK is less likely to meet current limits of nitrogen dioxide (NO_2) concentration, which is around 22 ppb for the annual mean concentration. This is again consistent with the data we are presenting here over the measurement period. The mean outdoor NO_2 concentration is lower than that of the annual limit. DEFRA have published an air quality plan for nitrogen dioxide, setting out the plan to meet these limits in the shortest possible time.

Table 2.6: Mean value for $PM_{2.5}$, and NO_2, measured over the entire measurement period for inside and outside of Claremont Primary and comparable AURN Network sites in London.

MEASUREMENT SITE	PM $_{2.5}$ (MG M3)	NO_2 (PPB)
CLAREMONT INDOOR	3.8	
CLAREMONT OUTDOOR	9.1	16.9
London North Kensington	8.7	10.5
London Bexley	8.9	11.0
London Bloomsbury	11.9	15.2
London Eltham	7.0	7.1
London Haringey Priory Park South	12.2	10.1
London Hillingdon	15.2	7.3
London Honor Oak Park	7.9	
London Marylebone Road	12.0	24.0
London Teddington Bushy Park	8.0	
London Westminster	7.9	14.0

2.3.3 Average Diurnal Profile of Pollutants Outdoors

The diurnal profile refers to the pattern over a 24-hour period and gives insights into the sources of pollution. The plots show average concentrations for the hour beginning the measurement period, i.e. the value shown for 22:00 is the average over the period 22:00 to 23:00. In Figure 2.16, NO and NO_2 follows the diurnal profile that would be expected for a traffic related emission source, peaking at rush hour. The average peak NO observed was just over 17.5 ppb in the outdoor data.

The results of the analysis presented here in the diurnal trends show that NO and NO_2 increases are related to traffic flow. The diurnals in NO_x are also comparable to those measured at the North Kensington AURN site, which is defined as Urban Background, despite there being a less pronounced NO peak in the North Kensington data. It should however be noted that the relationships presented here are not simple and will be significantly affected by meteorology, the level of congestion (which can affect the NO/NO_2 ratio) and the fact that dispersion is often reduced during the night due to lower wind speeds and a more stable atmosphere.

There isn't such an obvious diurnal profile in the PM 2.5 data, owing to the complexity of sources and physical processes that lead to the production and loss of PM. The peak that is seen in the morning at most sites is likely related to road traffic and domestic sources, such as heating and cooking. The slight increase in PM 2.5 in the evening may be related to a reduced dispersion in the night and an increase in process that lead to volatile species in the atmosphere condensing to form PM as the temperature reduces as well as domestic sources.

Hourly mean ozone concentrations show characteristic diurnal cycles, with the lowest levels in the early morning and the highest level during the later afternoon into the early evening. This diurnal profile is consistent with almost all UK ozone monitoring sites. This is because ozone at ground level is not directly emitted but is created between reactions of NO_x and a range of volatile organic compounds in the presence of sunlight.

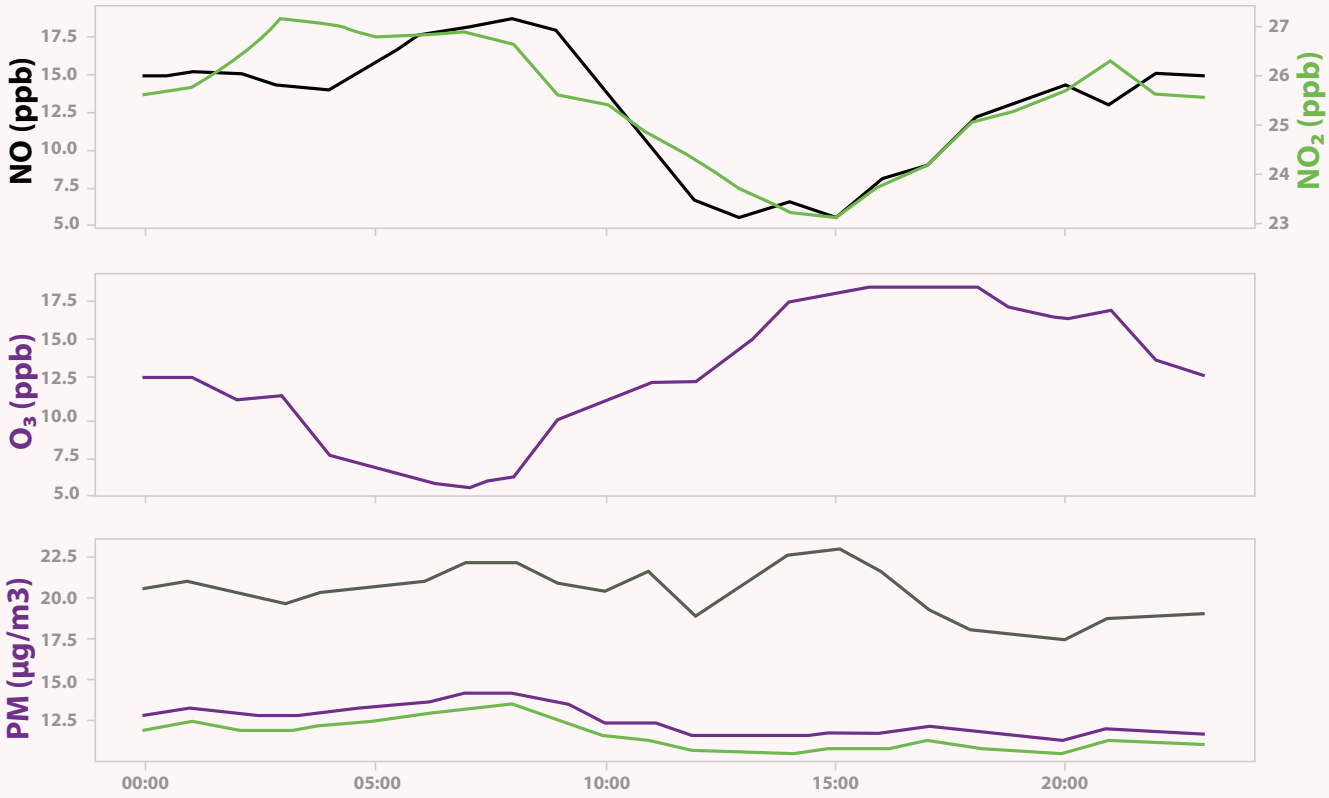


Figure 2.17:

Average diurnal cycle of NO, NO_2, O_3 and PM1 (green), 2.5 (purple) and 10 (grey) for the full measurement period, October 21 through To February 22

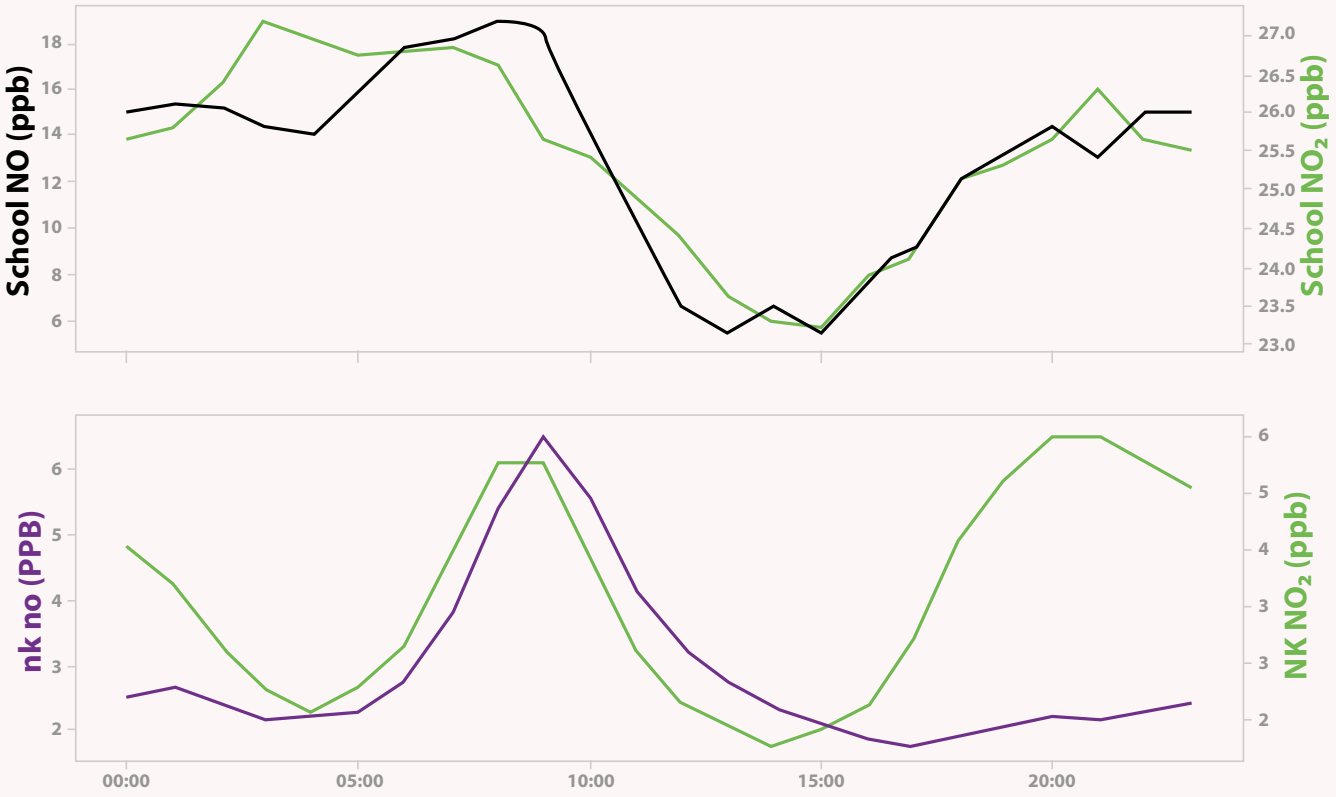


Figure 2.18:

Diurnal Profiles of NO and NO_2 from the outdoor measurements at Claremont School and another from the AURN site at North Kensington, London for comparison

Air quality inside Claremont Primary School

PM 2.5 measurements were also made inside of Claremont Primary School, to enable characterisation of the air quality inside of the school in comparison to directly outside.

As shown in Table 2.6 and Figure 2.18 the levels outside of the school are significantly higher than that of the indoor monitoring as would be expected and hoped for.

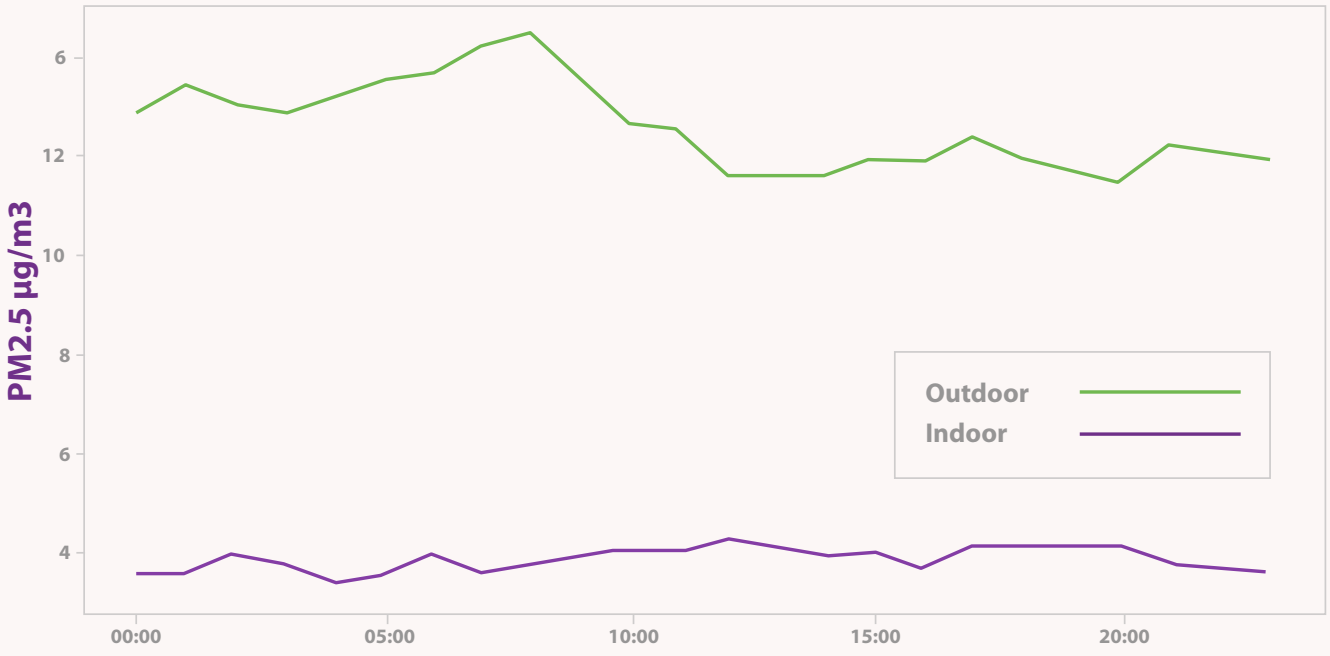


Figure 2.19:

Diurnal Profiles of PM 2.5 from the outdoor measurements at Claremont School (green) and inside of the school in a selected classroom (purple)

Air Quality Summary

Childhood exposure to particulate matter (PM), NO_x, O_3 and black carbon (BC) can impair lung development, cause respiratory inflammation and there is evidence to suggest that attainment can also be compromised. An understanding of air quality in and around schools is therefore of paramount importance.

A limited number of air quality measurements were made in this study that show comparable levels of NO_x and PM with other comparable urban background sites in London. Significantly lower concentrations of PM were measured inside of Claremont Primary School in comparison to those made directly outside of the school.

3 Reflections and Next Steps

3.1 Summary

The new Flourishing Index and initial baseline findings provide a robust basis for salient target setting within the forthcoming Brent Cross Town Social Value strategy, as well as updated targets within the social impact aspects of the overarching Sustainability Strategy.

From an asset perspective, the findings demonstrate key local wellbeing baseline strengths that, at a minimum, should be ardently protected and treated as a resource to draw- upon in working together to achieve the change set out within the initial ToC.

However, despite the good wellbeing findings, there are opportunities to strive for higher scores too. From a deficit angle and considering the unhealthy wellbeing insights, there are clear weaknesses within the baseline.

These include opportunities to align with or improve upon national levels of general happiness, a sense of worth, and loneliness.

Critically, examples of uneven and unjust distribution of wellbeing were identified. Although additional quantitative work is required, the findings demonstrate evidence of a lower baseline for several groups, including people aged between 25-34 years old, ethnic minorities, and those out of work and without qualifications. As shown in Figure 3.1, this raises the importance of equitable and inclusive interventions required at Brent Cross Town, targeted at people who are disadvantaged by their social and economic circumstances.

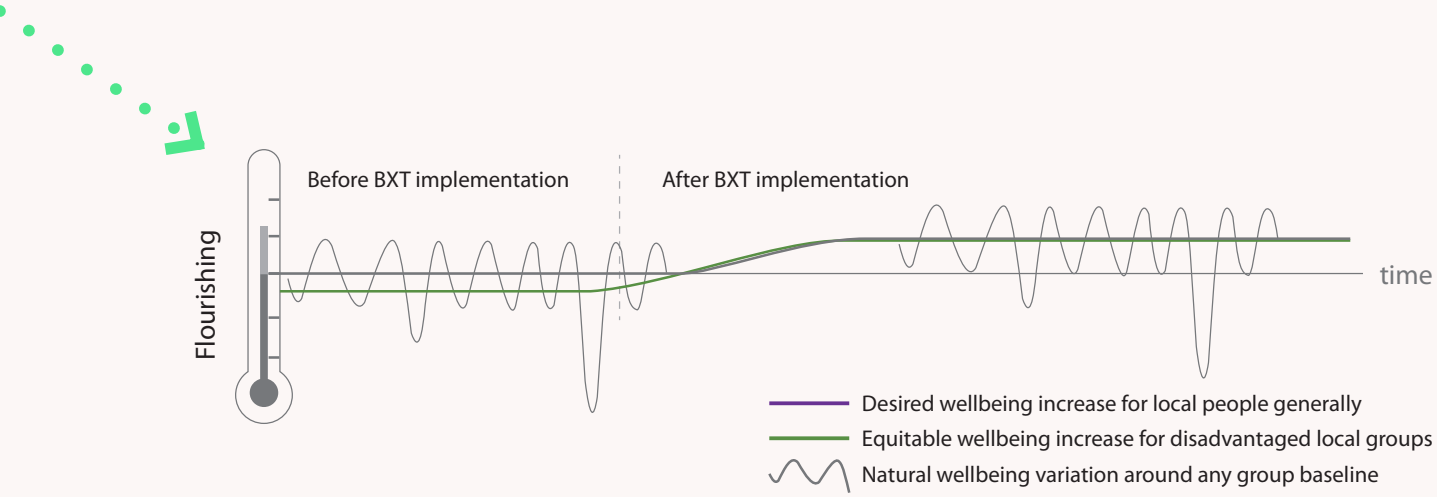


Figure 3.1:

Illustrative diagram showing desired equitable increases in flourishing before and after Brent Cross Town is delivered

Initial interpretation is also aided by the first round of community discussions and consideration of key determinants of wellbeing.

In particular, the survey work highlighted the importance of opportunities to improve job, income and general neighbourhood satisfaction – each of which present considerable scope for improvement. It remains to be seen whether satisfaction with amount of leisure time local people has remains stable, or can be improved upon.

The behaviour observations demonstrate deficiencies at Clitterhouse Playing Fields, providing opportunity for Project Play, post-completion, to support substantially more wellbeing activities. The automated Vivacity sensor baseline also provides a robust basis for the subsequent impact of various forthcoming Brent Cross Town phases, for walking and cycling in five strategically important sites.

3.2 Opportunities for continuous improvement

The Flourishing Index baseline represents a foundation for future research relating to a range of outcomes, interventions and topics. To the best of our knowledge and as highlighted by the Urban Land Institute in 2021 and UK Green Building Council (UKGBC) in 2022, the breadth of transdisciplinary partnership involved and the bespoke datasets generated may be industry firsts.

Despite these strengths and like all research, there are limitations that may be addressed to build on and bolster this groundwork, increasing the scope of future research and its funding eligibility:

Improve representation of the local community.

In regard to the community consultation, the intercept and online surveys, there is scope to increase representation of the existing diverse local community. The online discussion groups coincided with a lockdown and the field researchers were unable to fulfil their age and ethnicity target quotas in the time available. Further baseline work should address this, working with local stakeholders to recruit and engage more ethnic minority persons, young persons (children and teenagers), and older people (65+), those out of work, and people with low or no qualifications. In order to understand the potential displacement of the existing community, it will also be very important to seek insights from people who move away from the area in the next 10-15 years.

Address potential social desirability.

In order to address a potential Social Desirability Bias created by the intercept data collection mode, this collection mode can be replicated in matched comparison areas (whilst still using national datasets where appropriate). This was partially achieved regarding the NOURISH social wellbeing measure (comparing to deprived areas of Greater Manchester) but can be increased. In addition, considering reduced COVID restrictions, field researchers can give participants more personal autonomy and space. For example, passing a clip-board or tablet to the participant to fill out the personal survey by themselves.

Reduce data collection timing bias.

Both timing and desirability challenges may be addressed via increased participation in an online survey. It is likely that the lower online survey completions were due to 'consultation fatigue'. But also, a high proportion of participants did not fully complete the survey, suggesting it may help to reduce the length of this survey and consider trying a wider range of incentives – for example free local event tickets and new business taster opportunities.

Quantify variation and spread around average scores.

Most of the statistics presented through the report are means which can, if presented alone, be uninformative or misleading. For example, the high SWEMWBS averages shown for Brent Cross could have many different distributions of scores that can be quantified. Further analysis could test what extent the average is pulled upwards by a small number of individuals or alternatively, is clustered around the average. Although initial distributional analyses are presented, further work to investigate confidence intervals, standard deviation, and interquartile range will help clarify patterns.

Measure additional unintended consequences.

The baseline data to date has sought to capture potential unintended negative consequences of the regeneration for disadvantaged groups i.e., unequal distribution. However, it is possible that interventions may bring further unintended negative impacts which can be considered within future work. For example, anti-social behaviours in new public spaces, or the displacement of existing residents whose wellbeing wouldn't be captured in local follow-up data collection waves.

3.3 Co-interpretation

The majority of the results sections represent basic descriptive statistics with short interpretations of the findings. This interpretation is based largely on technical information and relevant literature. However, it is not the interpretation of the local community and stakeholders.

A significant proportion of the consultation and survey participants expressed an interest in the findings. In the context of related Social Value work undertaken by PRD, the research team will conduct a co-interpretation of the data, in line with Medical Research Council guidance, so that an updated ToC may be produced.

This would provide opportunity to compare and contrast the researcher team's technical interpretation with a democratic process that is likely to generate unique insights and help set targets and benchmarks for the area. It will also help further establish a constructive and reciprocal conversation between the Brent Cross Town Team and local people.

The Flourishing Index team has proposed the creation of a 'Working Group', comprised of local experiential experts[15], to examine and interpret the findings of this Baseline Report and the resulting strategy, design, and programmed interventions.

3.4 Dissemination

Initial industry and policy response has been positive, with key institutions such as ULI and UKGBC sharing the research process as best practice within their extensive member and open networks.

The project has begun to build national and international interest; it most recently featured for dissemination by the UN Habitat and World Economic Forum's World Urban Pavilion, [16] and cited by Green Building Council Australia. [17]

There is a further invite for dissemination from The World Green Building Council. In the UK, in 2024 the Flourishing Index has been the subject of panels at the Festival of Place, and the London Festival of Architecture. [18]

The Flourishing Index has also been shared in ESG reports, blogs, podcasts, and recorded interviews broadcast at the new pavilion building. This has raised interest from developers such as Grosvenor Estates in London and Far East Consortium in Manchester, investors such as MEPC and Hermes, and policy makers including the Greater London Authority, Homes England, Manchester City Council, Redbridge London Borough Council, and the Thames Estuary Board.

There is potential for further targeted dissemination regarding a) approaches, methods and processes adopted (to date and planned) b) the index itself and the initial baseline findings. As part of a current package of works, the research team will continue to work with the Brent Cross Town Team and BXS JV to maintain momentum and maximise desired impact within industry, policy, research, and investment arenas.

3.5 Open Data sharing

A key ambition set out within the research agreement between University of Manchester and the BXS JV was to share anonymised data, as Open Data.

We remain committed to this goal and exploring avenues. This may include hosting raw, anonymised data in spreadsheet form.

Once this baseline report has been shared amongst the wider Brent Cross Town partnership, this topic can be addressed with senior Related Argent and Barnet Council staff. In particular, the research team are keen to work with relevant parties to generate a public facing summary document that makes the approach and findings accessible to a general audience.

Please refer to the Appendix for further details.

We are not measur
we are measuring
works, what doesn'

Brent Cross Town Flourishing

3.6 Next Steps

The baseline results have done much to inform Brent Cross Town's strategy. The Brent Cross Town partnership's response to these findings are summarised in the accompanying Flourishing Index Report.

The Brent Cross Town partners, Related Argent and Barnet Council, have committed that the Flourishing Index will run for at least 10 years, with ongoing research and results published every two to three years. This will create feedback loops that will shape the development of Brent Cross Town towards fulfilment of the pledge "we will make a town where all can flourish".

The question remains "How can the regeneration of Brent Cross Town improve the local population's wellbeing?", and the commitment to understanding the extent to which that is achieved through the Flourishing Index methodology stands.

The research team has drafted a set of research pathway questions to explore with the community and stakeholders as we move forward. These paths were based on a combination of insights from the local community workshops (in 2021), the findings of the first round of wellbeing data collection, and the latest thinking from the wellbeing science field.

The research pathways are:

- Employment opportunities
- Community resources – indoor and outdoor
- Housing provision
- Environmental conditions
- Public transport and active travel

ing our impact for the sake of it;
our impact to understand what
t, and how we can do better.

g Index Report

Buro Happold and The University of Manchester have set out the following actions to be completed in 2024. The inclusion of Sheffield Hallam within this research partnership is a welcome addition.

Collaborative communications

The team will support the Brent Cross Town partners to circulate the approach, methodology, findings, and value of the Flourishing Index work within the community, wider public, academia, government, and industry (locally, nationally, and globally). This will include design of and input to reports, panels, press releases, and speaking at and/or attending events.

Community research and stakeholder engagement

The team will design and carry out an inclusive co-interpretation discussion with members of the Brent Cross Town community. These will be local community leaders and experiential experts. A series of workshops will seek feedback on the work done to date, interpretation of results, response, and planned survey activity moving forward.

Steering groups

We plan to set up a Stakeholder Group, comprising project partners, community members, and related experts. We also plan to set up a Working Group, building on the co-interpretative work outlined above, to maintain feedback loops as the project develops.

The Stakeholder Group will consider governance, research, funding, partnerships, and communications. It is our intention for the Working Group to provide a critical oversight role, including shared memberships with the Stakeholder Group.

Follow-up data collection and analysis

Our team will carry out the same research methodology, replicating timing and location wherever possible, to help ensure a robust follow-on data set. We will deploy this methodology using the same partners and methods as outlined in Section 1. This data will be analysed, and this analysis will be published in line with Brent Cross Town's timetable for the Flourishing Index. The project will leverage academic, practitioner, and policy input.

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4 Appendix

A note on the Brent Cross Town Flourishing Index Evidence Base

Brent Cross Town, The University of Manchester, and Buro Happold are committed to publishing full details of the methodologies used, the results of the activity, and the (anonymised) raw data collected.

At the point of publication, this information was not ready for dissemination. We aim to add it once it has been peer reviewed, as part of the scientific journal publication process.

In the meantime, please contact Jamie Anderson (jamie.anderson@manchester.ac.uk) with any requests.

The list of information that will be published includes:

- Full list of acknowledgements comprising a summary of organisations and persons involved in the Brent Cross Town Flourishing Index.
- Full list of organisations that contributed financially to the Brent Cross Town Flourishing Index.
- Full list of measures used to understand Individual Wellbeing (Short Warwick-Edinburgh Wellbeing Scale plus five additional European Social Survey measures).
- Details of propensity score matching procedure used to match Brent Cross participants to UK comparators on key socio- demographic variables.
- Details of Comparison Sites used and comparison methodology.
- Full details of data collection locations at Brent Cross and Comparison Sites.
- Intercept survey questionnaire.
- Full socio-economic details of Brent Cross Town and surrounding areas.
- Full results of all surveys and data collection.


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