**Specification for “Developing spatial indicators of vulnerability to the impacts of climate change in the UK”**

Tender Reference Number: OS-0324

**Specification of Requirements**

Invitation to Tender for: **Developing spatial indicators of vulnerability to the impacts of climate change in the UK**

Tender Reference Number: OS-0324

Deadline for Tender Responses: **29March 2024**

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# 1 Introduction and summary of requirements

The Climate Change Committee (CCC) is an independent, statutory body established under the Climate Change Act in 2008. The CCC has been commissioned by the Department for Environment, Food and Rural Affairs to conduct the Fourth UK Climate Change Risk Assessment Independent Assessment (CCRA4-IA). This will assess the risk the UK faces from Climate Change across society and the economy and the potential adaptation actions that could be taken. We are looking to conduct this assessment at as narrow a spatial level as possible.

# 2 Background

The CCC is currently collecting evidence and preparing its advice for the Fourth Climate Change Risk Assessment Independent Assessment (CCRA4), due for publication in 2026. This will look to assess the risks the UK faces today and in the future. It will also look to update the priority scoring of risks from CCRA3. It will assess adaptation actions that can be taken to reduce these risks. A key output the CCC is looking to produce for CCRA4 is the assessment of risk by household, business and local area/community characteristics. This project is looking to build the evidence of vulnerability under these three categories to facilitate this assessment.

We require a contractor to produce a vulnerability dataset to be used within CCRA4 commissioned and in-house analyses. This dataset will be a key input into our research and will need to give an up-to-date spatial mapping of key vulnerabilities to climate change impacts across the UK and an indication of future vulnerabilities.

# 3 Aims and Objectives

The CCC is looking to generate a database of indicators of vulnerability against climate change risks (as identified by CCRA), geographically mapped across the UK (including the Devolved Administrations (DAs) of Scotland, Wales, Northern Ireland and inhabited islands). The dataset should capture the key characteristics of households, businesses and local communities/economies that could drive vulnerability to the risks identified in CCRA3. These include:

* **Population/household characteristics:**
	+ General population and demographic characteristics, such as age and health.
	+ Household characteristics such as income, housing type, (type of) employment and household travel.
* **Business characteristics:**
	+ We are looking to understand spatial and sectoral variability in characteristics which may influence business vulnerability to climate impacts. More detail can be found in the methodology section.
* **Local area characteristics:**
	+ We are looking to understand spatial variability in characteristics which may influence community resilience overall, encompassing:
	+ Household characteristics which may influence adaptive capacity at the community scale, such as single-occupant, lone-parent, internet access.
	+ Place-based characteristics that may reduce adaptive capacity at the community scale, such as crime, connectivity and key service provision.

We are also interested in the potential to project changes in these spatial mappings of characteristics into the future, particularly out to 2050. There is an additional task for bidders to gather relevant projection data (e.g. ONS population and health scenarios). Key variables for projection are: population structure (age and geography), health and, if possible, employment/workforce.

# 4 Methodology

There are three key tasks in this project:

1. **Mapping population and household characteristics.** Establish the distribution of individual and household characteristics (at as high-resolution geographical level as possible) that make people vulnerable to the impacts of climate change associated with the risks identified in the UK CCRA.
2. **Mapping business characteristics.** Establish the characteristics of business and the economy spatially to indicate whether businesses in an area particularly vulnerable to the impacts of climate change.
3. **Mapping local area characteristics.** Map some key place-based social characteristics which may influence community-level adaptive capacity.
4. **Future projections*.*** Link to existing future scenarios/projections to establish how some of these variables/indicators may change out to 2050. Consider how variables which are not included in available projections could be estimated.

We have provided a list of key variables and potential sources below. Data should be aggregated an agreed spatial resolution, ideally LSOA level, for England and the Devolved Administrations.

We recommend using Census 2021data for England and Wales, and Census 2022 for Scotland and Census 2021for NI. Some data may be available from other sources – we welcome bidders suggestions (we have highlighted some other potential sources, where relevant, below). The latest census data for Scotland is expected to be released in phases from May 2024. If required data is not available within the original timeline of this project, we would consider pausing the data collection for Scotland until after September (when further data is expected to be released). We would welcome a discussion on the practicalities of this with the supplier.

These variables are mostly must-haves, but we are open to suggestions of alternative or additional variables that we could include. The CCC are commissioning analysis for sector-specific deep dives. Further variables relevant to vulnerability data may be identified during these research projects and where feasible, bidders should be flexible to incorporating these.

**Task 1: Mapping household characteristics at a population level.**

Gather a UK-wide spatial dataset of the following individual characteristics at LSOA level.

Population characteristics (from Census data):

* **Age -** Percentage under 16s**,** Percentage 16-34s**,** Percentage 35-65s**,** Percentage 65-75**,** Percentage 75+.
* **Sex**
* **Gender**
* **Ethnic group**
* **Sexual orientation**
* **Health –** Very good health, good health, fair health, bad health, very bad health.
* **Disability -** Disabled under the Equality Act, Disabled under the Equality Act: Day-to-day activities limited a lot, Disabled under the Equality Act: Day-to-day activities limited a little, Not disabled under the Equality Act, Not disabled under the Equality Act: Has long term physical or mental health condition but day-to-day activities are not limited, Not disabled under the Equality Act: No long term physical or mental health conditions.
* **Employment status**

Household characteristics:

* **Household gross income bands (computable)**
* **Assets, saving and wealth** (to indicate ability to invest in capital and respond to shocks) (e.g. [ONS Wealth and Assets survey 2022](https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/distributionofindividualtotalwealthbycharacteristicingreatbritain/april2018tomarch2020)).
* **Housing tenure –** Private renter, social renter, owner occupied.
* **Housing type –** Small terrace, Medium/large terrace, Semi-detached, Detached, Bungalow, Converted flat, Purpose built flat (high rise / low rise), Mobile homes.
	+ Where possible, it would be useful to have population characteristics also disaggregated by housing type.
	+ It may be possible to link this data across to data collected for the CCC’s building stock model for the 7th Carbon Budget. This can be discussed with suppliers.
* **Household size**
* **Insurance –** Buildings insurance, contents insurance, no insurance.
* **Household English (at least one adult or at least one person aged 3-15 has English as a language)**

Other:

* **People receiving home-based care**
* **Number of cars or vans available to households**
* **Distance travelled to work** (e.g. Census 2021 has 11 classification categories from < 2 km to works mainly offshore/not fixed. N.B. this, and other 2021, data may be skewed by Covid lockdowns, see ‘Challenges’ section).
* **Transport method to work**
* **Key characteristics of population living in different communal establishments –** variables such asage, sex, disability, health condition.
	+ This is publicly available at England/Wales level for age, sex, ethnicity, disability, religion and sexual orientation. It may be possible to request more detailed breakdowns or apply averages across the number of people living in the broad communal establishments at a more local level. We welcome proposals on alternative ways of approaching this.

**Task 2: Mapping business characteristics**

Gather a UK-wide spatial dataset of the business characteristics – intended to represent proxies for business vulnerability to climate risk. Some examples are set out in the list below, but we welcome alternative and additional suggestions on data and methodology from suppliers.

Data should be able to be disaggregated both spatially (i.e. by local authority/LSOA) and by sector (we suggest by ONS UK Standard Industrial Classification 3-digit SIC codes).

* **Business characteristics –** business size band, number of employees, location.
* **Outdoor workers** – number of employees working outdoors.
* **Indoor workers** – average time spent doing sedentary and active work, number of home workers.
* **Air conditioning availability –** number of employees/business assets with access to air conditioning
* **Infrastructure disruption –** average employee commute length and mode of transport, customer disruption related to extreme weather.
* **Employee characteristics –** age, disability, sex and average income of employees.
* **Sector specific characteristics –** there may be some sectors which have specific vulnerabilities to climate change impacts, which could be considered further, should data be available. These may include variables such as outdoor visitors (for tourism businesses), critical stock at physical risk (e.g. weight of crops at risk).

**Task 3: Mapping local area characteristics**

Gather a UK-wide spatial dataset of variables which may influence the adaptative capacity at the community-scale. The aim of this task is to collect data which may help to draw out areas which are more vulnerable to due to place-based and community characteristics.

Previous examples of vulnerability mapping have included variables designed to demonstrate community resilience. For example, [ClimateJust mapping includes variables of ‘Community support’ within the Neighbourhood Flood Vulnerability Index](https://www.climatejust.org.uk/sites/default/files/CJ-map-menu_2018.pdf). This covers housing characteristics, collective experience of past floods, the availability of community services and social networks. We welcome other suggestions for further variables or methodology insights from suppliers.

* **Rural-urban classification** – e.g. based on ONS RUC dataset categories. RUC datasets have previously been linked to travel and connectivity data (e.g. [15\_08\_2023\_-\_5\_-\_Connectivity\_and\_Accessibility\_to\_load.pdf (publishing.service.gov.uk)](https://assets.publishing.service.gov.uk/media/64e265733fde6100134a54e5/15_08_2023_-_5_-_Connectivity_and_Accessibility_to_load.pdf))
* **Car or van ownership**
* **Average minimum travel times**
* **Average trip length and number of trips made**
* **Internet connectivity**
* **Number of key services within 30 minutes travel time** – should include schools, health services, food stores and town centres.
* **Access to green space** – average distance from households to [public/private] green space.
* **Capacity and availability of key services** – this could include hospital/A&E waiting times.
* **Direct previous experience of extreme events** – this could include average number of severe flood or heat alerts for an area.
* **Power disruption** – this could include the annual number of network outages in an area.
* **Crime, air pollution and noise pollution** – variables which may influence actions in the local area, such as whether households can open windows or use outdoor space comfortably.
* **Social network variables** – these could include the following:
	+ Percentage of single pensioner households
	+ Percentage of lone parent households
	+ Percentage of new residents in the area
	+ Percentage of English-speaking households

**Task 4: Future projections of vulnerability data**

We would like to understand how the spatial distribution of key vulnerability drivers may change in the future. Future projections under a range of scenarios already exist for some variables listed in the tasks above (e.g. ONS population and demography projections, public health projections). Suppliers should collate relevant available projection datasets consistent with the present-day datasets from tasks 1, 2 and 3 and include discussion of the limitations of using each within the methodology document. We would also like methodology proposal(s) (as part of the response to the ITT for this task) for estimating projections for the other variables which are not currently included in standard projections so that future vulnerability could be assessed.

# 5 Outputs required

Outputs should include data from all tasks (including agreed optional tasks), presented at consistent spatial units across the UK and Devolved Administrations. Outputs should be presented in spreadsheet form and accompanied by relevant spatial data layers – e.g. in a geo-package including raw .csv or spreadsheet files and vector shapefiles.

The CCC may wish to use parts of the dataset as and when they are ready, allowing us to feed vulnerability data into other CCRA analysis. We suggest that the successful supplier sets up a file sharing system with CCC to enable this.

The following datasets should be included:

* A consistent dataset of individual and household vulnerability variables across the UK and devolved administrations, aggregated to consistent spatial resolution (LSOA).
* A consistent dataset of business characteristic variables across the UK and devolved administrations, aggregated to consistent spatial resolution (LSOA) and grouped by industry sector.
* A consistent dataset of identified local characteristic variables across the UK and devolved administrations, aggregated to consistent spatial resolution (LSOA).
* A complementary dataset of future projections for relevant and available variables. Projection datasets should be collated and their limitations covered in the methodology document.
* A clear guidance document to allow for the correct use and interpretation of the datasets.
* A clear methodology document, including the statistical approaches used to aggregate the datasets and data sources and limitations of datasets and projections. Suppliers should also provide a folder containing raw data used in any statistical processing.
* *Optional output – CCC will decide with suppliers as to whether data should be published in an interactive dashboard or interface. We welcome questions or suggestions on this.*

# Ownership and Publication

The key deliverables will be handed over to the CCC, who may choose to publish these as supporting evidence on their website. We may wish to publish full datasets and maps.

Data access should be unrestricted, and the CCC should have full access to all statistical analysis to enable full quality assurance of results and assumptions.

# 7 Quality Assurance

All research tasks and modelling must be quality assured and documented.

Contractors should:

* Include a quality assurance (QA) plan that they will apply to the modelling.
* Specify who will take lead responsibility for ensuring QA. This responsibility should rest with an individual not directly involved in the research or analysis.
* Provide a QA log to demonstrate the QA undertaken, which must identify who undertook the QA and the scope, type, and level of QA that has been undertaken.
* Sign-off for the quality assurance must be done by someone of sufficient seniority within the contractor organisation to be able to take responsibility for the work done. Acceptance of the work by the CCC will take this into consideration. The CCC reserves the right to refuse to sign off outputs which do not meet the required standard specified in this invitation to tender.
* The successful tenderer will be responsible for any work supplied by sub-contractors and should therefore provide assurance that all work in the contact is undertaken in accordance with the quality assurance expectation agreed at the beginning of the project.

The CCC expects that:

* Analysis must be delivered in a simple, transparent spreadsheet or set of spreadsheets, where key assumptions (agreed with the CCC) are clearly stated. All assumptions and figures should be adequately referenced and include any supporting workings. Any such spreadsheets will be the property of the CCC.
* Spatial analysis should also be delivered in a relevant spatial data format. This should include spatial data layers for use in GIS applications and metadata.
* Existing analysis and published research should be reviewed and considered in developing the scenarios and approaches to be analysed within this assignment.

# 8 Timetable

The final outputs from the project are required for use in the CCC’s analysis no later than the end of July 2024.

A suggested timetable for delivering the project is set out below. The bidder should include a proposed timetable for the project as part of their tender submission. The CCC is willing to be flexible and will consider alternative timetable proposals.

The CCC recognises that there might data accessibility issues for some datasets (particularly for the Devolved Administrations). We can provide support to suppliers to access these data and can adjust timelines appropriately.

|  |  |
| --- | --- |
| **Date (w/c)** | **Action/deliverable** |
| 8/04/24 | Commence project |
| 22/04/24 | Agree final methodology and data sources  |
| 06/05/24 | Confirm access has been obtained to required datasets |
| 03/06/24 | Provide initial outputs for review and comment |
| 29/07/24 | Provide final outputs |

In addition to the formal reporting points, the CCC would expect to have regular scheduled meetings or calls to ensure the work is progressing as expected, as well as email updates.

Where possible, it would be useful to have datasets as they are available. We welcome supplier perspectives on approaches for this but suggest a file sharing system to enable this.

# Challenges

We anticipate the following challenges may be associated with the above tasks. Bids should set out how these challenges will be addressed, and the measures used to mitigate risks to delivery arising from them.

* **Data availability.** Not all Census data are available yet and there may be delays to forthcoming releases. Some data may not be publicly available and there may be delays in accessing data. There are additional challenges with data availability in the Devolved Administrations. Bidders should identify data availability risks and plan for these in timelines.
* **Data age, validity and inconsistency.** Some data which has not been updated may be out of date and some data may have methodological/accuracy problems. Some data may have spatial inconsistencies. These data should be identified and will require appropriate screening or sensitivity testing.
* **Data collected during Covid lockdowns.** There are some datasets collected during 2021 Census’ which may have been skewed by changing behaviours due to the Covid pandemic and lockdowns – such as distances travelled to work. Suppliers should consider where data may be skewed and discuss with the CCC team.
* **Data comparison across different sources.** We have identified data from a mixture of sources. There may be methodological challenges with comparing and linking some datasets (for example, where statistical geographies are different).
* **Spatial aggregation of datasets.** It may not be possible for all datasets identified in this tender to be aggregated to the same spatial resolution, or the resolution we have indicated in the tender. There may be different methods for aggregating datasets.
* **Future projections of data.** Future projections of the requested variables may not be available or consistent across all nations.
* **Data maintenance.** There may be some variables in the datasets which are updated frequently. It would be useful to flag these in the outputs and the use of data which has a high risk of becoming dated should be discussed with the CCC team. This project won’t be able to support the long-term maintenance and updating of generated datasets beyond the life of the tender. However, data may be publicly available, so we would value an insight into the potential datedness of any variables.

# Working Arrangements

The successful contractor will be expected to identify one named point of contract through whom all enquiries can be filtered. A CCC project manager will be assigned to the project and will be the central point of contact.

The CCC would expect the choice of variables and attributes, methodological approaches and underlying assumptions to be developed through a collaborative process and as such expect regular (fortnightly) contact and check-ins with the contractor.

# Skills and experience

 CCC would like bidders to demonstrate that you have the experience and capabilities to undertake the project. Your tender response should include a summary of each proposed team members experience and capabilities.

Contractors should propose named members of the project team and include the tasks and responsibilities of each team member. This should be clearly linked to the work programme, indicating the grade/ seniority of staff and number of days allocated to specific tasks.

Contractors should identify the individual(s) who will be responsible for managing the project.

# Consortium Bids

In the case of a consortium tender, only one submission covering all of the partners is required but consortia are advised to make clear the proposed role that each partner will play in performing the contract as per the requirements of the technical specification. We expect the bidder to indicate who in the consortium will be the lead contact for this project, and the organisation and governance associated with the consortia.

Contractors must provide details as to how they will manage any sub-contractors and what percentage of the tendered activity (in terms of monetary value) will be sub-contracted.

If a consortium is not proposing to form a corporate entity, full details of alternative proposed arrangements should be provided. However, please note CCC reserves the right to require a successful consortium to form a single legal entity in accordance with Regulation 28 of the Public Contracts Regulations 2006.

CCC recognises that arrangements in relation to consortia may (within limits) be subject to future change. Potential Providers should therefore respond in the light of the arrangements as currently envisaged. Potential Providers are reminded that any future proposed change in relation to consortia must be notified to CCC so that it can make a further assessment by applying the selection criteria to the new information provided.

# Budget

The budget for this project is £50,000 excluding VAT.

Contractors should provide a full and detailed breakdown of costs (including options where appropriate). This should include staff (and day rate) allocated to specific tasks.

Cost will be a criterion against which bids which will be assessed.

Payments will be linked to delivery of key milestones. The indicative milestones and phasing of payments can be adjusted and agreed with the contractor and Project Manager. Please advise in your tender response how this breakdown reflects your usual payment processes.

In submitting full tenders, contractors confirm in writing that the price offered will be held for a minimum of 60 calendar days from the date of submission. Any payment conditions applicable to the prime contractor must also be replicated with sub-contractors.

The Committee on Climate Change aims to pay all correctly submitted invoices as soon as possible with a target of 10 days from the date of receipt and within 30 days at the latest in line with standard terms and conditions of contract.

# Evaluation of Tenders

Contractors are invited to submit full tenders of no more than 30 pages, excluding declarations and CV’s. Tenders will be evaluated by at least three CCC staff.

CCC will select the bidder that scores highest against the criteria and weighting listed below, see the ITT for further information.

**EVALUATION CRITERIA AND SCORING METHODOLOGY**

|  |  |  |
| --- | --- | --- |
| Criterion | Description | Weighting [example %] |
| 1 | RELEVANT EXPERIENCE / DEMONSTRATION OF CABABILITY | 20% |
| 2 | UNDERSTANDING OF REQUIREMENTS | 15% |
| 3 | METHOD, ABILITY AND TECHNICAL CAPACITY  | 20% |
| 4 | PROJECT TEAM – SKILLS AND KNOWLEDGE | 15% |
| 5 | MANAGEMENT STRUCTURE AND MANAGING YOUR RELATIONSHIP WITH THE CCC  | 10% |
| 6 | QUALITY ASSURING THE SERVICES YOU PROVIDE | 10% |
| 7 | RISK AND CHALLENGES | 10% |
|  |  | 100% |

**Scoring Method**

Tenders will be scored against each of the criteria above, according to the extent to which they meet the requirements of the tender. The meaning of each score is outlined in the table below.

The total score will be calculated by applying the weighting set against each criterion, outlined above; the maximum number of marks possible will be 100. Should any contractor score 1 in any of the criteria, they will be excluded from the tender competition.

|  |  |
| --- | --- |
| **Score** | **Description** |
| 1 | Not Satisfactory: Proposal contains significant shortcomings and does not meet the required standard |
| 2 | Partially Satisfactory: Proposal partially meets the required standard, with one or more moderate weaknesses or gaps  |
| 3 | Satisfactory: Proposal mostly meets the required standard, with one or more minor weaknesses or gaps. |
| 4 | Good: Proposal meets the required standard, with moderate levels of assurance |
| 5 | Excellent: Proposal fully meets the required standard with high levels of assurance |

**Scoring for Pricing Evaluation**

Price will be marked using proportionate pricing. Please see the example below.

Marking proportionate to the lowest price.

Price will be scored as set out below.

There will be a maximum of e.g. 20 marks

The lowest priced bid will receive the full 20 marks, all other bids will then be marked as set out below.

Proportionate Pricing scoring example

If 20% = 20 marks

|  |  |  |
| --- | --- | --- |
| Supplier | Price | Marks |
| 1 (lowest bid) | £50,000 | 20 |
| 2 | £60,000 | 50/60 \* 20 = 16.7 |
| 3 | £75,000 | 50/75 \* 20 = 13.3 |

**Structure of Tenders**

Contractors are strongly advised to structure their tender submissions to cover each of the criteria above and supply a price schedule specifying the daily rates (ex-VAT) you will charge for each level of your staff.

**Evaluation for Interviews, if held**

CCC reserves the right to award the contract based on applicants’ written evaluation only if one candidate emerges from the evaluation stage as significantly stronger than the others.

Should interviews go ahead, CCC will shortlist the top three suppliers with the highest marks from the written proposals. Interviews are provisionally expected to be held around 5th April 2024. If this date changes, CCC will notify applicants.

The areas to be covered in the interview, and markings allocated to each topic area will be sent to the shortlisted supplier prior to interview.

Further details of interviews will be sent to successful applicants on selection.

**Feedback**

Feedback will be given in the unsuccessful letters or emails.