

Community Needs Index 2022: consultation paper

Introduction and context

'Left-behind' areas are a growing concern for social policy with a range of studies starting to explore underlying factors contributing to areas being 'Left-behind' – including low levels of social mobility, low skills or declining industries and exclusion from external investment by the public and voluntary sector. In 2018 Local Trust commissioned Oxford Consultants for Social Inclusion (OCSI) to provide a quantitative definition of 'Left-behind' areas – with a Community Needs Index developed to capture the social infrastructure challenges experienced in deprived communities. The Index combined a series of indicators under three domains:

- Civic Assets: Capturing the presence of key community, civic, educational and cultural assets in and in close proximity to the area
- Connectedness: Capturing connectivity to key services, digital infrastructure, isolation and strength of the local jobs market
- Active and engaged community: Concerning the levels of third sector civic and community activity and barriers to participation and engagement

The findings of this research were published in 2019 in the paper [Left behind? Understanding Communities on the edge](#). The research suggested that a lack of places to meet (whether community centres, pubs or village halls); the absence of an engaged and active community; and poor connectivity to the wider economy - physical and digital – make a significant difference to social and economic outcomes for deprived communities. Deprived areas which lack these assets have higher rates of unemployment, ill health and child poverty than other deprived areas. And they appear to be falling further behind them. This adds up to these areas being some of the most 'left behind'.

2022 Methodology review

Following on from [the research](#) we are now looking to review and update the Community Needs Index. The overarching aim of this project is to provide a refined model, which makes use of the most up to date evidence and robust methodologies in order to provide further insights into the challenges and experiences of high needs communities and ensure areas are being identified using the most recent data which reflects the profound social changes experienced over the last couple of years (in the context of the global pandemic).

There are a number of reasons why we feel that it would be beneficial to review the methodology of the Community Needs Index:

- 1) We want to ensure that there are no inherent flaws in the methodology which lead to the wrong areas being identified.
- 2) We want the audience who use the research for informing programmes or funding allocation to feel confident that the methodology is robust to maximise the utility and impact of the work.
- 3) We want to ensure the evidence is comprehensive and up to date and reflecting all facets of community need and the complexities of the different processes and dynamics occurring in vulnerable communities.
- 4) We want to consult more widely to bring in expertise of key stakeholders to ensure the index meets the needs of the user community.

This consultation document provides a step-by-step exploration of the proposed methodological approach to developing a revised Community Needs Index, with a particular focus on the changes we plan to introduce.

Summary of consultation questions

The following aspects of the model will be reviewed as part of this consultation:

- 1) Geography changes: Exploring the potential of changing the underlying geography used to identify Community Need.
- 2) Changes to proposed indicators: Exploring potential changes to the indicator set, including revisions and supplements to existing indicators, removal of indicators and suggested new indicators.
- 3) Review of methods: Highlighting potential options for weighting, standardising and combining indicators to produce the Community Needs Index scores and ranks.
- 4) Combining the Community Needs Index with other needs frameworks: Possible approaches to linking the Community Needs Index with other key frameworks developed to identify the social and economic challenges experienced in areas in England including the Index of Multiple Deprivation.

Each part will have a set of consultation questions. You will not have to complete all the questions to complete the consultation. Please feel free to answer only the questions that you feel you are comfortable answering. You can complete the consultation at https://www.surveymonkey.co.uk/r/LBN_Consultation. The consultation questions are listed below:

Part 1: Geography changes

1. **We're exploring building the 2022 Community Needs Index using the 2021 MSOA geography. Do you support this approach? (Yes/No/In part/I'm not sure/I have no view on this)**
2. **Please add any comments or suggestions you'd like to share regarding the proposal to build the 2022 Community Needs Index using the 2021 MSOA geography.**

Part 2: Changes to proposed indicators

3. Do you agree with this set of indicators? (I agree with them all/ I agree with some of them/ I don't agree with any of them/ I have no view on this)
4. Please add any comments regarding the proposed set of indicators to include in the 2022 Community Needs Index.
5. If you have any suggestions for additional indicators, please list them in the consultation survey. If possible, please include the source, the indicator name and any source links to the indicator.

Part 3: Review of methods

6. Do you agree with our proposed methodology for standardising, weighting and combining indicators (as outlined in this paper)? (Yes/No/In part/I'm not sure/ I have no view on this).When considering a weighting method for the research indicators, is factor analysis the most appropriate method, or should we consider another approach? (Factor analysis is the most appropriate method, You should consider another approach, I have no view on this)
7. Please share any additional thoughts you have or details of alternative approaches.
8. Do you agree with our proposed methodology for standardising, weighting and combining indicators (as outlined in this paper)? (Yes/No/In part/I'm not sure/ I have no view on this).
9. Please share your comments and any thoughts on how the methodology could be improved

Part 4: Combining the Community Needs Index with other needs frameworks

10. How should the Community Needs Index and the Index of Multiple Deprivation be combined in order to identify vulnerable communities?
11. What other frameworks do you think we should consider linking with the Community Needs Index, in order to highlight community need? If possible, please provide the source of the framework and any links to the framework.
12. Based on your answer to the previous question, how do you think linking the Community Needs Index with other frameworks could add value to our understanding of community need?
13. Is there anything else you would like to tell us about the new Community Needs Index methodology?

Part 1: Geography changes

This section explores the possible options for the geography to use as the building block in the construction of the 2022 Community Needs Index.

The following key principles have been considered when selecting the appropriate unit of geography for the Index:

- It should be possible to align the geography units to statistical geography boundaries in order to link key socio-economic indicators to the geography units.
- Geography units should be of sufficient size in order to ensure they are not smaller than the smallest standard statistical geographies (Output Areas), so that it is possible to obtain key socio-economic indicators to be used in the analysis.
- Geography units should be at a neighbourhood (sub-Local Authority) level in order to capture inequalities in social infrastructure provision and participation.
- Geography units should be relatively homogenous in population size so that it is possible to make direct comparisons between communities in terms of their relative needs and community and civic strength.
- Geography units should be meaningful and recognised as areas by the people residing in them.

In the 2019 iteration of the Index, 2017 wards were selected as the unit of geography. A challenge with using wards is that ward boundaries are revised on an annual basis – leading to a lack of stability in the Index as old areas become redundant. As an illustration, 2,098 of the 7,445 wards used in the 2019 Community Needs Index have since been subject to boundary changes (28.2%). The change in ward boundaries impacts on both the Community Needs Index and on any frameworks that are combined with this index to identify areas of need.

Wards were initially selected as the unit of geography for a number of reasons:

- Ward boundaries are traditionally centred around established neighbourhoods, rather than cutting across existing neighbourhoods.
- Wards are administrative geographies used for electoral purposes and people are normally aware of the wards they are located in through engagement with the political process e.g. through voting in council elections or through dialogue with local councillors.
- Wards closely align to statistical boundaries and are sufficiently large and homogeneous in size that they can be used in comparative analysis.
- Until relatively recently, wards were the only geography at below neighbourhood level with names attached to them. This was useful for dissemination purposes, enabling us to provide a generally recognised name to each individual neighbourhood identified as 'left-behind'.

However, there are disadvantages with using wards.

- Ward boundaries change on an annual basis: This will lead to constant change in the list of 'left-behind' or 'at-risk' neighbourhoods as we update the research. It also risks the names of the neighbourhoods becoming redundant in local communities as the ward names change.
- There are considerable variations in population size of wards in different parts of the country – the smallest ward in 2017 had a population of 971¹ while the largest ward had a population of 46,566. By using a unit of geography that varies considerably in size, there is a risk that in more metropolitan areas (where wards are generally larger) that the wards cover more than one neighbourhood. This increases the likelihood that a mixture of neighbourhoods with different contexts and needs are grouped together, masking pockets of need within the ward and increasing the likelihood that neighbourhoods with high need are overlooked.
- There are fewer datasets available at ward level: Because data is rarely published at ward level, additional steps are required to convert data to ward geographies – we have used a best-fit Output Area to ward lookup table to achieve this in most cases.

Our recommendation is therefore to switch to using 2021 Middle Layer Super Output Areas (MSOA) in the revised Community Needs Index.

MSOAs are the preferred unit of measure because:

- They only change after every census, so they are more consistent over time. Even when changes are made following census updates, these changes are capped, with a minimum of 95% of boundaries remaining unchanged. They therefore represent a more stable geography than wards.
- MSOAs are designed to be fairly homogenous in size (averaging at 8,300 people) but are sufficiently large enough that they are comparable to the average ward sizes.
- They now have neighbourhood names (not just codes) so are more identifiable.
- They also nest directly with smaller statistical geographies such as Output Areas and Lower layer Super Output Areas (LSOA) without requiring a best-fit lookup.
- Finally, MSOAs are a more commonly used geography and are increasingly used to disseminate key statistics releases². Producing the Community Needs Index at MSOA level would therefore enable users to benchmark the performance of high need areas against a wider range of socio-economic measures. This would increase the utility and analytical value of the indicator and ultimately raise the profile of the work.

However, there are challenges with reverting from ward to MSOA geography in terms of backwards comparability. One consequence of changing the unit of geography is that it is difficult to compare results with the previous Community Needs Index. The map below highlights the sometimes complicated relationship between Wards and MSOAs. While they can be similar in population size, it is possible for wards to cut

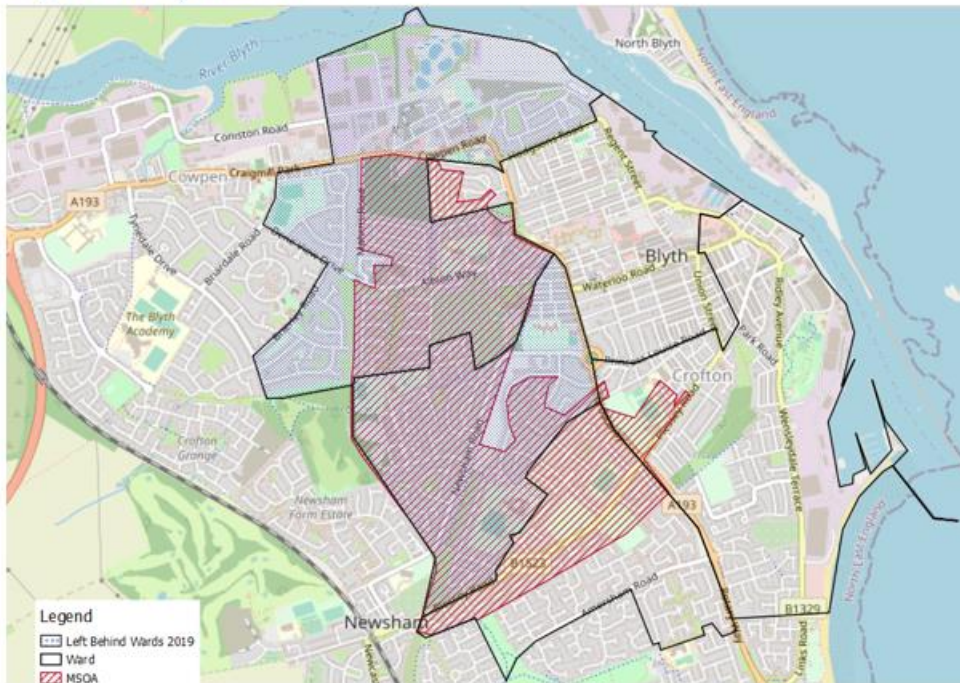
¹ Excluding the micro wards in Isles of Scilly and City of London

² See for example, the daily COVID-19 caseload data <https://coronavirus.data.gov.uk/>

across multiple MSOA boundaries and vice versa. In this example the new MSOA (the red striped boundary on the map) overlaps with five wards. This is something that needs to be taken into consideration when communicating any changes across multiple versions of the Community Needs Index, should we move from wards to MSOAs.

Overlap between Ward and MSOA

Blyth Valley: Isabella



It is also important to note that the MSOA boundaries will be revised as part of the 2021 Census updates. While the Office for National Statistics (ONS) will maintain the principle of stability of small area geographies between the 2011 and 2021 Census period, up to 5% of Output Areas could be potentially changed. These changes will only occur in areas that have undergone significant population or household change following the 2011 Census (to preserve homogeneity in size), to align more closely with wards or parishes or where an Output Area cuts across a new Local Authority boundary. This will then have knock on effects for the LSOA and MSOA boundaries as all Output Areas will continue to nest

into MSOAs. It is unclear how this will ripple up to MSOAs – however as an indication, in 2011 2.6% of Output Areas were changed, which affected 1.4% of MSOAs.

We will know more about the full extent of these changes in the next couple of months with the ONS intending to release the definitions of the new MSOAs in advance of the first data release (in summer 2022). We would recommend developing the revised Community Needs Index using the updated 2021 MSOA geographies.

Consultation Questions:

- ***We're exploring building the 2022 Community Needs Index using the 2021 MSOA geography. Do you support this approach? (Yes/No/In part/I'm not sure/I have no view on this)***
- ***Please add any comments or suggestions you'd like to share regarding the proposal to build the 2022 Community Needs Index using the 2021 MSOA geography.***

You can complete these consultation questions at https://www.surveymonkey.co.uk/r/LBN_Consultation.

Part 2: Changes to proposed indicators

This section outlines the key indicators we propose to include in the 2022 Community Needs Index – highlighting key changes from the 2019 iteration of the model.

It is necessary to review the indicators in the Community Needs Index in light of the availability of a wider range of datasets in 2022 compared with 2018 (when the Index was first constructed). In approaching a review of potential indicators we have worked on the basis that the indicator set identified in the 2019 Community Needs Index is a baseline starting point and indicators should be retained and brought up to date where this is possible in order to aid backwards comparability. Indicators should only be replaced where more robust or up to date indicators can be found from alternative sources.

However, we have also explored the inclusion of additional indicators where they add strength, thematic depth (capture a different facet of community need) or bring together more robust or up to date information on existing aspects of community need.

The table below presents the initial long-list of 65 indicators which were considered for inclusion in the 2022 index (grouped by source):

Source	Indicators
360 Giving – Grant Nav	<ul style="list-style-type: none">• Big Lottery funding per head• Grant funding per head from major grant funder

Arts Council	<ul style="list-style-type: none"> Arts Council funding
Business Register and Employment Survey	<ul style="list-style-type: none"> Jobs density in the Travel to Work Area Jobs density in the local area
CDRC Access to Health Assets and Hazards	<ul style="list-style-type: none"> Access to pharmacies (km) Access to dentists (km) Access to leisure services (km) Access to blue spaces (km) Access to green spaces (active) (km) Access to green spaces (passive) (km) Access to GPs (km)
Census 2011	<ul style="list-style-type: none"> Households with no car People living alone
Charity Base	<ul style="list-style-type: none"> Registered charities
Community Life Survey	<ul style="list-style-type: none"> Self-reported levels of loneliness Strength of local social relationships Self-reported measures of community and civic participation
Companies House	<ul style="list-style-type: none"> Charitable Incorporated Organisations, Community Interest Companies, PRI/LTD BY GUAR/NSC (Private, limited by guarantee, no share capital) and Registered Societies
Co-operatives UK	<ul style="list-style-type: none"> Co-operative societies
Corine land cover classification	<ul style="list-style-type: none"> Historical green and leisure assets
Department for Transport (DfT)	<ul style="list-style-type: none"> Travel times in minutes to primary school by public transport/walking and cycling Travel times in minutes to Employment centre (LSOA with more than 500 jobs) by public transport/walking and cycling Travel times in minutes to Further Education Institution by public transport/walking and cycling Travel times in minutes to GP by public transport/walking and cycling Travel times in minutes to Hospital by public transport/walking and cycling Travel times in minutes to Secondary School by public transport/walking and cycling Travel times in minutes to Supermarket by public transport/walking and cycling Travel times in minutes to Town Centre by public transport/walking and cycling
Electoral Commission	<ul style="list-style-type: none"> Voter turnout at local elections
Financial Conduct Authority	<ul style="list-style-type: none"> Community benefit societies, and former industrial and provident societies
Historic England	<ul style="list-style-type: none"> Parks and open space/Landscape and natural heritage assets
Local Data company	<ul style="list-style-type: none"> Shop vacancy in the local area Local Data Company: Shop vacancy in the retail catchment area Local Data Company: Leisure vacancy in the retail catchment area
Mutual aid UK	<ul style="list-style-type: none"> Mutual aid groups

MyCommunity	<ul style="list-style-type: none"> • Community owned assets
Neighbourhood watch	<ul style="list-style-type: none"> • Neighbourhoods Watch schemes
NHS Digital	<ul style="list-style-type: none"> • Community Services Data Set (CSDS)
OfCom	<ul style="list-style-type: none"> • Broadband speeds • Premises below Universal Service Obligation • 3G/4G coverage
Office for National Statistics	<ul style="list-style-type: none"> • Loneliness Index – GP prescriptions for loneliness
ONS/Ordnance Survey	<ul style="list-style-type: none"> • High streets
Ordnance Survey AddressBase	<ul style="list-style-type: none"> • Density of community space assets • Density of educational assets • Density of sport and leisure assets • Density of cultural assets • Density of green assets • Density of retail assets
Ordnance Survey Open Greenspace	<ul style="list-style-type: none"> • The percentage of an area that is covered by public parks and gardens.
Petitions UK	<ul style="list-style-type: none"> • People who have signed a petition on https://petition.parliament.uk/
Place-based Longitudinal Data Resource	<ul style="list-style-type: none"> • Small Area Mental Health Index (SAMHI)
Place Survey	<ul style="list-style-type: none"> • Civic participation in the local area (the proportion of the adult population who say they have, in the last 12 months, participated in a group which makes decisions that affect their local area) • Percentage who have given unpaid help at least once a month over the last 12 months
Plunkett Foundation	<ul style="list-style-type: none"> • Community shops and pubs
Renaisi	<ul style="list-style-type: none"> • Community-owned assets
Sport England: Active Lives Adult Survey	<ul style="list-style-type: none"> • Participation in sport
Sport England: Active places database	<ul style="list-style-type: none"> • Directory of sports and leisure assets
Taking Part Survey	<ul style="list-style-type: none"> • % of local authority population visiting a heritage site at least three times in the past 12 months • % of local authority population visiting a museum or gallery at least once in the past 12 months • % of local authority population visiting an archive at least once in the past 12 months
TellUs Survey	<ul style="list-style-type: none"> • Young people's participation in positive activities (the proportion of young people in school year 10 reporting participation in any group activity led by an adult outside school lessons (such as sports, arts, music or youth group) in the previous four weeks).

UK Finance	<ul style="list-style-type: none"> • SME lending by banks
Valuation Office Agency	<ul style="list-style-type: none"> • Number of retail premises

Each of these indicators were collected and a series of quality assurance checks were applied to test the suitability of the indicators for inclusion in the 2022 Community Needs Index. Indicators were considered for inclusion where they adhered to the following principles:

- Indicators had full national coverage and were collected on a consistent basis.
- Indicators were available at sufficient granularity in order to make meaningful comparisons between areas.
- Indicators were non-disclosive and open.
- Indicators were domain-relevant.
- Indicators were sufficiently statistically robust to be included in a measure intended for use in resource allocation.

As a result of these tests, a sub-set of indicators were excluded.

The table below presents the criteria for including indicators and identifies indicators from the initial list which we have excluded from the final 2022 Community Index due to failing to fulfil these conditions.

Criteria	Indicators excluded
Indicators have full national coverage and are collected on a consistent basis at national level	<ul style="list-style-type: none"> • Community Life Survey – enhanced version with sample boost
Indicators are available at sufficient granularity in order to make meaningful comparisons between community areas	<ul style="list-style-type: none"> • Arts Council funding • TellUs Survey - Young people's participation in positive activities (the proportion of young people in school year 10 reporting participation in any group activity led by an adult outside school lessons (such as sports, arts, music or youth group) in the previous four weeks). • Place Survey - civic participation in the local area (the proportion of the adult population who say they have, in the last 12 months, participated in a group which makes decisions that affect their local area) • Place Survey - Percentage who have given unpaid help at least once a month over the last 12 months • Parks and open space/Landscape and natural heritage assets • % of local authority population visiting an archive at least once in the past 12 months • % of local authority population visiting a heritage site at least three times in the past 12 months

	<ul style="list-style-type: none"> • % of local authority population visiting a museum or gallery at least once in the past 12 months
Indicators represent the most up-to-date measure of this particular theme	<ul style="list-style-type: none"> • Place Survey - civic participation in the local area (the proportion of the adult population who say they have, in the last 12 months, participated in a group which makes decisions that affect their local area) • Place Survey - Percentage who have given unpaid help at least once a month over the last 12 months
Indicators are Open Data	<ul style="list-style-type: none"> • Local Data Company: Shop vacancy in the local area • Local Data Company: Shop vacancy in the retail catchment area • Local Data Company: Leisure vacancy in the retail catchment area
Indicators do not contain skewed distributions e.g. large numbers of zero/null values, equal or 100% values	<ul style="list-style-type: none"> • 360Giving Grant Nav – Covid Grants • Mutual aid UK – Mutual aid groups • OfCom - Premises below Universal Service Obligation • 3G/4G coverage • Travel time to supermarkets • Arts Council funding
Indicators are non-binary	<ul style="list-style-type: none"> • ONS/Ordnance Survey – High Streets
Indicators should not include any double counting	<p>Four indicators from separate sources have been combined into a non-overlapping count (with duplicate references removed):</p> <ul style="list-style-type: none"> • Registered charities from Charity Base • Co-operative societies from Co-operatives UK • Charitable Incorporated Organisations, Community Interest Companies, PRI/LTD BY GUAR/NSC (Private, limited by guarantee, no share capital) and Registered Societies from Companies House • Co-operative societies, community benefit societies, and former industrial and provident societies from Financial Conduct Authority
Indicators of temporal change cannot be included	<ul style="list-style-type: none"> • Historical green and leisure assets
Indicators containing inputted data should not be included	
Indicators containing suppressed data should not be included	
Indicators which overlap with the Indices of Deprivation should not be included	<ul style="list-style-type: none"> • Place-based Longitudinal Data Resource - Small Area Mental Health Index (SAMHI) • CDRC - Road distance to GPs

Face validity questions	<ul style="list-style-type: none"> • Access to pharmacies (km) • Access to dentists (km) • Access to leisure services (km) • Access to blue spaces (km) • Access to green spaces (active) (km) • Access to green spaces (passive) (km) • Access to GPs (km)
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The final indicators short-list

The table below outlines the key socio-economic indicators which we propose to include in the 2022 Community Needs Index. These have been grouped into domains:

- **Civic Assets:** Measures of the presence of key community, civic, educational and cultural assets in and in close proximity to the area.
- **Connectedness:** Measures of connectivity to key services, digital infrastructure, social isolation and strength of the local jobs market.
- **Active and engaged community:** Measures concerning the levels of third sector civic and community activity and low levels of participation and engagement.

New indicators are presented in bold.

The table below provides an overview of each of these indicators with metadata detailing:

- Source (included URL)
- Timepoints the data is available for
- Geographical unit at which the data is published
- Notes/Caveats associated with the indicator – including robustness issues to consider when incorporating the data
- Details of change from the 2019 Community Needs Index.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
Civic Assets						

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CA1: Density of community space assets	This is conceptualised as the number of community and civic assets inside the local area or within 1km of the local area boundary, divided by the number of people living in inside the local area or within 1km of the local area boundary. Rate is expressed per 100,000 population. The following assets are included: <ul style="list-style-type: none"> • Public / Village Hall / Other Community Facility • Youth Recreational / Social Club • Church Hall / Religious Meeting Place / Hall • Community Service Centre / Office • Place Of Worship 	AddressBase https://www.ordnancesurvey.co.uk/business-government/products/addressbase	2022	Point Location	Details are not available on how accessible the assets are to the community.	Updated for 2022 and now expressed as rate per 100,000 population.
CA2: Density of educational assets	This is conceptualised as the number of community and civic assets inside the local area or within 1km of the local area boundary, divided by the number of people living in inside the local area or within 1km of the local area boundary. Rate is expressed per 100,000 population The following assets are included: <ul style="list-style-type: none"> • College • Further Education • Higher Education • Children's Nursery / Crèche • First School • Infant School • Junior School • Middle School • Primary School • Secondary School • University • Special Needs Establishment. • Other Educational Establishment 	AddressBase https://www.ordnancesurvey.co.uk/business-government/products/addressbase	2022	Point Location	Details are not available on how accessible the assets are to the community.	Updated for 2022 and now expressed as rate per 100,000 population.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CA3a: Density of sport and leisure assets (address base)	This is conceptualised as the number of community and civic assets inside the local area or within 1km of the local area boundary, divided by the number of people living in inside the local area or within 1km of the local area boundary. Rate is expressed per 100,000 population. The following assets are included: <ul style="list-style-type: none"> • Public House / Bar / Nightclub • Activity / Leisure / Sports Centre • Skateboarding Facility • Recreational / Social Club(Bingo) •Leisure Pier •Swimming facility •Public tennis court •Bandstand 	AddressBase https://www.ordnancesurvey.co.uk/business-government/products/addressbase	2022	Point Location	Details are not available on how accessible the assets are to the community. Some of the facilities identified will have a cost associated with access, which could potentially exclude those on lower incomes in the community.	Updated for 2022 and now expressed as rate per 100,000 population. Additional assets included.
CA3b: Density of sport and leisure assets (Active places database)	Active places database is compiled by Sport England and contains a record of all of the sports facilities in an area (grouped by type). The following facilities are included: Athletics Tracks, Health and Fitness Suite, Indoor Bowls, Indoor Tennis Centre, Grass Pitches, Sports Hall, Swimming Pool, Artificial Grass Pitch, Golf, Ice Rinks, Ski Slopes, Studio, Squash Courts, Tennis Courts, Cycling. An asset is included if it is located inside the local area or within 1km of the local area boundary and the figure is expressed as a rate per 100,000 people living in inside the local area or within 1km of the local area boundary.	Active places database https://www.activeplacespower.com/OpenData/download	2022	Point Location	Details are not available on how accessible the assets are to the community. Some of the facilities identified will have a cost associated with access, which could potentially exclude those on lower incomes in the community.	New

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CA4: Density of cultural assets	This is conceptualised as the number of community and civic assets inside or within 1km of the local area boundary divided by the number of people living in the inside or within 1km of the local area boundary. Rate is expressed per 100,000 population The following assets are included: <ul style="list-style-type: none"> • Library • Reading Room • Museum/Gallery •Historical Site / Object •Historic Structure / Object •Monument Obelisk / Milestone / Standing Stone Statue •Castle / Historic Ruin • Permanent Art Display / Sculpture 	AddressBase https://www.ordnancesurvey.co.uk/business-government/products/addressbase	2022	Point Location	Details are not available on how accessible the assets are to the community. Some of the museums will not be free to enter, which will exclude some sections of the community. Some of the libraries and reading rooms will not have open access.	Updated for 2022 and now expressed as rate per 100,000 population. Additional assets included.
CA5a: Green assets (density)	This is conceptualised as the number of community and civic assets inside or within 1km it divided by the number of people living in the inside or within 1km of the local area boundary. Rate is expressed per 100,000 population. The following assets are included: <ul style="list-style-type: none"> • Public Park / Garden • Public Open Space / Nature Reserve • Playground • Play Area • Paddling Pool • Picnic / Barbeque Site • Allotment • Playing Field • Recreation Ground • Woodland • Lake / Reservoir • Forest / Pinetum 	AddressBase https://www.ordnancesurvey.co.uk/business-government/products/addressbase	2022	Point Location	Details are not available on the accessibility of the asset form within the community. Some assets are not open- access to the whole community, e.g. allotments and some of the play areas/paddling pools. It is not possible to distinguish between these (though private parkland has been excluded). There is no information regarding the size or quality of the green space.	Updated for 2022 and now expressed as rate per 100,000 population. Additional assets included.
CA5b: Green assets (Area of public green space)	Area of public green space. This includes cemeteries, playing fields, public parks and gardens, religious grounds, plus Countryside Right of Way open access land. Based on Ordnance Survey Open Greenspace Map and Natural England CRoW Act 2000 - Open Access Mapping.	Friends of the Earth	Sep 2020	MSOA	Areas smaller than 2 hectares have been omitted.	Updated for 2020 from alternative source.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CA6: Retail assets	Number of retail premises in the local area or within 1km of the local area boundary) divided by the number of people living in the inside or within 1km of the local area boundary. The rate is expressed per 100,000 population. The following assets are included: Post Office, Market, Restaurant / Cafeteria, Shop / Showroom and Garden Centre.	AddressBase https://www.ordnancesurvey.co.uk/business-government/products/addressbase	2022	Postcode	Does not take into account the size of the retail unit or how accessible it is to the local community. Excludes assets with negative community benefit.	New
CA7: Community-owned assets	Community owned assets in divided by the number of people living in the inside or within 1km of the local area boundary. The rate is expressed per 100,000 population. Figures are compiled using data from Power to Change, the Community Land Trust Network, Co-operatives UK, Plunkett Foundation and Locality and Keep it in the Community.	Renaisi/ Plunkett Foundation/Locality	2022	Postcode	Some assets are geolocated based on the location of the organisation owning the assets rather than the assets itself, and some postcodes containing multiple assets are listed as single assets in the database.	New
Connectedness						
Physical connectivity (subdomain)						
CN1a: Travel time to key services by public transport/walk	Travel times in minutes to key services by public transport/walking and cycling. The following services are included: <ul style="list-style-type: none"> • Primary School • Employment centre (LSOA with more than 500 jobs) • Further Education Institution • GP • Hospital • Secondary School • Town Centre These statistics are derived from the analysis of spatial data on public transport timetables; road, cycle and footpath networks; population and key local services.	Department for Transport (DfT) https://www.gov.uk/government/collections/journey-time-statistics	2019	LSOA	Although the statistics are calculated to a high level of geographical detail, some assumptions and simplifications are necessary in the modelling (for example assigning the start point of journeys to a single point in each Output Area, road speeds, interchange times for public transport).	Updated for 2019 and supermarket removed due to large number of areas with equal value for this indicator.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CN1b: Access to Green/Blue Spaces	<p>Access to Blue Spaces, Green Spaces (both active and passive) is measured as mean road distance to these facilities (in km). Blue spaces are water features that can be positive amenities. Blue space indicator is based on the distance people need to travel to access their nearest water body such as a beach, a lake and a river. Blue space locations such as beaches were acquired from OpenStreetMap and the mainland water bodies (lakes, rivers) were retrieved from the European Settlement Map (ESM 2012) raster dataset at a 5 meters resolution.</p> <p>Active green spaces refer to recreational opportunities involving moderate to high intensity use requiring modification of natural landforms and the provision of service facilities, playing fields or equipment.</p> <p>Passive green space refers to recreational opportunities that occur in a natural setting requiring minimal development or facilities and providing areas for informal, self-directed activities for individuals or small groups.</p> <p>Open data from OS on Green spaces was used for preparing two variables related to the distance from the nearest green space(active) and the total green space areas available to each postcode in a range of a 900-meter buffer (passive) before creating LSOA level averages.</p>	<p>CDRC – Access to Health Assets and Hazards https://data.cdrc.ac.uk/dataset/ahah2</p>	2017	LSOA		New

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CN2a: Jobs density in the Travel to Work Area	The number of jobs located in the area as a percentage of the working-age population in that area – this is to be used as a measure of economic opportunities locally. Data are taken from the Business Register and Employment Survey (BRES) of approximately 80,000 businesses, weighted to represent all sectors of the UK economy. The BRES definition of an employee is anyone aged 16 years or over at the time of the survey, whom the employer pays directly from its payroll(s) in return for carrying out a full-time or part-time job or for being on a training scheme. This indicator will be calculated at travel-to-work-area (TTWA) level rather than at community- geography level, to reflect the fact that people typically commute outside of their local area to work ³ . TTWAs are a geography created to approximate labour-market areas. In other words, they are designed to reflect self-contained areas in which most people both live and work. The current ONS criteria for defining TTWAs are that at least 75% of the area's resident workforce work in the area, and at least 75% of people who work in the area also live in the area. The area must also have an economically active population of at least 3,500.	Business Register and Employment Survey (BRES) https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=57	2020	TTWA	This measure does not take into account the quality of the job, whether they are full or part time, zero hours or temporary or permanent contract or how easily accessible the core of the travel to work area is from the specific community geography area.	Updated for 2020.

³ More than half of those in employment travel more than 5km to work, with the average distance travelled to work across the England and Wales - 15km – Source: Census 2011 Distance travelled to work

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CN2b: Jobs density in the local area	The number of jobs located in the area as a percentage of the working-age population in that area – this is to be used as a measure of economic opportunities locally. Data are taken from the Business Register and Employment Survey (BRES) of approximately 80,000 businesses, weighted to represent all sectors of the UK economy. The BRES definition of an employee is anyone aged 16 years or over at the time of the survey, whom the employer pays directly from its payroll(s) in return for carrying out a full-time or part-time job or for being on a training scheme. This indicator will be calculated at based on the number of jobs inside or within 1km of the local area boundary to balance and ranked alongside the Jobs Density measure to get a weighted measure of local jobs and jobs in the wider labour market.	Business Register and Employment Survey (BRES) https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=57	2020	LSOA	This measure does not take into account the quality of the job, whether they are full or part time, zero hours or temporary or permanent contract.	New
Wider connectivity (subdomain)						
CN3: Households with no car	The proportion of households who do not have a car or van. Figures are based on responses to the 2011 Census car ownership question, which asks for information on the number of cars or vans owned or available for use by one or more members of a household. It includes company cars and vans available for private use. This is included to supplement the accessibility of key services and labour market indicators in this domain, to take account of the additional challenges in accessing services for those without access to private transport.	Census 2021 (expected summer 2022)	2021	Output Area	The count of cars or vans in an area is based on details for private households only. Cars or vans used by residents of communal establishments are not counted.	Updated for 2021.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CN4a: Broadband download speeds	Average broadband download line-speed (Mbit/s) for connections in the area.	OfCom	2021	Postcode	Due to variations in broadband performance over time, this data should not be regarded as a definitive and fixed view of the UK's fixed broadband infrastructure. However, the information provided here may be useful in identifying variations in broadband performance.	Updated for 2021.
CN4b: Broadband upload speeds	Average broadband upload line-speed (Mbit/s) for connections in the area.	OfCom	2021	Postcode	Due to variations in broadband performance over time, this data should not be regarded as a definitive and fixed view of the UK's fixed broadband infrastructure. However, the information provided here may be useful in identifying variations in broadband performance.	New
CN5: Loneliness (People living alone)	Shows the proportion of households that comprise one person living alone (as a proportion of all households). Figures are self-reported and taken from the household composition questions in the 2011 census.	Census 2021 (expected summer 2022)	2021	Output Area	This is included as a proxy measure of social isolation.	Updated for 2021.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CN5b: Loneliness (Loneliness Index – GP Prescriptions for Loneliness)	An outcome-based loneliness index using open prescription data. Open prescription data lists medicines, dressings and appliances prescribed by NHS England primary care facilities, including General Practices (GPs), each month. Loneliness Index is created by using GP prescription data to find areas with above-average prescriptions for five conditions where loneliness has been shown to be a risk factor: Alzheimer's, depression, high blood pressure, anxiety and insomnia. An index was created for each condition by standardising the proportion of a practices prescriptions that were given for the condition relative to the levels in other practices (into z scores). The index for each condition had a value that was negative if prescribing was lower than typical and positive if it was greater than typical. The loneliness index is generated by summing together these standardised-scores for each condition.	Office for National Statistics' Data Science Campus /NHS England/Red Cross	2019	GP Practice	These data do not include any information about the person it was prescribed to and are averaged for a whole GP practice.	New

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
CN4c: Loneliness (Self-reported levels of loneliness)	People who have self-reported that they 'feel lonely always or often' in the 2015/16 and 2016/17 Community Life Survey. Data is apportioned from national level to Output Area level based on Output Area Classification group.	Community Life Survey: DCMS/Output Area Classification 2011	2016 and 2017	Output Area	Data are constructed from a survey with a small sample size. Data has been apportioned down to Output Area level using Output Area Classification group membership – (which groups together Output Areas based on their shared socio-economic characteristics. Caution should be applied when interpreting these results at small-area level because of the small sample size of the survey. Two years of data were used to increase the size of the response rate.	New
Active and engaged community						

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
AE1: Voter turnout at local elections	Valid votes turnout (%) at the most recent Local Council Elections.	Electoral Commission https://www.electoralcommission.org.uk/who-we-are-and-what-we-do/elections-and-referendums/past-elections-and-referendums/european-parliamentary-elections/report-may-2019-european-parliamentary-elections-and-local-elections	2016/ 2017/ 2018 /2019	Ward	There is some local variation in the frequency and dates of local elections, with different parts of the country going to the polls at different times and at different intervals. Caution is therefore advised when drawing direct comparisons between local areas, as the socio-political context and weather conditions vary from year to year with associated impacts on turnout rates. Another factor affecting turnout is whether the local election is concurrent with other elections (for example, turnout is generally higher when general elections coincide with local ones. We have included suggested steps to mitigate against this by adjusting estimates from previous years to the 2019 average turnout.	Updated for 2019.

<p>AE2: Civic participation (Self-reported measures of community and civic participation)</p>	<p>The Community Life Survey contains key indicators of volunteering and civic participation.</p> <p>The 2015/16 and 2017/18 iterations of the Community Life Survey are published with the associated Output Area Classification of each respondent in the survey. Using the Output Area Classification it is possible to apportion response rates to Output Area level allocating response rates (%) to each Output Area based on their Output Area Classification group membership. Data is then aggregated from Output Area to provide estimated rates for key indicators for MSOAs. The following indicators are included:</p> <ul style="list-style-type: none"> • People have not taken part in a consultation about local services or issues in their local area. • People are not a member of a local decision making group e.g. group set up to regenerate the local area, tackle crime problems, making decisions on local health or education services, tenants' group decision making committee, group making decisions on local services for young people or the local community. • People have not been personally involved in helping out with local issue/activity. • People have not taken part in community groups clubs or organisations e.g. children's education/schools, youth/children's activities, education for adults, Sport/exercise (taking part, coaching or going to watch), religion, politics, health, disability and social welfare, 	<p>Community Life Survey: DCMS/Output Area Classification 2011: ONS Licensed data – access via UK data archive https://www.data-archive.ac.uk/</p>	<p>2016 and 2017</p>	<p>Output Area</p>	<p>Data are constructed from a survey with a small sample size. Data has been apportioned down to Output Area level using Output Area Classification group membership – (which groups together Output Areas based on their shared socio-economic characteristics). Caution should be applied when interpreting these results at small-area level because of the small sample size of the survey. Two years of data were used to increase the size of the response rate.</p>	<p>New</p>
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Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
	<p>older people, safety, first aid, the environment, animals, justice and human rights, local community or neighbourhood groups, citizens groups, hobbies, recreation/arts/social clubs.</p> <ul style="list-style-type: none"> • People have not taking part in any civic engagement. • People have not been engaged in formal or informal volunteering in the last month. • People definitely or tend to disagree that they can influence decisions in their local area. 					

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
AE3a Neighbourhood cohesion	<p>The Community Life Survey contains key indicators of Neighbourhood cohesion</p> <p>The 2015/16 and 2017/18 iterations of the Community Life Survey are published with the associated Output Area Classification of each respondent in the survey. Using the Output Area Classification it is possible to apportion response rates to Output Area level allocating response rates (%) to each Output Area based on their Output Area Classification group membership. Data is then aggregated from Output Area to provide estimated rates for key indicators for MSOAs. The following indicators are included:</p> <ul style="list-style-type: none"> • People do not feel that they belong very strongly to neighbourhood. • People disagree that they can borrow things or exchange favours with neighbours. • People never chat to their neighbours. • People are fairly or very uncomfortable with asking a neighbour to mind their child(ren) for half an hour. • People feel fairly or very uncomfortable with asking a neighbour to keep a set of keys to their home for emergencies. • People feel fairly or very uncomfortable with asking a neighbour to collect a few shopping essentials if they were ill and at home on their own. • People disagree that people in this neighbourhood pull together to improve the neighbourhood. 	<p>Community Life Survey: DCMS/Output Area Classification 2011: ONS</p> <p>Licensed data – access via UK data archive https://www.data-archive.ac.uk/</p>	2016 and 2017	Output Area	<p>Data are constructed from a survey with a small sample size. Data has been apportioned down to Output Area level using Output Area Classification group membership – (which groups together Output Areas based on their shared socio-economic characteristics). Caution should be applied when interpreting these results at small-area level because of the small sample size of the survey. Two years of data were used to increase the size of the response rate.</p>	New

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
AE3b: Strength of local social relationships	This is calculated by combining responses to the following questions: "To what extent would you agree or disagree that people in this neighbourhood pull together to improve the neighbourhood?" (Community Life Survey); "The friendships and associations I have with other people in my neighbourhood mean a lot to me." (Understanding Society Survey); "I borrow things and exchange favours with my neighbours." (Understanding Society Survey); "I regularly stop and talk with people in my neighbourhood." (Understanding Society Survey); "I would be willing to work together with others on something to improve my neighbourhood." (Understanding Society Survey); "If I needed advice about something I could go to someone in my neighbourhood." (Understanding Society Survey).	Social Life (constructed from responses to the Community Life Survey and Understanding Society Survey) – http://www.social-life.co/	2016 and 2017	Output Area	Data are modelled by Social Life from the Community Life Survey and Understanding Society Survey (based on the sociodemographic characteristics of the local area). Caution should be applied when interpreting these results at small-area level because of the small sample size of the survey.	Combined with additional measures from the Community Life Survey.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
AE4: Leisure and cultural participation: Participation in sport	These data show the modelled estimated percentage of adults (aged 16+) who are classed as 'active'. People are described as being active if they have done at least 150 minutes of moderate intensity equivalent (MIE) physical activity (excluding gardening) in the previous week. Activity is counted in moderate-intensity equivalent minutes whereby each 'moderate' minute counts as one minute and each 'vigorous' minute counts as two minutes. Moderate activity is defined as activity where you raise your breathing rate; whereas vigorous activity is defined as one in which you are out of breath or sweating (you may not be able to say more than a few words without pausing for breath).	Sport England (Active Lives Adult Survey) https://www.sportengland.org/know-your-audience/data/active-lives	2020-21	MSOA	Data are derived from survey data with a small sample size, which have been modelled down to small-area level, based on local characteristics. Sport England has modelled its 'active lives activity' estimates to produce small area estimates at MSOA level. More information about the data modelling process can be found in Sport England's SAE technical document: https://www.sportengland.org/our-work/partneringlocal-government/smallarea-estimates/ This data will be combined with the Culture and Heritage Participation Rate indicators to produce an overall Leisure and Cultural Participation indicator.	Updated for 2020/21.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
AE5: Third sector organisations	<p>Non-overlapping count of</p> <ol style="list-style-type: none"> 1) Registered charities from Charity Base. 2) Co-operative societies from Co-operatives UK. 3) Charitable Incorporated Organisations, Community Interest Companies, PRI/LTD BY GUAR/NSC (Private, limited by guarantee, no share capital – excluding Property Management companies) and Registered Societies from Companies House . 4) Co-operative societies, community benefit societies, and former industrial and provident societies from Financial Conduct Authority. <p>Figure is expressed as a rate per 100,000 population.</p>	<p>Charities Commission https://charitybase.uk/chc . Co-operatives UK https://www.uk.coop.uk , Companies House http://download.companieshouse.gov.uk/en_output.html , from Financial Conduct Authority https://mutuals.fca.org.uk/</p>	2022	Postcode	<p>This is based on the location of organisations rather than on their area of operations (some will have a global focus). Larger charities are excluded from this measure. This indicator is included in this theme to capture the level of third sector activity in the local area. Organisations with an exclusively national or international focus have been excluded, to ensure only organisations with a local focus are included. Some organisations appear on multiple registers – duplicate records have been stripped so only unique records remain. This will exclude smaller companies not registered and exclude co-operatives, community benefit societies, associations, trusts and partnerships (of varying types).</p>	New (though charity base data was included in the previous iteration).
AE6: National Lottery Community Fund	<p>Combined total of grants made to local projects and organisations by the National Lottery Community Fund between 2004 and 2022 per 1,000 population (£). Figures are taken from data on grants made to projects and organisations in local areas in the UK by the Big Lottery Fund, from grants data published by Big Lottery in conjunction with the 360Giving initiative. Big Lottery used the 360Giving standard to produce a file of all the grants made in 2004-2022.</p>	<p>National Lottery (through 360 Giving) https://grantnav.threesixtygiving.org/</p>	2004-2022	Ward level	<p>Included in the active/engaged community theme to capture the level of third sector activity in the local area.</p>	Updated for 2022.

<p>AE7: Grant funding per head from major grant funders</p>	<p>Combined grant funding from grant giving organisations whose data has been subject to the 360giving standard (per head of population). The following organisations are included: A B Charitable Trust, Access to Justice Foundation, Andrew Lloyd Webber Foundation, Barrow Cadbury Trust, CHK Foundation, Cabinet Office, Calouste Gulbenkian Foundation, UK Branch, Co-operative Group, Coop Foundation, Department for Business, Energy and Industrial Strategy, Department for Culture, Media and Sport, Department for Digital, Culture, Media & Sport, Department for Digital, Culture, Media and Sport, Department for Education, Department for Environment, Food and Rural Affairs, Department for International Development, Department for International Trade, Department for Transport, Department for Work and Pensions, Department of Health, Department of Health and Social Care, Esm�e Fairbairn Foundation, Gatsby Charitable Foundation, HM Revenue & Customs, Hazelhurst Trust, Home Office, Imperial Health Charity, Indigo Trust, John Ellerman Foundation, John Moores Foundation, Joseph Levy Foundation, LGBT Consortium, LandAid Charitable Trust, Lloyd's Register Foundation, Lloyds Bank Foundation for England and Wales, London Marathon Charitable Trust, Masonic Charitable Foundation, Mercers' Charitable Foundation, Ministry for Housing, Communities and Local Government, Ministry of Defence, Ministry of Housing, Communities & Local Government, Ministry of Justice, National Churches Trust, National Emergencies Trust, Nationwide Foundation,</p>	<p>360 Giving Grant Nav data https://grantnav.threesixtygiving.org/</p>	<p>Up to 2022</p>	<p>Postcode level⁴</p>	<p>Data are based on the location of grant recipients rather than the location of their beneficiaries. This is indicator is included in this theme to capture the level of third-sector activity in the local area. Grants above �1m excluded to ensure capturing local initiatives rather than national activity. Measure expanded to include all grant funders which have a nationwide focus (e.g. not focused in one region of the country⁵) where geographic information supplied.</p>	<p>Updated for 2022 with broader set of grant funders included.</p>
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Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
	Nesta, Nuffield Foundation, OVO Foundation, Paul Hamlyn Foundation, Pears Foundation, Power to Change Trust, Rank Foundation, Road Safety Trust, Rothschild Foundation, Samworth Foundation, Sport England, Staples Trust, Tedworth Charitable Trust, The AIM Foundation, The Badur Foundation, The Bishop Radford Trust, The Blgrave Trust, The Clothworkers Foundation, The David & Elaine Potter Foundation, The Dulverton Trust, The Dunhill Medical Trust, The Fore, The Henry Smith Charity, The Joseph Rank Trust, The Michael And Betty Little Trust, The Pilgrim Trust, The Rayne Foundation, The Seafarers' Charity, The Segelman Trust, The Tudor Trust, Three Guineas Trust, True Colours Trust, Tuixen Foundation, Virgin Money Foundation, Vision Foundation, Wates Family Enterprise Trust, Wates Foundation, William Grant Foundation, Wolfson Foundation, Woodward Charitable Trust, ZING, the Trussell Trust					

⁴ Comic relief and Children in Need only supply references of Local Authority recipients. This data will be allocated to local area by apportioning

⁵ Grant givers with a specific area focus e.g. Community Foundations have been excluded to mitigate against reflecting the extent to which local grant givers have submitted data to GrantNav e.g. Not all Community Foundations have submitted data to Grant Nav and we want to guard against introducing systematic bias into the data by including data for some regions and excluding others.

Indicator	Details	Source	Date	Granularity	Notes/Caveats	Changes in 2022
AE8a: SME lending by banks	Total value of lending to SME businesses from key financial lenders (Barclays, CYBG, Lloyds Banking Group, HSBC, Nationwide Building Society, Royal Bank of Scotland and Santander UK in Great Britain).	UK Finance	June 2021	Postcode sector	The measure covers four quarters of lending data at postcode sector level. The data is modelled from postcode sector to Output Areas using a weighted lookup built from the numbers of shared postcodes between a postcode sector and Output Area in combination with the working age population per Output Area. Data is then aggregated to local area level to get total value of SME lending at local area level.	Updated for June 2021.
AE8b: Small businesses: Local Business Units with 0-4 employees	Small businesses: VAT registered local businesses with 0-4 employees per 10,000 population	Inter Departmental Business Register (IDBR)	2021	MSOA		New

Further indicators to explore:

- CACI Digital Exclusion Index: The Digital exclusion index is derived from postcode-level data provided by CACI combining information on Broadband speed, Buying online, Managing current accounts online, Mobile phone ownership, Internet usage and People agreeing with the statement "computers confuse me, I will never get used to them".
- Onward Job access score: Reachable number of jobs and distance with 15 minutes, 30 minutes, 60 minutes and 90 minutes by both driving and public transport across Great Britain for each LSOA.

Consultation Question:

- **Do you agree with this set of indicators? (I agree with them all/ I agree with some of them/ I don't agree with any of them/ I have no view on this)**
- **Please add any comments regarding the proposed set of indicators to include in the 2022 Community Needs Index.**
- **If you have any suggestions for additional indicators, please list them in the consultation survey. If possible, please include the source, the indicator name and any source links to the indicator.**

You can complete these consultation questions at https://www.surveymonkey.co.uk/r/LBN_Consultation.

Part 3: Review of methods

This section outlines the proposed step by step approach to developing the Community Needs Index.

Step 1 Convert all indicators to MSOA geography

As explored above, we propose to produce the 2022 Community Needs Index at Middle layer Super Output Area (MSOA) geography (using the updated version of the MSOA boundaries which are being developed as part of the Census 2021 outputs).

However, the majority of the indicators in the Index are not published at MSOA level. It is therefore necessary to convert these indicators to 2021 MSOA geographies.

The table below outlines our approach to converting indicators to MSOA level:

Geography	Indicators	Approach to conversion
Postcode/Point Location	Density of community space assets Density of educational assets Density of sport and leisure assets Density of cultural assets Density of retail assets Density of community owned asserts Green assets: a) Density of green assets Broadband speeds	Use GIS software to overlay point data against 2021 MSOA polygon boundaries and using a point-in-polygon method to calculate the number of points that fall within each MSOA. For some indicators a buffer zone will be applied around the MSOA boundary before overlaying.

	Grant funding per head from major grant funders Third sector organisations	
Polygon	Green assets: b) Area of public green space	Overlay Output Area boundaries and Address Base points against polygon boundaries. If the majority of residential addresses within an Output Area fall within the polygon, the Output Area will be identified as part of the polygon. A best-fit approach is taken with no splitting across multiple polygons or apportioning in/out of a polygon and the entire OA is included in a single ward. The Output Area 2021 to MSOA 2021 Lookup table developed by the ONS will be used to aggregate data from Output Area to MSOA level.
Output Area	Households with no car People living alone Strength of local social relationships Self-reported measures of community and civic participation Neighbourhood cohesion Self-reported levels of loneliness	Use the Output Area to MSOA level lookup table from the ONS Census 2021 geography products to aggregate to MSOA. Where data is produced using 2011 Output Area boundaries, overlay the 2011 and 2021 Output Area boundaries with individual residential postcode data from the ONS Postcode directory. Apply a point-in-polygon method to calculate the number of postcodes that fall within each 2011 and 2021 Output Area boundaries. Use this to weight the extent of overlap between 2011 and 2021 Output Areas. Apply this weighting to generate 2021 Output Area estimates. Aggregate from 2021 Output Area to 2021 MSOA using the Output Area to MSOA level lookup table from the ONS Census 2021 geography products.
LSOA	Travel time to key services by public transport/walk Access to green and blue spaces Jobs density in the local area	Use the 2011 Output Area to 2011 LSOA Look-up table to apportion data to 2011 Output Area. Overlay the 2011 and 2021 Output Area boundaries with individual residential postcode data from the ONS Postcode directory. Apply a point-in-polygon method to calculate the number of postcodes that fall within each 2011 and 2021 Output Area boundaries. Use this to weight the extent of overlap between 2011 and 2021 Output Areas. Apply this weighting to generate 2021 Output Area estimates. Aggregate from 2021 Output Area to 2021 MSOA using the Output Area to MSOA level lookup table from the ONS Census 2021 geography products.
MSOA	Leisure and cultural participation Small businesses: VAT registered local businesses with 0-4 employees per 10,000 population Loneliness Index – GP prescriptions for loneliness	Use the 2011 2011 Output Area to 2011 MSOA Look-up table to apportion data to 2011 Output Area. Overlay the 2011 and 2021 Output Area boundaries with individual residential postcode data from the ONS Postcode directory. Apply a point-in-polygon method to calculate the

		number of postcodes that fall within each 2011 and 2021 Output Area boundaries. Use this to weight the extent of overlap between 2011 and 2021 Output Areas. Apply this weighting to generate 2021 Output Area estimates. Aggregate from 2021 Output Area to 2021 MSOA using the Output Area to MSOA level lookup table from the ONS Census 2021 geography products.
Electoral ward	Voter turnout at local elections Big Lottery funding per head	Apportion data from relevant ward to Output Area (using ONS open geography portal Output Area to ward lookup tables). Overlay the 2011 and 2021 Output Area boundaries with individual residential postcode data from the ONS Postcode directory. Apply a point-in-polygon method to calculate the number of postcodes that fall within each 2011 and 2021 Output Area boundaries. Use this to weight the extent of overlap between 2011 and 2021 Output Areas. Apply this weighting to generate 2021 Output Area estimates. Aggregate from 2021 Output Area to 2021 MSOA using the Output Area to MSOA level lookup table from the ONS Census 2021 geography products.
TTWA	Jobs density in the Travel to Work Area	Use the 2021 Output Area to Travel to Work Area (TTWA) lookup table and apply the Jobs density score to all the Output Areas in the TTWA. Aggregate from 2021 Output Area to 2021 MSOA using the Output Area to MSOA level lookup table from the ONS Census 2021 geography products.

Step 2 Quality Assurance of the data

The next step is to comprehensively check the distributions of all the indicators at MSOA level to ensure that all indicators have passed the relevant fitness tests and are “fit for purpose”. These tests include excluding indicators with high numbers of zeros or equal upper limits (for example where a large number of areas have values of 100%) which would distort the Index.

Step 3 Applying shrinkage to improve the robustness of indicators

Where a rate or other measure of community need for a small area is based on small numbers, the resulting estimate may be unreliable, with an unacceptably high standard error. The technique of shrinkage estimation is used to ‘borrow strength’ from larger areas to increase the reliability of small area data; the impact of shrinkage will tend to move a MSOA’s score towards that of their parent higher-level area. Shrinkage moderates the levels of unreliability in the dataset and reduces the impact of chance fluctuations from year to year. Such scores occur most

commonly where numbers are small at MSOA level and the event is thus relatively rare. This may be the case for the indicator as a whole or only for particular MSOAs. In shrinkage estimation the score for a small area is estimated as a weighted combination of that small area's score and the mean value for a larger area from which the smaller areas within the larger area borrow strength. We propose using the most up to date set of Local Authority Districts as the larger area (this was the larger area used in the Indices of Deprivation shrinkage calculations). MSOAs within a single Local Authority District share issues relating to local governance. To a certain extent, they may also share issues relating to labour market sub-climates. Shrinkage will be applied to all indicators with the exception of the indicator published at Travel to Work Area (see the table in Step 1 above).

Further details about the shrinkage technique are given in Appendix C.

Step 4 Ensuring that all indicators are “pointing in the same direction”

In order to combine the indicators into domains, it is necessary for each of the indicators to be orientated in the same direction. However, for some of the indicators included in the Community Needs Index, a *high* value indicators *low* levels of need – for example an area with high levels of grant funding would be measured as having low levels of need. By contrast, for other indicators, a high score denotes high levels of need – for example areas with high travel times to key services. It is necessary therefore to ‘reverse the polarity’ for some scores to ensure that a high value is negative for all indicators – so they can be consistently combined.

Step 5 Producing composite indicators

A small subset of the indicators will be amalgamated to provide composite indicators before combining with the other indicators to create domain scores. The purpose of creating composite indicators is to produce more robust indicators that capture multiple facets of what the indicator is intending to measure.

The following indicators are grouped together:

Original indicators	Combined indicator
<ul style="list-style-type: none"> • Density of sport and leisure assets part 1 (from AddressBase) • Density of sport and leisure assets part 2 (from Active places database) 	Density of sport and leisure assets
<ul style="list-style-type: none"> • Density of green assets • Area of public green space 	Green assets

<ul style="list-style-type: none"> • Travel time to employment centre (LSOA with more than 500 jobs) • Travel time to Further Education institution • Travel time to GP • Travel time to hospital • Travel time to Primary School • Travel time to Secondary School • Travel time to town centre • Access to blue spaces • Access to green spaces (active) • Access to green spaces (passive) 	Access to services
<ul style="list-style-type: none"> • Jobs density in the Travel to Work Area • Jobs density in the local area 	Jobs Density
<ul style="list-style-type: none"> • People living alone • Loneliness Index – GP prescriptions for loneliness • Self-reported levels of loneliness 	Loneliness
<ul style="list-style-type: none"> • Neighbourhood cohesion • Strength of local social relationships 	Self-reported measures neighbourhood strength
<ul style="list-style-type: none"> • SME lending by banks • Local business units with 0-4 employees 	Small businesses

Before combining each of the individual indicators to produce an overall composite indicator, the indicators will first have shrinkage applied (to reduce any standard errors associated with small numbers), the indicators will then be standardised (by ranking and transforming to a normal distribution) – as each of the composite indicators are on a different scale (section 6 below describes the standardisation process in more detail). Indicators will be weighted before combining to produce the composite indicators. Section 7 below outlines possible approaches to weighting indicators before combining.

Step 6 Standardisation

When combining measures, it is important to ensure that indicator scores are comparable and that the weighting of domains is not distorted by the fact that some of the indicators may have very different distributions. The indicators in the Community Needs Index are based on different metrics and each indicator in the Index needs to be standardised to ensure that they have a common distribution, so that indicators can be combined, without a single indicator dominating due to having a large distribution. Indicators will be standardised by ranking each of the indicators and then transforming to a normal distribution.

Step 7 Weighting

Because the Community Needs Index is a compositional measure, decisions have to be made as to the weight given to the various indicators and domains of the Index. There are a number possible approaches to weighting the indicators in a domain.

Option 1 is to provide equal weightings to each of the indicators in a domain. This was the approach taken in the 2019 Community Needs Index.

Option 2 is to apply different weights depending on theoretical judgements regarding the suitability of indicators in the model. Examples of this approach include applying higher weightings to indicators which are constructed from more robust administrative data sources and lower weightings to data from modelled data sources. Alternatively higher weightings can be applied to indicators which more closely match the issue that is being captured – this can be ascertained through a Discrete Choice Experiment (DCE) – a survey of key stakeholders and people from impacted communities identifying the relative importance of indicators.

Option 3 is to introduce a statistical technique called Maximum Likelihood Factor Analysis to determine the weights of the indicators within each domain (Appendix A provides a more detailed explanation of the process). Factor analysis works most effectively where there is a single overwhelming factor which explains the performance on a set of indicators within a domain⁶ and where indicators within a domain exert an influence on one another. The outcome of applying factor analysis is that not all indicators in the domain will have equal weights, with the weights affected by the extent to which each of the indicators within a domain measure the underlying aspect that the domain is trying to capture. A key advantage of using factor analysis, is that it takes into account 'double-counting' within domains. However, if there is no underlying factor common among the indicators in a domain, factor analysis is less effective. One way to get around this is to split domains into subdomains which share a common factor. If we wanted to bring in factor analysis we would first run correlation analysis to determine the associations between indicators within each domain. Where there were no clear correlations, we would explore grouping indicators into subdomains.

We have reviewed the indicators and determined that all of the indicators in the Civic Asset domains have close associations (they are all measuring aspects of the same issue – the density of assets of community benefit or community value in a local area) and that factor analysis can be safely applied. However, the *Connectedness* and *Active and engaged community* domains measure conceptually distinct subsets of indicators and would need to be split into subdomains in order for factor analysis to be applied.

⁶ For example in the 2019 Indices of Deprivation, factor analysis was used to weight indicators in the health domain because there was an underlying factor (general health) that impacted on the range of measures from prevalence of long term illness, hospital admissions to premature mortality.

The *Connectedness* domain explores connectivity both in terms of access to services and wider measures of connectivity such as access to transport, digital connectivity and isolation - which do not necessarily have strong associations with the more physical concepts of connectivity. We therefore propose grouping the domain into two subdomains:

Subdomain	Indicators
Physical connectivity	Access to services Jobs density
Wider connectivity	Households with no car Broadband speeds Loneliness

The Active and engaged community domain consists of measures concerning self-reported participation and engagement, alongside measures of the strength of the community sector. Again, it makes conceptual sense to group these into separate subdomains as follows:

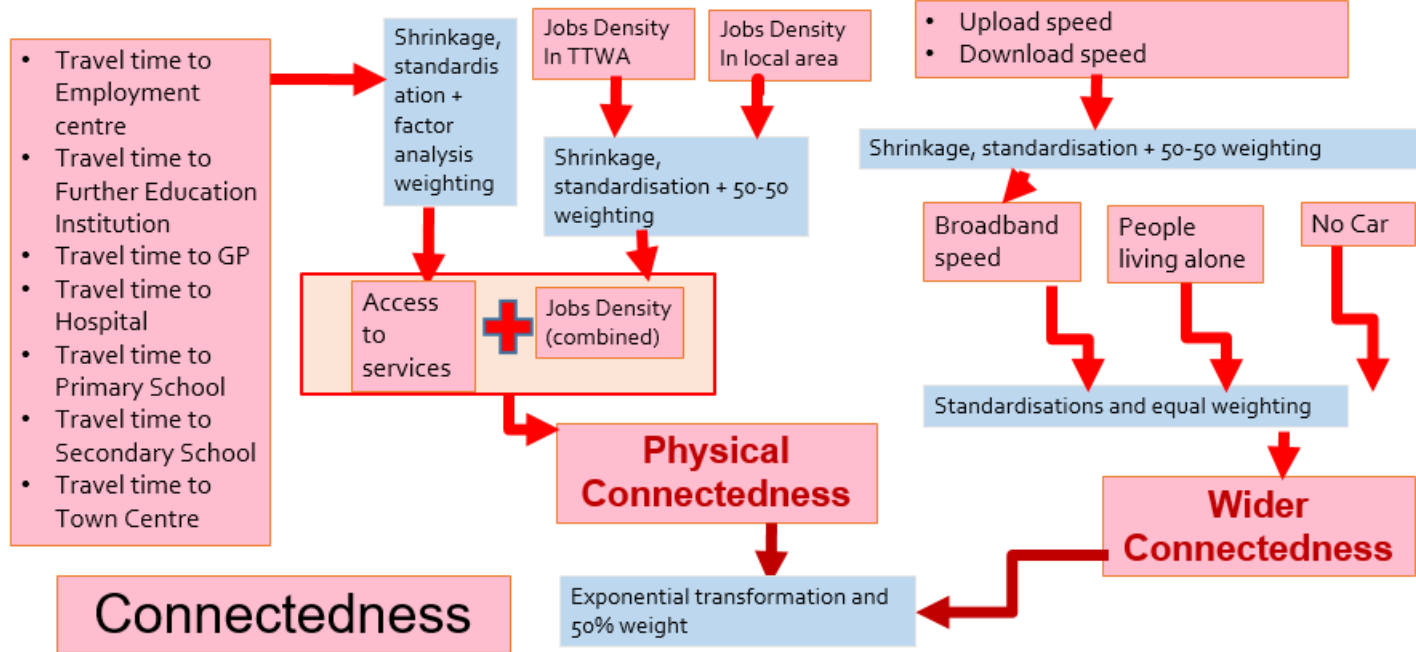
Subdomain	Indicators
Civic participation	Voter turnout at local elections Self-reported measures of community and civic participation Participation in Sport Self-reported measures neighbourhood strength
Civic activity	Third sector organisations per head Big Lottery funding per head Grant funding per head from major grant funders Small businesses

The weighted and standardised indicators would then be combined to form subdomain scores (in the case of indicators in the *Active/engaged community* and *Connectedness* domains) and domain scores (in the case of the Civic assets domain – which would not contain any subdomains).

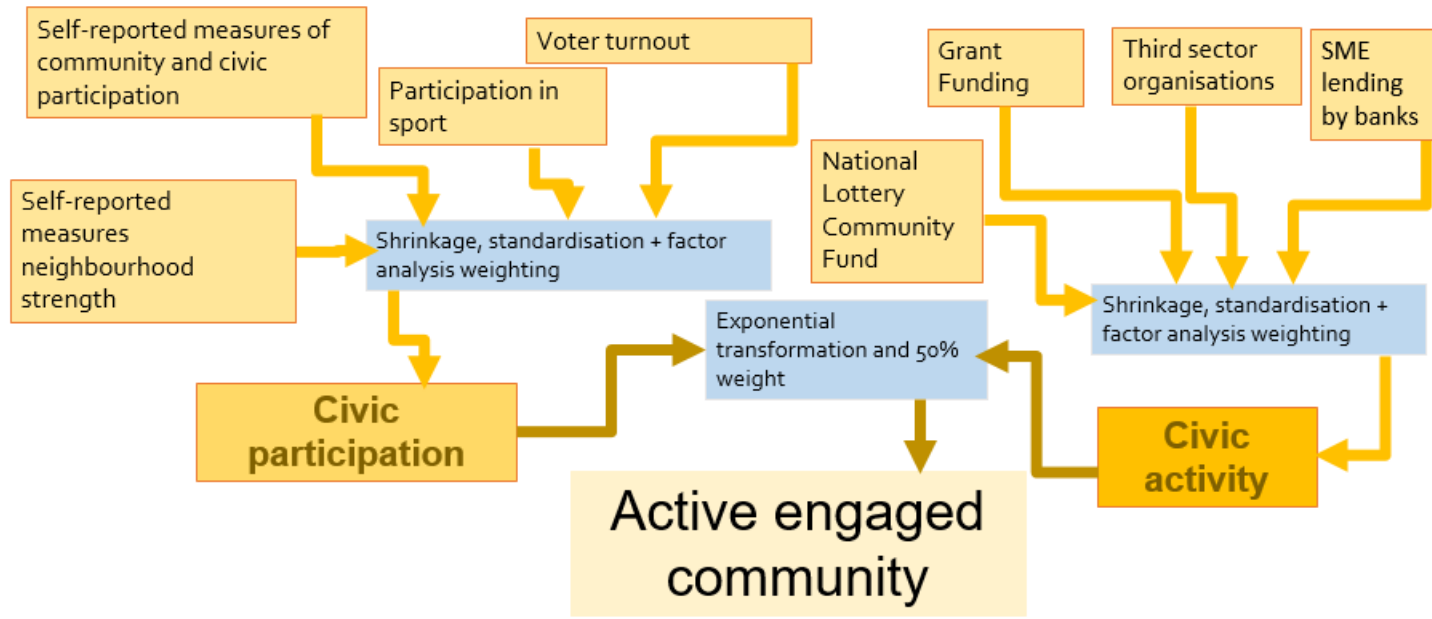
The combination process involves summing each of the weighted indicator scores (the standardised indicator scores * weight) together for all of the indicators within a domain/subdomain. The subdomains subsequently need to be standardised (using the exponential transformation method outlined in step 8 below) and added together to form domain scores.

The flow chart below shows the overall structure of these indicators and subdomains:

Connectedness Subdomains



Active Engaged Community Subdomains



However, there are a number of challenges associated with applying factor analysis:

- Introducing factor analysis represents a greater departure from the 2019 approach, making it harder to compare meaningful change over the period.
- Factor analysis cannot be applied across all of the indicators in the Index so it brings in an inconsistency in the way that the weights are applied in different domains.
- Factor analysis relies on assumptions of commonality of relationships between different indicators which may not apply. Factor analysis works less well where there are no indicators which have influence over other indicators within a domain.
- Factor analysis does not weight based on the robustness of the indicator sources, so where we have obtained data modelled from sample surveys, this could potentially receive more weight than indicators acquired from direct administrative sources.

We will explore each alternative approach for weighting indicators and will apply basic sensitivity testing to determine the impact of different indicator weight approaches, for example to see how they correlate and what happens if you vary the domain weights slightly i.e. how stable are the results?

Consultation Question:

- **When considering a weighting method for the research indicators, is factor analysis the most appropriate method, or should we consider another approach? (Factor analysis is the most appropriate method, You should consider another approach, I have no view on this)**
- **Please share any additional thoughts you have or details of alternative approaches.**

You can complete these consultation questions at https://www.surveymonkey.co.uk/r/LBN_Consultation.

Step 8 Standardising domains

Once we have finalised the weighting approach we will be able to combine the domains to produce the overall Community Needs Index.

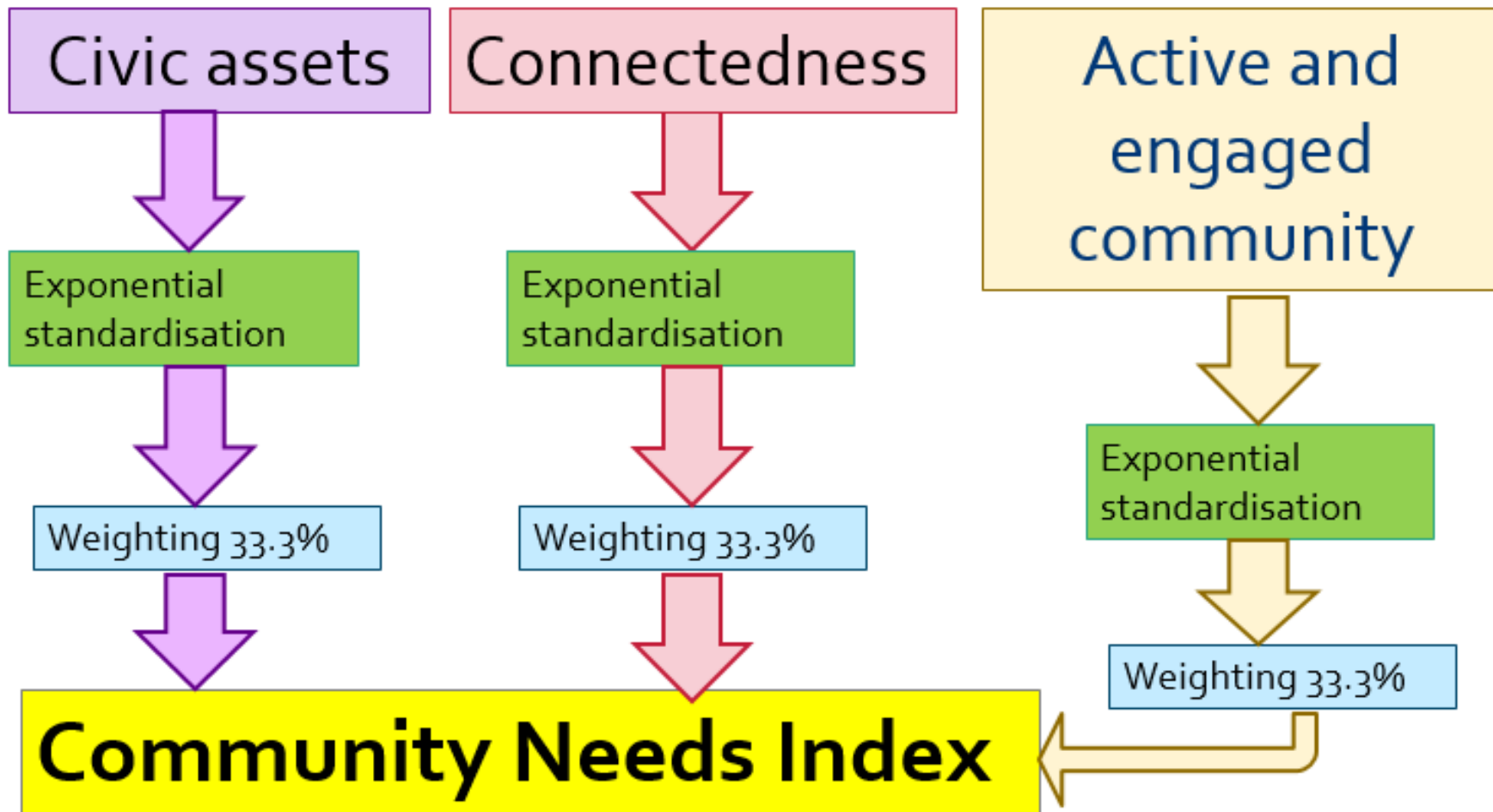
However, each of the domains will be on a different scale to one another, with two of the three domains produced from combined subdomain scores, while the Civic assets domain is produced from combined weighted indicators.

It will therefore be necessary to standardise the domain scores before combining. As with the 2019 Community Needs Index, the method of standardisation that we propose to adopt in 2022 is to transform the domains to a specified **exponential distribution** using an *exponential transformation* function (see Appendix B for details). The exponentially transformed subdomain/domain scores can then be combined to form an overall 'community need' measure at MSOA level.

The *exponential transformation* method of standardisation differs from the normal distribution method as it gives more emphasis on the top end of the distribution (the areas with the highest scores) and so facilitates identification of the areas with the highest levels of need. This was the method of standardisation applied in the Indices of Deprivation in order to control cancellation effects (e.g. high levels of deprivation in one domain are not completely cancelled out by low levels of deprivation in a different domain) and ensures that areas that perform particularly badly on one aspect of community need are moved closer to the high end of the community need spectrum even when they show positive outcomes on other indicators.

Step 9 Weighting domains

The final stage for producing the Community Needs Index is to assign weights to the three domains that have been created – to apply to the domain scores before importing. It is important to note that all potential combinations of domains involve weights. If, after standardisation, the domains are simply added together, this gives each domain an equal weight. Our aim is that the weights should be explicit and based on clear criteria. Part of this commitment to transparent weights involves the standardisation of the domain Indices as outlined above. This ensures that the domains can be combined without 'hidden' weights. Having standardised the domains, we are then able to choose explicit weights. We propose applying equal weights to each of the three domains to mirror the approach taken in the 2019 Community Needs Index where equal weights were selected to reflect the equal importance afforded to each of the dimensions of Community Need. Once each domain is weighted, the domains can be combined to produce the overall Community Needs Index. The combination process involves summing each of the weighted standardised domain scores (the exponentially transformed domain scores * weight) together to produce an overall Community Needs Index score (see flow chart below).



Consultation Question

- **Do you agree with our proposed methodology for standardising, weighting and combining indicators (as outlined in this paper)? (Yes/No/In part/I'm not sure/ I have no view on this).**
- **Please share your comments and any thoughts on how the methodology could be improved.**

You can complete these consultation questions at https://www.surveymonkey.co.uk/r/LBN_Consultation.

Part 4: Combining the Community Needs Index with other needs frameworks

This section explores how the Community Needs Index can be combined with other frameworks in order to identify key communities at risk – where social infrastructure challenges co-exist with other key socio-economic challenges.

In 2019, the Community Needs Index was combined with the Index of Multiple Deprivation (IMD) to identify 'left-behind' areas. The decision to use the IMD in combination with the Community Needs Index arose from our theoretical conception of 'left-behind' areas as areas which experienced a "dual disadvantage":

- a) High levels multiple deprivation (measured by the IMD)
- b) Poor connectivity, low levels of civic assets and community participation and engagement (measured by the Community Needs Index).

Areas were identified as 'left behind'; if they ranked among the most deprived **10%** of Wards in England on *both* the 2019 Community Needs Index and the 2019 IMD. It is important to note that the development of the Community Needs Index was conceptually shaped by the interactions with the Index of Multiple Deprivation. The Index was created in order to capture the social infrastructure challenges in areas that also experienced multiple deprivation challenges (with a recognition that social infrastructure challenges are more acute for those experiencing low income, worklessness or poor health) and indicators were only considered for the Community Needs Index where they are not already included in the IMD.

As part of the 2022 update, we are intending to review the interaction between community needs and other socio-economic challenges. We would therefore like to consult on alternative options for combining the Community Needs Index with the IMD and other key frameworks in order to identify at 'risk groups'.

There are a number of potential options for combining the 2022 iteration of the Community Need Index with the IMD. The following are presented as examples only, but we would be interested in hearing your views on the most appropriate indicators to use:

- Raising the threshold at which areas are identified as at risk e.g. a two-tier categorisation of 'left behind', with those in the top 20% on both IMD and the Community Needs Index being regarded as 'moderately left behind' in addition to the 10% identified as 'severely left behind' (which would therefore be a subset of the moderately left behind group).
- Identifying areas as 'left behind' if an MSOA with high Community Needs contains any LSOAs with high levels of deprivation.
- Identify a set number of areas with the highest scores on the Community Needs Index and IMD.
- Defining cut-points based on cumulative population rather than number of MSOAs.

Consultation Question

- **How should the Community Needs Index and the Index of Multiple Deprivation be combined in order to identify vulnerable communities?**

You can complete these consultation questions at https://www.surveymonkey.co.uk/r/LBN_Consultation.

In addition, we would be interested in exploring how the Community Needs Index could interact with other key frameworks to identify specific socio-economic challenges. The table below highlights examples of potential frameworks which could be explored.

Framework	Source	Geographical level	URL
Social Mobility Index	Social Mobility and Child Poverty Commission	Local Authority	https://www.gov.uk/government/publications/social-mobility-index
Community Wellbeing Index	Co-op in collaboration with Geolytix and the Young Foundation	Locality	https://communitywellbeing.coop.co.uk/
Thriving Places Index	Centre for Thriving Places	Local Authority	https://www.thrivingplacesindex.org/
Health Index	Office for National Statistics	Local Authority	https://blog.ons.gov.uk/2020/12/03/developing-the-health-index-for-england/
Resilience Index	British Red Cross	Local Authority	https://britishredcross.shinyapps.io/resilience-index/
Green Space Index	Fields in Trust	LSOA	https://www.fieldsintrust.org/green-space-index
UK Food Insecurity Index	Sheffield University	Local Authority	https://www.sheffield.ac.uk/news/new-map-shows-where-millions-uk-residents-struggle-access-food
Heritage Index	RSA	Local Authority	https://www.thersa.org/reports/heritage-index-2020
Small Area Vulnerability Index (SAVI)	Place based longitudinal data resource	MSOA	https://pldr.org/dataset/e6kl0/small-area-vulnerability-index-savi

Social Fabric Index	Onward	Local Authority	https://www.ukonward.com/reports/the-state-of-our-social-fabric/
Understanding Local Needs for Wellbeing Data	What Works Centre for Wellbeing, Happy City, PHE and ONS	Local Authority	https://whatworkswellbeing.org/resources/understanding-local-needs-for-wellbeing-data/

Note, many of these frameworks are not available at below Local Authority level so any combination with the Community Needs Index would necessarily be at Local Authority level.

Consultation Question:

- ***What other frameworks do you think we should consider linking with the Community Needs Index, in order to highlight community need? If possible, please provide the source of the framework and any links to the framework.***
- ***Based on your answer to the previous question, how do you think linking the Community Needs Index with other frameworks could add value to our understanding of community need?***
- ***Is there anything else you would like to tell us about the new Community Needs Index methodology?***

You can complete these consultation questions at https://www.surveymonkey.co.uk/r/LBN_Consultation.

Appendix A: Factor Analysis methodology

Factor analysis is used as a method for combining indicators, by finding appropriate weights for combining indicators into a single score based on the inter-correlations between all the indicators.

Factor analysis is only used in domains where 'latent variables' are hypothesised to exist and where the indicator variables are 'effect indicators', i.e. indicators that are influenced by the latent variable.

There are many candidates in terms of types of factor analysis. Two of the main contenders are maximum likelihood factor analysis (as used in the current and previous versions of the Indices of Deprivation) and Principal Components Analysis. The distinction between maximum likelihood factor analysis and Principal Components Analysis is a technical one. In brief, the assumptions underpinning Principal Components Analysis are that the indicators going into the analysis are perfectly reliable and measured without error. Maximum likelihood factor analysis requires no such assumption.

The process of combining indicators using factor analysis comprises three stages:

- All indicators are converted to the standard normal distribution.
- The standardised scores were factor analysed (using the Maximum Likelihood method), deriving a set of weights.
- The indicators were then combined using these weights.

Appendix B: Exponential transformation

In order to combine the domains into an overall measure of need, the domain scores first need to be standardised. Any standardisation and transformation should meet the following criteria:

- Standard distribution. It must ensure that each domain has a common distribution, so that domains can be combined, without one domain dominating due to a much larger distribution.
- Identify areas of need. It must facilitate the easy identification of the areas with highest levels of need.
- Scale independent. It must not be scale dependent (in other words confuse population size with level of need).

One possible standardization approach involves each of the domain scores being ranked, and then the ranks are transformed to an exponential distribution. The exponential distribution has a number of properties that satisfy the criteria above.

Standard distribution

The exponential distribution transforms each domain so that they each have a common distribution, the same range and identical maximum / minimum values. The process starts by ranking the scores in each domain to standardise the domain scores (from 1 for the lowest need to 6,791 for the most highest need), before applying the exponential transformation procedure to create a standardised domain score ranging from 0 (lowest need) to 100 (highest need).

Cancellation

The exponential transformation procedure gives control over the extent to which lack of need in one domain cancels or compensates for high need in another domain. It allows precise regulation, although not elimination, of these cancellation effects. The scaling constant (23) used produces roughly 10 per cent cancellation. This means that in the extreme case, an MSOA which was ranked most deprived on one domain but least deprived on another would overall be ranked at the 90th percentile in terms of levels of need. This compares to the 50th percentile if the untransformed ranks or a normal distribution had been used instead.

Identify deprived areas

The exponential transformation effectively spreads out that part of the distribution in which there is most interest - that is the 'tail' which contains the areas with the highest levels of need in each domain. The scaling constant ensures that the most deprived 10 per cent of areas cover 50 per cent of the distribution of scores (in other words, scores between 50 and 100 after exponential transformation).

Scale independent

The transformation is not affected by the size of the MSOA's population.

The exponential transformation calculation

The transformation used is as follows:

For any MSOA, denote its rank on the domain R , scaled to the range $[0,1]$. $R=1/N$ for the least deprived and $R=N/N$ (in other words $R=1$) for the most deprived, where N =the number of MSOAs in England.

The transformed domain score X is given by:

$$X = -23 \ln(1 - R(1 - \exp^{-100/23}))$$

where 'ln' denotes natural logarithm and 'exp' the exponential or antilog transformation

Appendix C: Shrinkage

Improving the reliability of small area data values using shrinkage estimation

The shrinkage technique is designed to deal with the problems associated with small numbers in an MSOA. In some areas – particularly where the at-risk population is small – data may be 'unreliable', that is more likely to be affected by sampling and other sources of error. The technique of shrinkage estimation (in other words empirical Bayesian estimation) is used to 'borrow strength' from larger areas to avoid creating unreliable small area data. Shrinkage estimation involves moving MSOA scores towards another more robust score, often relating to a higher geographical level. All MSOA scores will move somewhat through shrinkage, but those with large standard errors (in other words the most 'unreliable' scores) will tend to move the most. The MSOA score may be moved towards a 'higher need' or 'lower need' score through shrinkage estimation. Without shrinkage, some MSOAs would have scores which do not reliably describe the community need in the area due to chance fluctuations from year to year.

It could be argued that shrinkage estimation is inappropriate for administrative data which are, in effect, a census. This is not correct. The problem exists not only where data are derived from samples but also where scans of administrative data effectively mean that an entire census of a particular group is being considered. This is because such censuses can be regarded as samples from 'super-populations', which one could consider to be samples in time. All the data from administrative sources and the 2011 Census are treated as samples from a super-population in this way, and the shrinkage technique was applied to indicators which use this data. The exceptions are the indicators supplied at Local Authority District level.

Selecting the larger areas from which unreliable small area data can borrow strength

The principle for selecting the larger area should be that the MSOAs within them share characteristics. In the current shrinkage methodology, Local Authority Districts are used. The MSOAs within a single district share issues relating to local governance and possibly to economic sub-climates. To a certain extent, they may also share issues relating to labour market sub-climates.

The shrinkage calculation

The actual mechanism of the shrinkage procedure is to estimate deprivation in a particular MSOA using a weighted combination of (a) data from the MSOA, and (b) data from another more robust score (in the case of the Indices, this is the Local Authority District score). The weight attempts to increase the efficiency of the estimation, while not increasing its bias. All MSOA scores are adjusted to some degree through the shrinkage process, but the magnitude of the adjustment will be greatest for areas with the least reliable scores. The amount of movement depends on both the size of the standard error and the amount of heterogeneity amongst the MSOAs in a Local Authority District.

The 'shrunk' estimate of a MSOA level proportion (or ratio) is a weighted average of the two 'raw' proportions for the MSOA and for the corresponding District. The weights used are determined by the relative magnitudes of within-MSOA and between-MSOA variability.

If the rate for a particular indicator in MSOA j is r_j events out of a population of n_j , the empirical logit for each MSOA is:

$$m_j = \log \left[\frac{(r_j + 0.5)}{(n_j - r_j + 0.5)} \right]$$

whose estimated standard error s_j is the square root of:

$$s_j^2 = \frac{(n_j + 1)(n_j + 2)}{n_j(r_j + 1)(n_j - r_j + 1)}$$

The corresponding counts r out of n for the district in which MSOA j lies gives the district-level logit:

$$M = \log \left[\frac{(r + 0.5)}{(n - r + 0.5)} \right]$$

The 'shrunk' MSOA level logit is then the weighted average:

$$m_j^* = w_j m_j + (1 - w_j) M$$

where w_j is the weight given to the 'raw' MSOA- j data and $(1 - w_j)$ the weight given to the overall rate for the district. The formula used to determine w_j is:

$$w_j = \frac{1/s_j^2}{1/s_j^2 + 1/t^2}$$

where t^2 is the inter-MSOA variance for the k MSOAs in the district, calculated as:

$$t^2 = \frac{1}{k-1} \sum_{j=1}^k (m_j - M)^2$$

Thus large MSOAs, where precision $1/s_j^2$ is relatively large, have weight w_j close to 1 and so shrinkage has little effect. The shrinkage effect is greatest for small MSOAs in relatively homogeneous districts.

The final step is to back-transform the shrunk logit m_j^* using the 'anti-logit', to obtain the shrunk MSOA level proportion for each MSOA:

$$z_j = \frac{\exp(m_j^*)}{1 + \exp(m_j^*)}$$