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**Request for Quotation**

**Soil Sample Metabarcoding for Natural England’s Long Term Monitoring Network (LTMN)**

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You are invited to submit a quotation for the requirement described in the specification below.

Please confirm, by email, receipt of these documents and whether you intend to submit a quote.

Your response should be returned to the following email addresses by:

Email: [matthew.j.shepherd@naturalengland.org.uk](mailto:matthew.j.shepherd@naturalengland.org.uk), [victoria.sloan@naturalengland.org.uk](mailto:victoria.sloan@naturalengland.org.uk)

Date: Thursday 15th December 2022

Time: 5pm

Ensure you state the reference **‘LTMNSOIL - METABARCODING’** and **‘Final Submission’** in the subject field to make it clear that it is your response.

**Contact Details and Timeline**

Matthew Shepherd will be your contact for any questions linked to the content of the quote pack or the process. Please submit any questions by email and note that, unless commercially sensitive, both the question and the response will be circulated to all tenderers.

|  |  |
| --- | --- |
| Action | Date |
| Date of issue of RFQ | 05/12/2022 at 17:00 |
| Deadline for clarifications questions | 15/12/2022 at 17:00 |
| Deadline for receipt of Quotation | 19/12/2022 at 17:00 |
| Intended date of Contract Award | 22/12/2022 |
| Intended Contract Start Date | 04/01/2023 |
| Intended Delivery Date / Contract Duration | 31/03/2023 |

**Glossary**

Unless the context otherwise requires the following words and expressions used within this Request for Quotation shall have the following meanings (to be interpreted in the singular or plural as the context requires):

|  |  |
| --- | --- |
| “Authority” | Means Natural England acting as part of the Department for Environment, Food and Rural Affairs |
| “RFQ” | Means this Request for Quotation and all related documents published by the Authority and made available to suppliers |
| “Contract” | Means the contract to be entered into by the Authority and the successful supplier. |

The Authority is Natural England. The Authority’s priorities are to secure a healthy natural environment; a sustainable, low-carbon economy; a thriving farming sector and a sustainable, healthy and secure food supply. Further information about the Authority can be found at: [Natural England](http://www.naturalengland.org.uk/)

**Conditions applying to the RFQ**

You should examine your response to the RFQ and related documents ensuring it is complete prior to submitting your completed quotation.

Your quotation must contain sufficient information to enable the Authority to evaluate it fairly and effectively. You should ensure that you have prepared your quotation fully and accurately and that prices quoted are arithmetically correct for the units stated.

The supplier by submitting a quotation is deemed to accept the terms and conditions in the RFQ. Failure to comply with the instructions set out in the RTQ may result in the supplier’s exclusion from this procurement.

**Acceptance of Quotations**

By issuing this RFQ the Authority does not bind itself to accept any quotation and reserves the right not to award a contract to any supplier who submits a quotation.

**Costs**

The Authority will not reimburse you for any costs and expenses which you incur preparing and submitting your quotation, even if the Authority amends or terminates the procurement process.

**Mandatory Requirements**

The RFQ includes mandatory requirements and, if you do not comply with them, your quotation will not be evaluated.  All mandatory requirements are set out in Bravo.

**Clarifications**

The Authority reserves the right to discuss, confidentially, any aspect of your quotation with you prior to any award of Contract to clarify matters.

**Amendments**

The Authority may amend the RFQ at any time prior to the deadline for receipt. If it amends the RFQ the Authority will notify you in writing and may extend the deadline for receipt in order to give you a reasonable time in which to take the amendment into account.

**Conditions of Contract**

The standard terms and conditions for this contract can be found [here](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914956/standard-condensed-terms.odt). These will be included in any contract awarded as a result of this RFQ process. The Authority will not accept any material changes to these terms and conditions proposed by a supplier.

It is anticipated that this contract will be awarded for a period of 4 months to end no later than 2/03/2023. Prices will remain fixed for the duration of the contract award period. We may at our sole discretion extend this contract to include related or further work. Any extension shall be agreed in advance of any work commencing and may be subject to further competition.

**Specification**

***Soil Sampling Method Comparison***

***Project background***

Natural England maintains a Long-term Monitoring Network (LTMN) comprising 37 sites, mainly National Nature Reserves (NNRs) in England where a wide range of environmental parameters are being monitored with the aim of detecting long-term changes in biodiversity and ecosystem function associated with climate change, pollution and land management. A suite of soil parameters is included in this monitoring to assess long-term changes in soil characteristics, functions and biodiversity.  The LTMN network sites cover multiple habitat types, soil types and environmental conditions, and more information about the project can be found [here](http://publications.naturalengland.org.uk/publication/4654364897050624).

The same five sampling plots are assessed for each site in each round of sampling, and, in each plot, samples are collected from 0-15 cm soil depth, bulked from 12 locations across 4 subplots, to be evaluated for soil microbial community characteristics. Since the start of the sampling in 2011, these samples have been analysed using terminal restriction fragment length polymorphism (tRFLP), acting on genetic material used to indicate bacteria (16SrRNA), fungi (ITS) and the 16SrRNA archaeal gene.  tRFLP is a well-established technique which indicates the diversity of a community of genes by extracting genetic material, amplifying it using PCR, and applying a restriction enzyme which cuts the genetic material into fragments of different lengths. The relative abundance of different fragment lengths, as measured using gas chromatography, is used as a proxy for diversity of microbial taxa.

Developments in genetic analysis over the last 10 years, however, have resulted in lower costs, higher capacity and more rapid complete sequencing of barcodes from mixed community samples – a process known as metabarcoding. Metabarcoding is rapidly becoming comparable in price to tRFLP, and provides improved information on the identities of the microbial species and strains present in communities. Metabarcoding is also, typically, carried out using the same genes as those analysed routinely by tRFLP for the LTMN soil monitoring.

We are therefore interested in exploring whether, and if so, how, we could make valid comparisons between these two methods to inform what methods are used for future analyses.

This project represents the initial stage of investigation and comprises metabarcoding of soil samples from LTMN, which have already been analysed for tRFLP. The approach will involve splitting samples and undertaking metabarcoding on the three genetic markers with two different sets of primers. The primers to be applied should include those that were used for the previous tRFLP analyses, and another set which represents primers more commonly used for metabarcoding, to allow for comparison.

**Metabarcoding analysis of LTMN samples**

Currently 200 LTMN soil samples are held at James Hutton Institute (Aberdeen

AB15 8QH). Each sample comprises a minimum of one 5 ml Eppendorf tube, approximately half filled with frozen soil, originating from one bulked and mixed sample per sample plot (as above), with the fresh soil passed through a 2 mm sieve prior to freezing.

**Given the uncertainty of the costs associated with these analyses, this contract is flexible as to the total number of these samples that will be analysed, so contractors are invited to submit a quotation based on the total number of samples that remain under the maximum project budget. Please note that this maximum is inclusive of VAT, so contractors should aim to deliver quotations that include VAT and continue to remain within the maximum budget stated.**

Under this contract arrangements will need to be made to collect and transport samples, in suitable frozen condition, to your laboratories for processing.

Each sample should be divided into two (or more subsamples) and DNA extracted using a reliable extraction kit for genetic material (e.g. Qiagen DNA-easy). Samples should be divided before or after DNA extraction depending on which is judged to give the most comparable pair of sub-samples.

* One subsample’s genetic material primed and amplified using the primer set and techniques typically used for tRFLP. These will be confirmed with the contractors but are most likely to be those used primers described on page 208-209 of this report: Scoping biological indicators of soil quality - phase II – Defra project SP0534 report available [here](https://randd.defra.gov.uk/ProjectDetails?ProjectID=11765):
* The other subsample’s genetic material should be primed and amplified using a set of primers in current typical use for metabarcoding microbial taxa using current best practice techniques for PCR. These are likely to be V3/V4 16S for bacteria and archaea and ITS1-F\_KY02/ITS2-r for fungi.

The processes above should result in amplicons generated from 2 different primer sets to allow those generated during typical tRFLP analysis to be compared to those generated using modern metabarcoding techniques.

Amplicon sets from both sub-samples should then be sequenced using an appropriate platform.

It is recognized that the amplicons inputted into the tRFLP analyses already carried out, and those generated by the PCR following application of tRFLP primers, may be longer than the read lengths typically generated by high-throughput next-gen sequencing platforms. Our existing tRFLP data typically reports bacterial and archaeal 16SrRNA, and fungal ITS fragment lengths 549 BP long. We would therefore ask contractors to identify potential solutions that would enable metabarcoding results from the tRFLP primer analysis set to be converted into forms suitable for in silico analysis by tRFLP in a way analogous to the biochemical processing the samples received during analysis. This could, for example, involve referencing matching OTUs to longer sequences available on GenBank, or cross referencing data between the results from the two primer data sets used.

Sequencing results should be processed through a suitable bioinformatics pipeline to remove chimaeras and other errors, then matched to known microbial species and strains using BLAST (or similar) against suitable, ideally curated, gene databases (e.g. Greengenes etc.). This should provide a list of microbial taxa detected identified to the most detailed taxonomic level possible, alongside a list of any apparently valid, but unidentified genes, in both cases, reporting on the abundance of matching sequence reads for each taxon.

Any remaining unused material samples suitable for future analyses should be returned to Natural England, and transported in suitable conditions to allow for future analysis.

All data generated should be shared in suitable formats with Natural England, including raw sequencing data in FASTQ format, and should be transferred to Natural England using an appropriate platform (OneDrive, Quatrix...)

A brief technical report should be provided alongside the raw data, to include all technical information on the processing and analyses described above, to a level of detail suitable for publication in a peer reviewed scientific journal.

***Deliverables***

* FASTQ format community metabarcode data for bacterial, fungi and arachaea using tRFLP and modern metabarcoding primers.
* Taxon lists for each sample, identifying the most detailed taxonomic name available and number of sequence reads.
* Brief advice on how to use sequences generated from use of tRFLP primers and PCR processes to generate in-silico tRFLP results, comparable to those gained from actual tRFLP analysis.
* All remaining samples returned to Natural England.

**Prices**

Please include for the sample transport cost (to your laboratory and to Natural England).

As mentioned above, we appreciate that it may not be possible analyse all available samples, and are therefore looking to understand the total number of samples you could feasibly analyse within the available budget.

Contractors should provide a per sample cost for the analyses described above (assuming that one ‘sample’ comprises analysis all the markers involved and application to both subsamples/primer sets).

Prices must be submitted in £ sterling, indicating whether VAT is applicable, and inclusive of any VAT.  Please note that the maximum budget indicated for this project is for costs including VAT.

**Quotation Submission and Evaluation**

We will award this contract in line with the most economically advantageous submission as set out in the following award criteria:

* Price – 50%
* Quality – 50%

Assessment against the quality criterion will be based on scores for tenders received, weighted in accordance to the importance of the following criteria, as indicated in the following table:

|  |  |  |
| --- | --- | --- |
| Criteria | Weighting | To include: |
| **Proposed delivery methods** | 45 | To include:   * A clear explanation of lab protocol and plans for processing samples, and any appropriate quality assurances applied. |
| **Delivery Capability** | 25 | To include:   * A description of the project’s management, showing who will have responsibility for different elements of the project. * A project risk assessment identifying potential threats to the delivery of the project, (such as problems with equipment, staffing, access to facilities) and mitigation strategies to overcome these. * Details of any subcontractors that may be involved in delivery of analyses or other services. * A description of how you will manage any risks to health and safety during laboratory analyses. |
| **Expertise** | 20 | To include:   * Brief descriptions of how the training, qualifications and experience of key staff members will enable them to deliver the project. * C.V.s of all key staff members. |
| **Sustainability** | 10 | To include:   * A description of how environmental impacts relating to the project will be minimized including reference to protocols for safe disposal of reagents, sustainable reuse or disposal of waste materials, and any other actions you will take to minimize environmental impact of the project. |

The scoring of submissions will be follow the rationale outlined in the table below:

|  |  |
| --- | --- |
| **Score** | **Justification** |
| For a score of hundred (100): | Excellent - Response is completely relevant and excellent overall.  The response is comprehensive, unambiguous and demonstrates a thorough understanding of the requirement and provides details of how the requirement will be met in full. |
| For a score of seventy (70): | Good - Response is relevant and good.  The response demonstrates a good understanding and provides details on how the requirements will be fulfilled. |
| For a score of fifty (50): | Acceptable - Response is relevant and acceptable.  The response provides sufficient evidence to fulfil basic requirements. |
| For a score of twenty (20): | Poor - Response is partially relevant and/or poor.  The response addresses some elements of the requirements but contains insufficient / limited detail or explanation to demonstrate how the requirement will be fulfilled. |
| For a score of zero (0): | Unacceptable - Nil or inadequate response.  Fails to demonstrate an ability to meet the requirement. |

**Contract Management**

This contract shall be managed on behalf of the Authority by Matthew Shepherd

It is expected that the contractor or contractors will liaise with Natural England by e-mail, and in telephone/webinar meetings to:

* Agree and finalise the project timetable and logistics
* Run through soil sampling methods prior to the sampling taking place.
* Report progress and discuss any issues arising during field sampling.

All progress meetings required will be held during the course of the contract by teleconference/webinar/videoconference.

The **Nominated Officer** for this project is:

Dr Matthew J Shepherd

Senior Environmental Specialist – Soil Biodiversity

Natural England, Sterling House, Dix’s Field, Exeter, EX1 1QA

Tel:  07866 680786

E-mail  [matthew.j.shepherd@naturalengland.org.uk](mailto:matthew.j.shepherd@naturalengland.org.uk)

This contract is to run until 31st March 2022.

**Table 2** Milestone dates.  The following project milestones are envisaged but will be subject to final agreement between the successful contractors and Natural England.

|  |  |
| --- | --- |
| **Milestone** | **Date** |
| Initial call to finalise sample plan / resolve any queries and arrange sample transport. | w/c 9th Jan 2023 |
| Metabarcoding analyses | Jan / Feb 2023 |
| Data transfer and return of samples | From mid-March 2023 |
| Technical report submitted | End march 2023 |
| Final invoice submitted | 31st March 2023 |

We will raise purchase orders to cover the cost of the services and will issue to the awarded supplier following contract award.

Payment will be following a single invoice at the end of the contract, on or before 31st March 2023.

**Disclosure**

All Central Government Departments, their Executive Agencies and Non Departmental Public Bodies are subject to control and reporting within Government. In particular, they report to the Cabinet Office and HM Treasury for all expenditure. Further the Cabinet Office has a cross-Government role delivering overall Government policy on public procurement, including ensuring value for money and related aspects of good procurement practice.

For these purposes, the Authority may disclose within Government any details contained in your quotation. The information will not be disclosed outside Government during the procurement.

In addition, the Authority is subject to the Freedom of Information Act 2000 and the Environmental Information Regulations 2004, which provide a public right of access to information held by public bodies. In accordance with these two statutes, the Authority may be required to disclose information contained in your quotation to any person who submits a request for information pursuant to those statutes.

By submitting a quotation you consent to these terms as part of the procurement.

**Disclaimers**

Whilst the information in this RFQ and any supporting information referred to herein or provided to you by the Authority have been prepared in good faith the Authority does not warrant that this information is comprehensive or that it has been independently verified.

The Authority does not:

* make any representation or warranty (express or implied) as to the accuracy, reasonableness or completeness of the RFQ;

* accept any liability for the information contained in the RFQ or for the fairness, accuracy or completeness of that information; or

* accept any liability for any loss or damage (other than in respect of fraudulent misrepresentation or any other liability which cannot lawfully be excluded) arising as a result of reliance on such information or any subsequent communication.

Any supplier considering entering into contractual relationships with the Authority following receipt of the RFQ should make its own investigations and independent assessment of the Authority and its requirements for the goods and/or services and should seek its own professional financial and legal advice.

**Protection of Personal Data**

In order to comply with the General Data Protection Regulations 2018 the contractor must agree to the following:

* You must only process any personal data in strict accordance with instructions from the Authority
* You must ensure that all the personal data that we disclose to you or you collect on our behalf under this agreement are kept confidential.
* You must take reasonable steps to ensure the reliability of employees who have access to personal data.
* Only employees who may be required to assist in meeting the obligations under this agreement may have access to the personal data.
* Any disclosure of personal data must be made in confidence and extend only so far as that which is specifically necessary for the purposes of this agreement.
* You must ensure that there are appropriate security measures in place to safeguard against any unauthorised access or unlawful processing or accidental loss, destruction or damage or disclosure of the personal data.
* On termination of this agreement, for whatever reason, the personal data must be returned to us promptly and safely, together with all copies in your possession or control.

**General Data Protection Regulations 2018**

For the purposes of the Regulations the Authority is the data processor.

The personal information that we have asked you provide on individuals (data subjects) that will be working for you on this contract will be used in compiling the tender list and in assessing your offer. If you are unsuccessful the information will be **held and destroyed within two years** of the award of contracts. If you are awarded a contract it will be retained for the duration of the contract and destroyed within **seven years** of the contract’s expiry.

We may monitor the performance of the individuals during the execution of the contract, and the results of our monitoring, together with the information that you have provided, will be used in determining what work is allocated under the contract, and in any renewal of the contract or in the award of future contracts of a similar nature. The information will not be disclosed to anyone outside the Authority without the consent of the data subject, unless the Authority is required by law to make such disclosures.