Information redacted under FOI Act, S40 Personal Information and S43 Commercial Information

LGC Limited
Queens Road
Teddington
TW11 0LY

Attn: [redacted]
By email to: [redacted]

Date: 08/12/2022
Our ref: FS900293

Dear Selvarani,

**Supply of Review of methods for the analysis of culinary herbs and spices for authenticity**

Following your tender/ proposal for the supply of Review of methods for the analysis of culinary herbs and spices for authenticity to Food Standards Agency we are pleased confirm our intention to award this contract to you.

The attached contract details ("**Order Form**"), contract conditions and the ***Annexes*** set out the terms of the contract between Food Standards Agency for the provision of the deliverables set out in the Order Form.

We thank you for your co-operation to date and look forward to forging a successful working relationship resulting in a smooth and successful delivery of the deliverables. Please confirm your acceptance of the Conditions by signing and returning the Order Form. No other form of acknowledgement will be accepted. Please remember to include the reference number above in any future communications relating to this contract.

We will then arrange for Order Form to be countersigned which will create a binding contract between us.

Yours faithfully,

[redacted]

[redacted]

# Order Form

| | | |
|---|---|---|
| **1. Contract Reference** | **FS900293** | |
| **2. Date** | 14/12/2022 | |
| **3. Buyer** | Food Standards Agency<br>Clive House<br>70 Petty France<br>London<br>SW1H 9EX | |
| **4. Supplier** | LGC Limited<br>Queens Road<br>Teddington<br>TW11 0LY | |
| **5. The Contract** | The Supplier shall supply the deliverables described below on the terms set out in this Order Form and the attached contract conditions ("**Conditions**") and any ***Annexes***.<br><br>Unless the context otherwise requires, capitalised expressions used in this Order Form have the same meanings as in Conditions.<br><br>In the event of any conflict between this Order Form and the Conditions, this Order Form shall prevail.<br><br>Please do not attach any Supplier terms and conditions to this Order Form as they will not be accepted by the Buyer and may delay conclusion of the Contract. | |
| **6. Deliverables** | **Goods** | None |

| | | |
|---|---|---|
| | **Services** | See **Annex 3 – Technical Proposal**<br><br>To be performed at **Suppliers Premises.** |
| **7. Specification** | The specification of the Deliverables is as set out in **Annex 2.** | |
| **8. Term** | The Term shall commence on<br>**14/12/2022**<br>and the Expiry Date shall be<br>**31/03/2023**<br><br>unless it is otherwise extended or terminated in accordance with the terms and conditions of the Contract. | |
| **9. Charges** | The Charges for the Deliverables shall be as set out in **Annex 4.** | |
| **10. Payment** | All invoices must be sent, quoting a valid purchase order number (PO Number), to:<br>[redacted]<br><br>Within [**10**] Working Days of receipt of your countersigned copy of this letter, we will send you a unique PO Number. You must be in receipt of a valid PO Number before submitting an invoice.<br><br>To avoid delay in payment it is important that the invoice is compliant and that it includes a valid PO Number, PO Number item number (if applicable) and the details (name and telephone number) of your Buyer contact (i.e. Contract Manager). Non-compliant invoices will be sent back to you, which may lead to a delay in payment. | |

| | |
|---|---|
| **11. Buyer Authorised Representative(s)** | For general liaison your contact will continue to be<br><br>[redacted] |
| **12. Address for notices** | **Buyer:**<br><br>FSA Commercial<br>Foss House<br>Peasholme Green<br>York<br>YO1 7PR<br><br>**Supplier:**<br>LGC Limited<br>Queens Road<br>Teddington<br>TW11 0LY |
| **13. Key Personnel** | See **Annex 3 – Technical Proposal** |
| **14. Procedures and Policies** | The Buyer may require the Supplier to ensure that any person employed in the delivery of the Deliverables has undertaken a Disclosure and Barring Service check.<br>The Supplier shall ensure that no person who discloses that he/she has a conviction that is relevant to the nature of the Contract, relevant to the work of the Buyer, or is of a type otherwise advised by the Buyer (each such conviction a "**Relevant Conviction**"), or is found by the Supplier to have a Relevant Conviction (whether as a result of a police check, a Disclosure and Barring Service check or otherwise) is employed or engaged in the provision of any part of the Deliverables. |

| Signed for and on behalf of the **Supplier** | Signed for and on behalf of the **Buyer** |
| --- | --- |
| [redacted] | |

# Annex 1 – Authorised Processing Template

| **Contract:** | **FS900293 Review of methods for the analysis of culinary herbs and spices for authenticity** |
|---|---|
| **Date:** | 12 December 2022 |
| **Description Of Authorised Processing** | **Details** |
| Subject matter of the processing | *Review of methods for the analysis of culinary herbs and spices for authenticity* |
| Duration of the processing | *Per dates of contract* |
| Nature and purposes of the processing | *LGC will use Stakeholder contact data arising from the professional networks of those delivering the project. Stakeholder's data will only be used and stored with their consent, and they have the right to withdraw this consent at any time.*<br><br>*Data will be stored electronically in accordance with LGC's Information Security Management and Data Processing policies (copies of which can were provided to the FSA as appendices to the tender for this contract).* |
| Type of Personal Data | *Stakeholder names, email addresses, and telephone numbers* |
| Categories of Data Subject | *Stakeholder contact details.*<br>*Low risk.*<br>*No special category data involved.* |

# Annex 2 SpecificationTHE SPECIFICATION, INCLUDING

## PROJECT TIMETABLE

## AND EVALUATION OF TENDERS

## GENERAL INTRODUCTION

The Food Standards Agency is an independent Government department working across England, Wales and Northern Ireland to protect public health and consumers wider interest in food. We make sure food is safe and what it says it is.

The Agency is committed to openness, transparency and equality of treatment to all suppliers. As well as these principles, for science projects the final project report will be published on the Food Standards Agency website (www.food.gov.uk ). For science projects we will encourage contractors to publish their work in peer reviewed scientific publications wherever possible. Also, in line with the Government's Transparency Agenda which aims to encourage more open access to data held by government, the Agency is developing a policy on the release of underpinning data from all of its science- and evidence-gathering projects. Data should be made freely available in an accessible format, as fully and as promptly as possible. Consideration should be given to data management as new contracts are being negotiated. Resource implications for this should be taken into account. The mechanism for publishing underpinning data should allow the widest opportunity for to enable its re-use. Where possible, underpinning data should be included in the final project report. Where data are included in the final report in pdf format, they should also be published separately in a format that can be used for further analysis. Large data sets can be provided separately in an annex to the report, and published, where possible, alongside the final report online Where it is more appropriate to publish underpinning data in an existing database, archive, repository or other community resource, or for data to be saved in a specialist proprietary format, information will be provided on how the data can be accessed. There will be some circumstances where release of data may need to be restricted or anonymised for reasons of commercial and/or personal sensitivities.

The FSA strategy sets out our vision to ensure that the UK food system is safe, and that food is what it says it is. This involves building our scientific capability through conducting research and development for analytical methods and undertaking knowledge transfer with UK laboratories, to ensure that we have a resilient laboratory network to test food consistently. Conventional microscopy methods used by UK Public Analyst (PA) Official Laboratories (OLs) are known to be laborious, require significant operator training and experience and may not be suitable for the detection of certain adulterants. FSA aims to ensure that PA OLs are adequately prepared with the most effective technology and methods to test herb and spice composition and detect adulteration. This helps to ensure best practise and to verify food labelling, protecting consumers from fraud and improving trust in our food supply chain.

To support this, the FSA is carrying out a procurement exercise to contract a supplier to engage with stakeholders and provide an up-to-date literature review of current and emerging technologies and analytical methods that could be used by OLs to test the composition of various herbs and spices, and to detect, identify and quantify adulterants.

## A. THE SPECIFICATION

### Background

The supply chain for dried culinary herbs and spices can often be long, complex, and globalised, made up of various unique supply chains. There are many stages throughout these supply chains, where the product is transferred between different operators for processes such as drying, cleaning, packaging, shipping, distribution etc., where there is potential for fraudulent manipulation. The industry is highly valuable and competitive, factors which make it more vulnerable to fraud. A recent European report stated that more than 300,000 tonnes of herbs and spices are imported into Europe every year and that there may be herbs and spices on the market that are adulterated but remain undetected[1].

As well as having financial implications to industry and society, food fraud also has implications for consumer confidence in food supply chains and has the potential to impact food quality and even public health[2]. It has also been recently reported that the industry is being increasingly targeted by organised crime gangs as a result of the impact of EU Transition, the global Covid-19 pandemic and the war in Ukraine[3].

The supply chain for herbs and spices can be affected by both addition and substitution adulteration. Adulterants may be non-declared extraneous matter, inorganic fillers or dyes. While the UK does not have its own standards for herbs and spices, the British Retail Consortium, Food and Drink Federation and the Seasoning and Spice Association has published guidance on authenticity issues. It is recognised that a certain level of extraneous and foreign matter is inevitable due to conditions in the field but recommends the European Spice Association's Quality Minima Documents maximum level of extraneous matter at 1% for spices and 2% for herbs[4]. Codex and ISO have also published standards on certain herbs and spices.

Some herb and spice companies have established good manufacturing practise including internal quality control, audit and assurance processes to ensure the appropriate composition and authenticity of their products; however, practises can vary between companies, and some could be more vulnerable.

In 2021, the Joint Research Council (JRC) published a report detailing the results of

[1] JRC Publications Repository - Results of an EU wide coordinated control plan to establish the prevalence of fraudulent practices in the marketing of herbs and spices (europa.eu)
[2] National Food Crime Unit | Food Standards Agency
[3] Criminals leave a bitter taste for UK cooks by targeting £17bn herbs and spices market with fakes (bia-analytical.com)
[4] Guidance-herbsandspices.pdf (fdf.org.uk)

1885 samples which were analysed to establish the prevalence of adulteration within the herbs and spices industry. The study included herbs and spices reported to be the most frequently targeted - cumin, turmeric, oregano, paprika/chilli, pepper, and saffron. 17% of samples analysed were found to be suspicious (defined as not consistent with ISO standards), with oregano being most commonly suspected of adulteration (48% of samples), with the presence of olive leaves detected in most cases. Other adulterants detected within the products sampled included endogenous and exogenous materials and ranged from non-declared plant material to non-authorised dyes. A variety of methods of analysis were used including high performance liquid chromatography coupled to high resolution mass spectrometry (HPLC-HRMS), real-time PCR (rtPCR), digital droplet PCR (ddPCR), next generation sequencing (NGS), energy dispersive-X-ray fluorescence (ED-XRF), Fourier transform infrared spectroscopy (FTIR) and thermogravimetric analysis (TGA), demonstrating the variety of methods available for use in this area[5].

Sampling surveys conducted by FSA have also detected non-declared plant matter, such as same-plant extraneous matter, foreign extraneous matter, or foreign, mineral-like material in oregano, sage, thyme, mixed herb and spice mix samples analysed by microscopy. However due to the labour intensity of the method only small numbers of samples can be analysed at a time at OLs. Visual inspection and conventional microscopy is the most commonly used method for the compositional analysis of herbs and spices in OLs, which currently limits sampling programmes and enforcement for herb and spice authenticity.

**The Specification**

Tenders are invited to review and assess current and emerging targeted and non-targeted analytical methods for the testing a range of herbs and spices in relation to composition and authenticity. To make recommendations of the most suitable methods which can be rolled out and validated within OLs and how they might be used in screening and confirmatory analysis, as well as recommendations for future work on emerging methods identified as suitable for the testing of herbs and spices.

This will require a literature review, engagement with various stakeholders and a scoping exercise, and will be split into 3 work packages. These are detailed as follows.

**WP 1 Objective:** Undertake a review of current and emerging methods for the analysis of herbs and spices, comparing and contrasting methods.

- Engage with the UK herb and spice industry, food businesses, local authorities, and Government (FSA, Defra) to identify needs in relation to the sampling and testing of herbs and spices:
    - What are the main herbs and spices of interest when it comes to authenticity, based on popularity/import/value/adulteration risk

[5] JRC Publications Repository - Results of an EU wide coordinated control plan to establish the prevalence of fraudulent practices in the marketing of herbs and spices (europa.eu)

    - What are the current standards and regulations in relation to herb and spice composition and labelling
    - What are the current practises/methods used in industry
    - What are the current issues/gaps
- Review literature (academic publications, kit manufacturer commercial documents, conference reports, ISO/CEN standardisation activity, BSI, Codex, etc.) for current and emerging targeted and non-targeted analytical methods for the detection, identification and quantification of the identified herbs and spices of interest and their potential adulterants.
- Engage with testing providers (including industry stakeholders) and instrument manufacturers to identify available and emerging technologies and methods that have potential for application in this area.
- Compare key characteristics – sample matrices, sensitivity and selectivity, validation status, costs (for set up, accreditation and maintenance of testing), transferability (including training, ease of use), availability of reference materials and proficiency testing, limitations.
- Discuss the practicability of testing herbs and spices in laboratories where method of analysis requires the use of a reference database.
- Present the methods of analysis, their key characteristics, and other aspects as reviewed, in a summary table.
- Discuss how different targeted and non-targeted methods might be used as part of a screening process to verify evidence of adulteration.

Deliverable: A draft interim report (1) consisting of a stakeholder engagement, literature review, and a summary table of new and existing methods for herbs and spices analysis will be submitted to the FSA.

At this point the contractor is expected to present back to FSA and Defra colleagues and agree on methods to take forward into further work.

**WP 2 Objective:** Carry out a desktop scoping exercise on the transferability of methods selected from WP1 into OLs.

- Engage with PAs and OLs on their current capability for the analysis of the identified herbs and spices and their adulterants, existing technology that could be adapted to testing these, and the potential for transferring newer technologies/methods into their laboratories.
- Scope out suitability for transferring the methods identified in the literature review to individual OLs.
- Identify any practical barriers or limitations to the application of the methods (to include costs) and how these could be mitigated.
- Suggest practical solutions for transferring methods that use reference databases.

- Make any further comparisons between the different methods assessed, where used for analysis of the same herbs and spices.

Deliverable: A draft interim report (2) detailing assessment of suitability of transferring methods into OLs and comparing their performance, limitations, and transferability will be submitted to the FSA.

**WP 3 Objective:** Make recommendations for future work in this area

- Make evidence-based recommendations on the most-suitable methods for testing of herbs and spices for enforcement purposes, based on the literature review and scoping exercise.
- Make recommendations on how to roll out and validate the recommended methods within OLs.
- Make further recommendations for the research and development of any current or emerging methods identified as suitable for the testing of herbs and spices.

Deliverable: A final project report incorporating interim reports (1) and (2) with recommendations for future work (WP3) will be submitted to the FSA.

**Deliverables**

**WP1:** A draft interim report (1) consisting of a stakeholder engagement, literature review, and a summary table of new and existing methods for herbs and spices analysis.

**WP2:** A draft interim report (2) detailing assessment of suitability of transferring methods into OLs and comparing their performance, limitations, and transferability.

**WP3:** A final project report incorporating interim reports (1) and (2) with recommendations for future work.

Usually reports require at least one round of substantive comments by FSA officials (and any other parties involved in the project as appropriate) and a final round to finalise minor outstanding comments. Unless otherwise agreed, the project manager will co-ordinate comments and provide them to the contractor and all responses will be recorded. The final report will be subject to external peer review, following which further amendments may be required. Contractors should agree the timetable for reporting and publication with the project officer but should note that FSA normally expect two weeks to provide a co-ordinated response per round of substantive comments. Please confirm in your proposal how you will meet FSA's requirements for reporting.

This project is expected to be completed over **4 months**. There may be opportunity to split the work packages into two separate phases (WP1, later followed by WPs 2 & 3). If this is proposed, then timeframes and costs should be discussed with FSA at the earliest convenience and outlined in the tender.

### Format

All reports must be formatted in line with FSA accessibility guidelines – the most up to date version of which should be checked prior to writing the report. They must be submitted in Microsoft Word format. These requirements additionally include (but are not limited to):

- Use a sans serif font (for example Arial, Helvetica), with a minimum font size of 12 points
- Use left aligned text, not justified
- Avoid chunks of italicised or capitalised text
- Only use underlines to indicate links
- Use standard bullets for lists
- Use styles and headings to structure your content, and ensure these are in the right order (for example, in Microsoft Word, heading 1 followed by heading 2)
- Ensure that all tables are simple (no split/merged cells) and have column and row headers

### Ethics

Tenderers are asked to identify the ethical concerns for this project and how these issues would be addressed.

### Risk

The tenderer should provide details of any relevant perceived risks in undertaking this project, as delays to business or personnel needs to mitigated.

### Quality

Quality management considerations and details on measures which will be taken to ensure quality of work should be given. The tenderer should consider how the Joint code of practice for research (JCoPR) applies to the project and how these standards will be met.

### Data protection

The tenderer should outline whether they anticipate any Personal Data will be collected as part of the project. If so, they should include a description of how their tender will comply with the General Data Protection Regulation (GDPR), recognising the

commissioning authority's role as the 'data controller' and the contractor's role as the 'data processor'. Handling published research may require you to comply with copy right. A Privacy Impact Assessment (PIA), and a privacy notice may be required, which will be reviewed by the FSA data security team.

**Data security**

Please confirm in your tender that you have in place, or that you will have in place by contract award, the human and technical resources to perform the contract to ensure compliance with the GDPR and to ensure the protection of the rights of data subjects.

Please provide details of the technical facilities and measures (including systems and processes) you have in place, or will have in place by contract award, to ensure compliance with the GDPR and to ensure the protection of the rights of data subjects. Your response should include, but should not be limited to facilities and measures:

- to ensure ongoing confidentiality, integrity, availability and resilience of processing systems and services;
- to comply with the rights of data subjects in respect of receiving privacy information, and access, rectification, deletion and portability of personal data;
- to ensure that any consent-based processing meets standards of active, informed consent, and that such consents are recorded and auditable;
- to ensure legal safeguards are in place to legitimise transfers of personal data outside the EU (if such transfers will take place);
- to maintain records of personal data processing activities; and
- to regularly test, assess and evaluate the effectiveness of the above measures.

**Dissemination**

The outcome of the work will be disseminated via the FSA website (www.food.gov.uk).

The tenderer should also outline any further planned methods of dissemination within their proposal. The Agency is committed to openness and transparency. As well as the final project report being published on the Food Standards Agency website, we encourage contractors to publish their work in open access peer-review journals wherever possible. If this is the intention of the tenderer, then any costs associated with this should be detailed in the proposal.

**Cost**

The proposal must identify all anticipated costs of conducting the work, providing a cost breakdown of staff involvement and days dedicated to the project for each staff member, and all other associated overheads and expenses.

The tenderer should provide the costings that they believe are reasonable to meet the

requirements outlined in this specification. The tenderer should be aware that all proposals will be evaluated against key criteria ‘value for money’, delivering the work outlined in the specification at a competitive price. This has been estimated to fall between £50-60k.

Costs should be provided exclusive of VAT and should clearly state whether VAT will be charged.

Payments will be made against key milestones and a 20% retention will be held against delivery of the final report. A proposed payment schedule is required, please use the template provided.

# Annex 3 – Technical

# Proposal

## Tender Application form for a project with the Food Standards Agency

- Applicants should complete each part of this application as fully and as clearly as possible
- Brief instructions are given in the grey boxes at the start of each section.
- Please submit the application through the Agency's eSourcing Portal (Bravo) by the deadline set in the invitation to tender document.

**LEAD APPLICANT'S DETAILS**

[redacted]

| Is your organisation is a **small and medium enterprise**. (EU recommendation 2003/361/EC refers http://www.hmrc.gov.uk/manuals/cirdmanual/cird92800.htm ) | | | No | x |
|---|---|---|---|---|

**TENDER SUMMARY**

**TENDER TITLE**

*Review of methods for the analysis of culinary herbs and spices for authenticity*

| **TENDER REFERENCE** | **FS900293** | | |
|---|---|---|---|
| **PROPOSED START** | December 2022 | **PROPOSED END** | March 2023 |

**1: TENDER SUMMARY AND OBJECTIVES**

**A. TENDER SUMMARY**

Please give a brief summary of the proposed work in no more than 400 words.

Herbs and spices are a commodity group that consistently appear in the top ten commodities most reported as being adulterated because of complex international supply chains, which make them vulnerable to food fraud. In addition, herbs and spices are often blended and processed to produce consistent retail products, which can influence the analytical test methods used to verify authenticity.

LGC and Queens University Belfast are collaborating to deliver this project. The organisations have a well-established working partnership through the Centre for Excellence in Agriculture and Food Integrity, and the

partnership provides an excellent combination of directly relevant skills and experience, which will be used to deliver this project by:

1. Undertaking a review of current and emerging methods for the analysis of herbs and spices. This will include comparing and contrasting methods by establishing stakeholder needs, conducting a thorough review of the literature, producing a summary of the relevant key characteristics of the identified methods, discussing the practicability of testing herbs and spices where the method requires the use of a reference database and how different targeted and non-targeted methods might be used as part of a screening process, and documenting the availability of reference materials and PT schemes.
2. Carrying out a desktop scoping exercise on the transferability of methods selected to UK PA OLs by arranging virtual meetings with all nine OLs covering the four nations of the UK (plus the Isle of Man) to understand their current capability for analysis of herbs and spices and their adulterants of importance. This information will be used to produce a capability map against the methods from the literature review. The suitability for transferring these to individual PA OLs will scoped out including barriers or limitations to their application and how these could be mitigated, practical solutions for transferring methods that use reference databases, and any further comparisons between the different methods assessed.
3. Making recommendations for future work on methods for testing of herb and spice authenticity including evidence-based recommendations on the most suitable methods for enforcement purposes, recommendations on how to roll out and validate these methods within OLs, and further recommendations for the research and development of any current or emerging methods.

## B. OBJECTIVES AND RELEVANCE OF THE PROPOSED WORK TO THE FSA TENDER REQUIREMENT

### OBJECTIVES

Please detail how your proposed work can assist the agency in meeting it stated objectives and policy needs.. Please number the objectives and add a short description. Please add more lines as necessary.

| OBJECTIVE NUMBER | OBJECTIVE DESCRIPTION |
|---|---|
| 1 | Undertake a review of current and emerging methods for the analysis of herbs and spices, comparing and contrasting methods. |
| 2 | Carry out a desktop scoping exercise on the transferability of methods selected from objective 1 into UK Public Analyst Official Laboratories. |
| 3 | Make recommendations for future work related to the analysis of culinary herbs and spices for authenticity. |

## 2: DESCRIPTION OF APPROACH/SCOPE OF WORK

## A. APPROACH/SCOPE OF WORK

Please describe how you will meet our specification and summarise how you will deliver your solution. You must explain the approach for the proposed work. Describe and justify the approach, methodology and study design, where applicable, that will be used to address the specific requirements and realise the objectives outlined above. Where relevant (e.g. for an analytical survey), please also provide details of the sampling plan.

Spices, seasonings, and herbs are all products that are generally added to both fresh and processed food to enhance flavour. The trade in spices can be traced back to as early as 3000 BC and can be considered as one of the earliest drivers of globalisation. More recently, the global spices and herbs market for 2022 has been estimated at USD 79.1 billion and is expected to grow to USD 126 billion by the end of 2023[6].

Herbs and spices are a commodity group that consistently appear in the top ten commodities most commonly reported as being adulterated[7]. Reasons for this include supply chain for herbs and spices can be long, global and complex, and can pass through many countries. The stages of the supply chain can include grower, collector, primary processor, local traders, secondary processor, exporter, importer, trader, processor / packager, food manufacturer / retailer / wholesaler, and finally the consumer; at any stage of this supply chain, a number of fraud opportunities can occur including misrepresentation, adulteration and substitution[8]. The main motivation for the addition to, or substitution of the authentic product is for economic reasons, however, three of the four largest recent food fraud incidents also had food safety effects as illustrated in Figure 1.

[6] Spices and herbs: global market size forecast | Statista
[7] Foods most reported as fraudulent - FoodAuthenticity
[8] Authenticity of Herbs and Spices | The Food & Drink Federation (fdf.org.uk)

**Figure 1: Link between food fraud and food safety**


The discovery of the illegal Sudan I in chilli powder in 2003 and the 2015 incident of allergens in spices are two high profile food fraud incidents in spices that had food safety concerns. Thus, food fraud must not be seen as "just a consumer choice" or an economic issue but one that can be linked to the food safety.

The current UK legislation relating to herbs and spices is the retained General Food Law Regulation EC 178/2002, which prescribes the general principles and requirements of food law and lays down procedures in matters of food safety. With regard to the consumer's interest, the General Food law aims to prevent, "fraudulent or deceptive practices, the adulteration of food, and any other practices which may mislead the consumer." In addition, the Seasoning and Spice Association and the European Spice Association are trade bodies that are actively involved in protection of the herb and spice industry.

In addition to the complexities caused by global supply chains, herbs and spices are often blended and processed to produce consistent retail products, which makes tracing the origin of herbs and spices to source, difficult. Commercial processing conditions can also affect samples and have an effect on the analytical test methods used to verify the authenticity of herbs and spices.

Unlike analytical test methods for food safety components, where testing is performed to check compliance against a legislative limit or some other recommendation such as maximum residue limits, food authenticity methods compare unknown samples against a reference set of 'authentic' samples. The challenge of obtaining traceable, internationally accepted reference samples for comparison remains one of the biggest challenges for food authenticity testing methods and is a barrier to the universal application / standardisation of methods. The pros and cons of methods commonly used to authenticate herbs and spices is documented in the Spices Chapter[9] of the FoodIntegrity Handbook authored by staff at QUB, which concluded that there is an increasing need for screening techniques that can detect economically adulterated adulteration, over a range of products, in the growing herb and spice industry.

The utility of Next Generation Sequencing (NGS) in accurate and sensitive determination of important plant and animal species (including herbs and spices and endangered CITES species) in mixed and complex food matrices has been clearly demonstrated in collaborative trials and is well understood, as demonstrated by some pioneering work in this area which LGC contributed towards[10]. However, although Next Generation Sequencing (NGS) is an informative and powerful technique, its limitations currently for quantitative application to food authenticity is now broadly accepted[11,12]. The European Spice Association (ESA) white paper quotes "Reference methods like classical microscopy or validated non-targeted chemical/physical methods (using NMR, NIR/MIR spectroscopy, mass spectroscopy,) or a combination of them should be used as primary analyses to prove herb and spice authenticity."

A review by LGC, first published in 2013 in the Journal of the Association of Public Analysts[13], provided an overview of the state-of-the-art the science and methods which were being used for authenticity testing in herbal medicinal products. Approaches for identifying herbal species included phenotypic characterisation by eye and microscopy, characterisation of chemical profiles, and successful analysis using DNA approaches (PCR and sequencing). The paper described some of the scope and limitations of the approaches being used, as well as the dependency upon appropriate reference materials and databases. Whilst a lot of these findings still remain valid, the work conducted in this review needs to be updated in line with current technologies, methods and best measurement practice guidance advice that have evolved since 2013.

[9] 11_Spices.pdf
[10] Arulandhu AJ, Staats M, Hagelaar R, Voorhuijzen MM, Prins TW, Scholtens I, Costessi A, Duijsings D, Rechenmann F, Gaspar FB, Barreto Crespo MT, Holst-Jensen A, Birck M, Burns M, Haynes E, Hochegger R, Klingl A, Lundberg L, Natale C, Niekamp H, Perri E, Barbante A, Rosec JP, Seyfarth R, Sovová T, Van Moorleghem C, van Ruth S, Peelen T, Kok E., (2017) "Development and validation of a multi-locus DNA metabarcoding method to identify endangered species in complex samples" GigaScience, 6, 2017: 1-18. DOI: 10.1093/gigascience/gix080
[11] ESA White Paper on NGS
[12] Guidance Note on Next Generation Sequencing
[13] Alice Gutteridge and Malcolm Burns (2013) "The Application of DNA Molecular Approaches for the Identification of Herbal Medicinal Products" Journal of the Association of Public Analysts (Online) 2013 (41) 53-66 http://www.apajournal.org.uk./html/japa_vol_41_pg_53-66.html

LGC is well aware of the challenges of verifying the authenticity of herbs and spices and was involved in the UK response to the 2015 allergens in spices issue; under the statutory referee function, the Government Chemist (GC), was asked by the Food Standards Agency to verify the authenticity of two spices and determine the presence of food allergens. The GC had to develop pioneering DNA methods for the determination of mahaleb in cumin[14,15,16] and a three-pronged analytical approach (ELISA, Mass Spectrometry and DNA methods) was required to resolve these complex cases. The GC has since published papers, run a workshop and prepared work instructions to disseminate practical information from this case to laboratory stakeholders.

In the FSA's 5th Chief Scientific Advisers report, dedicated to food allergy and intolerance, the Chief Scientific Adviser provided comment on the above work conducted at LGC, remarking on some of the deficits in current protein based approaches, the utility of DNA based approaches, and the importance of having a cross disciplinary approach for confirmation of important herbs/spices species[17].

QUB developed a rapid method based on FTIR and chemometrics to determine oregano authenticity[18]. WHICH? consumer magazine commissioned QUB in 2015 to survey the Herb and Spice sector in the UK and Ireland to indicate the level of oregano adulteration that was taking place. The survey revealed that 25 % of products were adulterated at levels ranging from 30-70 % with the main adulterants found to be olive leaves and myrtle leaves. More recently the Joint Research Council (JRC) in November 2021 published a report detailing the results of analysis to establish the prevalence of adulteration within the herbs and spices industry[19]. The study found that many herbs and spices were adulterated with oregano being the herb that was found to be most adulterated (48% of samples), with the presence of olive leaves detected in most cases. Therefore in the six years from 2015-2021, the adulteration of oregano has not decreased even though testing has become more sophisticated and rapid[20].

The LGC-QUB partnership provides an excellent combination of directly relevant skills and experience from the analysis of herbs and spices, knowledge and contact with the industry and close working knowledge of the Public Analyst (PA) Official Laboratories (OLs), which will be brought to bear to successfully deliver this project.

This will be achieved by delivering the required Work Packages in the following manner:

4. **Work Package 1: Undertaking a review of current and emerging methods for the analysis of herbs and spices, comparing and contrasting methods by**:
    a. Establishing needs via five stakeholder category based virtual focus groups
    b. Conducting a thorough review of the literature (both academic and grey) to identify for current and emerging targeted and non-targeted analytical methods for the detection, identification and quantification of herbs and spices and their potential adulterants.
    c. Collect broader stakeholder views on methods (available, emerging and currently being used) for identification and quantification of herbs and spices via an e-Survey on the Food Authenticity Network.
    d. Using the output of the literature review and the stakeholder engagement focus groups a summary table will be produced that compares the relevant key characteristics of the identified methods that are representative of the technologies most commonly used.
    e. Based on the output of the literature review, the stakeholder engagement focus groups and the summary table of methods, the practicability of testing herbs and spices in laboratories where method of analysis requires the use of a reference database and how different targeted and non-targeted methods might be used as part of a screening process to verify evidence of adulteration will be discussed.
    f. The availability of reference materials and proficiency testing schemes for herb and spice authenticity will be also be documented.
    g. A draft interim report (1) detailing the work conducted in Work Package 1 will be submitted to the FSA.
5. **Work Package 2: Carry out a desktop scoping exercise on the transferability of methods selected from Work Package 1 into UK PA OLs by:**

[14] Cumin analysis: DNA test for mahaleb developed - GOV.UK (www.gov.uk)
[15] Development of a Real-Time PCR Approach for the Specific Detection of *Prunus mahaleb DOI: 10.4236/fns.2016.78071*
[16] Novel Approach to the Rapid Differentiation of Common Prunus Allergen Species by PCR Product Melt Analysis DOI: 10.4236/fns.2016.710091
[17] Chief Scientific Adviser's Science Report – Issue five: Food allergy and intolerance. https://www.food.gov.uk/sites/default/files/media/document/fifth-csa-report-allergy%20%281%29.pdf
[18] A comprehensive strategy to detect the fraudulent adulteration of herbs: The oregano approach Black, C., Haughey, S. A., Chevallier, O. P., Galvin-King, P. & Elliott, C. T. Food Chemistry, 2016, 210, 551-557
[19] JRC Publications Repository - Results of an EU wide coordinated control plan to establish the prevalence of fraudulent practices in the marketing of herbs and spices (europa.eu)
[20] Development of a comprehensive analytical platform for the detection and quantitation of food fraud using a biomarker approach. The oregano adulteration case study, Ewa Wielogorska, Olivier Chevallier, Connor Black, Pamela Galvin-King, Marc Delêtre, Colin T. Kelleher, Simon A. Haughey, Christopher T. Elliott, Food Chemistry, 239, 2018, 32-39

a. Arranging virtual meetings with all nine PA OLs covering the four nations of the UK plus the Isle of Man Government Laboratory to gain an understanding of their current capability for the analysis of herbs and spices and their adulterants of importance to the UK market.
b. Using the information obtained a capability map across the PA OLs, for the methods identified in the literature review, will be prepared.
c. Drawing on the outputs of WPs 1 and 2, the Project Team will:
    i. Scope out the suitability for transferring the methods identified in the literature review to individual PA OLs.
    ii. Identify any practical barriers or limitations to the application of the methods (to include costs) and how these could be mitigated.
    iii. Suggest practical solutions for transferring methods that use reference databases.
    iv. Make any further comparisons between the different methods assessed, where used for analysis of the same herbs and spices.
d. A draft interim report (2) detailing assessment of suitability of transferring methods into PA OLs and comparing their performance, limitations, and transferability will be submitted to the FSA.

6. **Work Package 3: Make recommendations for future work on methods for testing of herb and spice authenticity.**

Combining interim reports (1) and (2), a final project report will be submitted to the FSA, which will include:

a. Evidence-based recommendations on the most-suitable methods for testing of herbs and spices for enforcement purposes, based on the literature review and scoping exercise.
b. Recommendations on how to roll out and validate the recommended methods within PA OLs.
c. Further recommendations for the research and development of any current or emerging methods identified as suitable for the testing of herbs and spices.

**B. INNOVATION**

Please provide details of any aspect of the proposed work which are considered innovative in design and/or application? E.g. Introduction of new or significant improved products, services, methods, processes, markets and forms of organization.

LGC and QUB have a well established working partnership through the Centre for Excellence in Agriculture and Food Integrity, which is a strategic partnership to enhance and future-proof the UK agrifood industry through the development and application of innovative scientific-measurement solutions and digital technologies for greater assurance of the sustainability, reliability, safety and productivity of inherent supply chains that was launched in May 2022. This partnership provides an innovative approach to delivering this project as, collectively, the Project Team has excellent working relationships with the herb and spice food industry, central government food authorities and Local Authorities and their PA OLs.

Based on a number of recent Defra and FSA funded research projects[21,22], LGC has led on the novel application of multispectral imaging techniques for food authenticity testing, inclusive of herbs and spices. Multispectral Imaging (MSI) uses the simultaneous measurement of reflected light across a broad range of wavelengths, and an order of spatial magnitude, to allow fast and accurate determination of surface colour, texture and in some cases, chemical composition of ingredients. The work includes the successful application of multispectral imaging for the authenticity and adulteration of important herbs and spices inclusive of oregano, myrtle, olive leaves, mahleb. paprika and cumin.

LGC has recently completed a project[23] titled 'Assessment of Point of Contact (POC) Testing Technologies to Verify Food Authenticity' (Defra Project code FA0178), which assessed the fitness for purpose of food authenticity testing deployed via POC instrumentation, with a focus on new and emerging techniques in the areas of chemical, imaging/colorimetric and –omics technologies. The project found that high priority food applications mostly featured meat/fish speciation, and herbs & spices testing, whilst the most common technologies included NIR, FT-IR, Spectral Imaging, Raman spectroscopy; MS; NMR; and nucleic acid approaches (PCR and NGS). The project also noted that the efficacy of all analytical technologies is dependent upon the availability of appropriate reference materials and databases, with POC instrumentation was no exception.

The learnings from these projects will be used in the delivery of this project.

With the importance of reference materials in mind, LGC has, using its established relationship with Royal Botanical Gardens (RBG) Kew, gained their agreement to participate in this project in an advisory capacity. In addition, QUB has a long history of using reference herb and spice samples from the American Herbal Pharmacopeia and from Chromadex and have found them to be dependable. The verification methods used for herbs and spices by these reference material owners / producers will be assessed, and the information will be used in the delivery of this project.

The LGC-QUB partnership will exploit its contacts and use its highly relevant knowledge and experience to develop and recommend a framework for the upskilling of UK PA OLs to ensure that they have the capability to effectively analyse samples of herbs and spices for authenticity.

## 3: THE PROJECT PLAN AND DELIVERABLES

### A. THE PLAN

Please provide a detailed project plan including, the tasks and sub-tasks required to realise the objectives (detailed in Part 1). The tasks should be numbered in the same way as the objectives and should be clearly linked to each of the objectives. Please also attach a flow chart illustrating the proposed plan.

**Indicative start date (T0) = 9 December 2022**

**Objective/Task: 1 - Project inception meeting (Kick-off meeting)**
**Start date: T0 (5 December 2022) + 3 days** **End date: T0 + 5 days**

A virtual project kick-off meeting will be held with FSA, LGC and QUB to discuss and agree specific details associated with the project plan and delivery such as literature review search parameters and organisations to invite to stakeholder focus groups etc.

**Objective/Task: 2 – Work Package 1 - Undertake a review of current and emerging methods for the analysis of herbs and spices, comparing and contrasting methods**
**Start date: T0 + 7 days** **End date: T0 + 8 weeks**

There are five sub-tasks associated with this WP.

[21] FSA project SEP-EOI-05 – Application of multispectral imaging (MSI) to food and feed sampling and analysis https://www.food.gov.uk/sites/default/files/media/document/fs301017finrep.pdf
[22] FSA/Defra project (FS301017) – Validation of MSI technology for food and feed analysis https://www.food.gov.uk/sites/default/files/media/document/validation-of-multispectral-imaging-msi-technology-for-food-and-feed-analysis_0.pdf
[23] 'Assessment of Point of Contact (POC) Testing Technologies to Verify Food Authenticity' (Defra Project code FA0178), which should be published by the end of 2022

**Sub-task 1: Stakeholder engagement to establish needs**

The Project Team has close working relationships with the UK herb and spice industry, food businesses, local authorities, and Government (FSA, Defra & FSS) and will engage with them via organised, category based, stakeholder focus groups to establish the needs in relation to the sampling and testing of herbs and spices. A topic guide of questions will be prepared, in conjunction with the FSA, for use at the focus groups and it is anticipated that it will include but not be limited to those shown below. This approach was used successfully to interview 22 stakeholders for a recent Defra project on food fraud that was led by LGC (report pending publication) and used by the lead applicant to conduct four category based stakeholder focus groups, with forty attendees, for a Review of the National food Crime Unit (report submitted and a paper will be discussed at the December FSA Board meeting[24]).

**Example questions:**

- What are the main herbs and spices of interest when it comes to authenticity, based on popularity / import / value / adulteration risk?
- What are the current standards and regulations in relation to herb and spice composition and labelling?
- What are the current practices / methods used in industry to verify authenticity?
- What are the current issues / gaps that need to be addressed?

Virtual focus groups will be held for the following stakeholder categories (examples of stakeholder organisations to be invited are provided):

1. **Industry**
   - o [redacted]
   - [redacted]
   - [redacted]
   - [redacted]
   - [redacted]
   - [redacted]
   - [redacted]
   - [redacted]
   - [redacted]
   - [redacted]
3. **Central government / NDPB**
   - o Defra
   - o FSA (England, Wales and Northern Ireland)
   - o FSS
   - o The National Food Crime Unit
   - o The Scottish Food Crime and Incidents Unit
   - o **Royal Botanic Gardens (RBG) Kew**
4. **Instrument manufacturers**
   - o **Agilent**
   - o **Thermo**
   - o Waters
   - o **Videometer multispectral imaging**
   - o **Oxford Nanopore Technologies**
   - o Other relevant manufacturers
5. **Testing providers**

Testing laboratories that are known to the Project Team to be offering herb and spice authenticity services include Eurofins, Intertek, SGS, Food Forensics, Bia Analytical, Campden BRI etc. Representatives from these organisations will be invited to participate in this focus group.

In addition, the lead contacts at the Food Authenticity Centres of Expertise, all well known to LGC who operate the Food Authenticity Network (FAN), will also be invited to attend.

Invitations will be sent to individuals personally known to the Project Team. Stakeholders in **bold** have already been contacted and have agreed to participate in the project. Where a personal contact cannot attend, an alternate person will be sought through personal contacts or the relevant trade association / professional body. By

[24] FSA Board Meeting 2022 | FSA Board Meeting 2022 (glasgows.co.uk)

pre-contacting stakeholders, the Project Team will ensure the relevant people will be available within the project timeframe and are engaged with supporting the project.

**Sub-task 2: Literature Review**

Building on the landscape review that was conducted for the Defra POC project[18], QUB will conduct a thorough review of the literature, based on their expertise in conducting qualitative academic research and testing herbs and spices for their authenticity, for current and emerging targeted and non-targeted analytical methods for the detection, identification and quantification of herbs and spices and their potential adulterants. A time period of 2015-2022 will be used, as this represents a growing interest in, and publications about this topic.

The plan will be to focus on identifying literature containing empirical evidence of what works in practice rather than on conceptual models or frameworks that have yet to be evaluated. The key steps include:

- Electronic searches of the academic literature, including case studies, will be conducted using the following databases: Scopus, Web of Science and PubMed.
- A search, using search engines such as Google or Bing or Yahoo, supplemented by scholar.google.co.uk, to identify relevant professional, industry and governmental literature, including reports and Blogs, to include kit manufacturer commercial documents, conference reports, ISO/CEN standardisation activity, BSI, Codex, etc. The scope will be global in terms of English language publications.

The findings of the literature review will be stored in an Excel database giving the details, key findings/conclusions and methods used for each document reviewed. The literature review will be validated by peer review within QUB; the initial data collection by the Research Assistant will be checked for completeness by the investigators at QUB. With external stakeholders, we can evaluate the robustness of the findings from the literature review by including key findings in the interview topic guides and cross-check the findings from both (Objective 2, Sub-tasks 1 and 3).

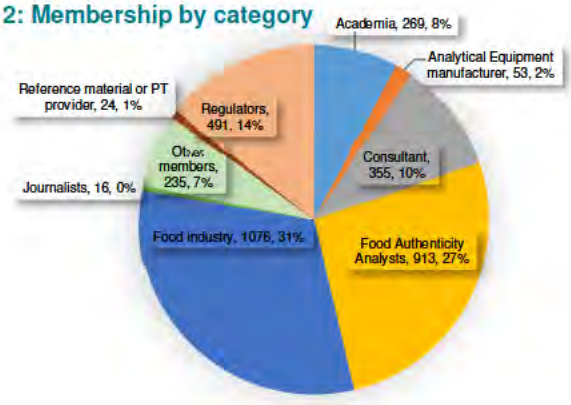
Key search terms to be used will include but not be limited to:

- Herb
- Spice
- Authenticity
- Methods
- Validation
- Targeted
- Non-targeted
- Untargeted
- Analysis
- Commercial test
- Fraud

**Sub-task 3: E-Survey on the Food Authenticity Network to collect broad stakeholder views**

FAN membership is currently at 3,440 people from ninety-three different countries. Membership by stakeholder category is shown in Figure 2.

**Figure 2: Membership by category**



FAN gives the Project Team access to a very large number of highly engaged stakeholders (as they have signed up to be members of a network that focuses on food authenticity testing and food fraud prevention), from whom, broad views on methods (available, emerging and currently being used) for identification and quantification of herbs and spices will be sought.

LGC has successfully conducted e-Surveys on FAN, with good response rates, for three recent projects:

- Defra food fraud project (report pending publication) – this survey was posted on FAN in June 2020 and attracted 330 responses.
- Review of the National Food Crime Unit (NFCU) – Selvarani is currently part of a three-person team undertaking a review of the NFCU. The report of the Review will be discussed at the December 2022 FSA Board meeting. An e-Survey was sent to the 1,013 Food Industry members in September 2022 and 106 responses were received.
- Defra POC Project[18] (report pending publication). This e-Survey consisted of forty-two questions including where POC instrumentation was being used, what the high priority food applications were, and what the common technologies were e.g. NIR, FT-IR, Spectral Imaging (MSI/HSI) and Raman spectroscopy; MS; NMR; nucleic acids (PCR and NGS); Proteomics. It was posted in July 2020 on FAN and 1,702 responses were received from a range of stakeholders.

Building on the e-Survey conducted for the Defra POC project, a list of questions specifically focused on the authenticity of herbs and spices will be developed in conjunction with FSA.

**Sub-task 4: Assessment of information**

Using the output of the literature review and the stakeholder engagement focus groups a summary table will be produced that compares the relevant key characteristics of the identified methods that are representative of the technologies most commonly used. Examples of key characteristics that will be considered for inclusion in the summary table are as follows:

- Sample matrices included in the scope of the method.
- Quantitative or qualitative.
- Sensitivity and selectivity.
- Validation status i.e. collaboratively evaluated, validated in multiple labs or validated in a single lab or research project and any references to internationally accepted validation protocols e.g. Eurachem, IUPAC, ISO etc.
- Reliance on a database of reference samples, whether the database is open access or privately owned, IP restrictions etc.
- Estimated costs for set up, accreditation and maintenance of testing (assuming there is an ongoing and consistent demand for services). The Project Team will consult with UKAS (Juliette Love, Head of Agri-Food, Life Sciences and Asbestos (AFLA)) to get their insights on the cost of setting up different methods / approaches, gaining UKAS accreditation to ISO 17025 and maintenance of it.
- The potential for transferability including training requirements and ease of use / skill requirements of the operator
- Expense (instrument cost, maintenance and servicing, test costs)
- Availability of instrument, training and expertise
- Ease of use of the instrument
- Size, weight and portability
- Time to result
- Complexity of sample preparation, sample size and representativeness
- Limitations.

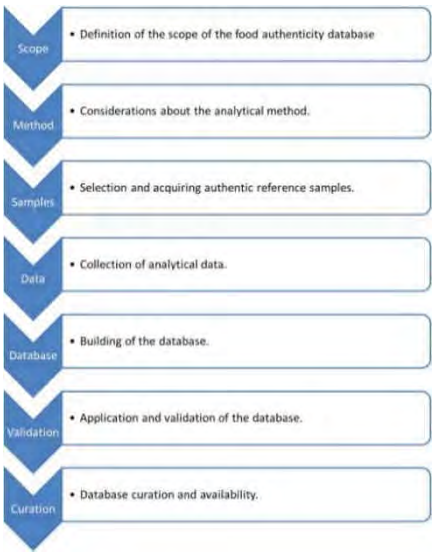
The key characteristics captured in the summary table will be compared and contrasted.

Based on the output of the literature review, the stakeholder engagement focus groups and the summary table of methods, the following issues will be discussed:

1. **Practicability of testing herbs and spices in laboratories where method of analysis requires the use of a reference database will be discussed.**

It is difficult to set-up, curate and maintain food authenticity databases because of the need for them to be representative of unknown samples that they are used to test, which will most likely, in the case of herbs and spices, have been blended, processed and be subject to seasonal, climate and other environmental conditions

that can affect their chemical or biological characteristics. The FoodIntegrity Project Scientific Opinion[25] details what the expert authors consider to be the key considerations in building and curating food authenticity databases, which is shown in Figure 3:




As Figure 3 illustrates, there are extensive considerations related to food authenticity databases. Private contractors have set-up their own commercial food authenticity databases and due to the expense involved in their development; they are usually protected by IP. Hence, access to the data is restricted, which acts as a potential barrier for the uptake of the method. There are excellent examples of open access databases[26,27,28] but these are supported/originated from large publicly funding programmes; these include:

- The Barcode of Life Data Systems (BOLD) is an initiative of the Consortium for the Barcode of Life (CBOL), which is fostering development of international research alliances to build a barcode library for all eukaryotic life. BOLD is a web platform specifically devoted to DNA barcoding and currently contains sequences for ~296,000 formally described species (~7 million specimens).
- GenBank is a nucleic acid sequence database and is hosted by the National center for Biotechnology Information (NCBI) in the US, as part of the International Nucleotide Sequence Database Collaboration.
- EU Wine Databank contains the isotopic composition of wines collected from across the EU so that competent authorities in Member States can request that information from the EC when disputes or court cases arise.

Both BOLD and GenBank are open access with a good level of curation associated with them, largely being regarded as the two main public databases of DNA barcode data for animals, plants and fungi. As such, they provide an excellent corner-stone underpinning comparability and confidence in DNA based sequencing results. QUB recently designed and implemented a multi-laboratory study using cheap handheld NIR instruments globally to determine the authenticity of oregano samples[29]. Although the study achieved a high level of success, one of the drawbacks was that the results determined by using the cloud-based analysis associated with the instruments were not as good as those determined using the spectra with external chemometric algorithms to generate results. This indicates shortcomings that might be encountered using off-the-shelf cloud based solutions.

Given these challenges, the practicability of testing herbs and spices in laboratories using methods of analysis that require the use of a reference database will be discussed. These challenges are not unique to herbs and spices testing, as the efficacy of any analytical approach is dependent upon the availability of appropriate reference materials and/or curated databases.

2. **Discuss how different targeted and non-targeted methods might be used as part of a screening process to verify evidence of adulteration**.

[25] Sampling guidelines for building and curating food authenticity databases - ScienceDirect
[26] GenBank Overview (nih.gov)
[27] https://www.boldsystems.org/
[28] European Wine DataBank | Knowledge for policy (europa.eu)
[29] The Potential of Handheld Near Infrared Spectroscopy to detect food adulteration: Results of a global, multi-instrument inter-laboratory study, McGrath, T. F., Haughey, S. A., Islam, M. & Elliott, C. T., Food Chemistry, 2021, 353, 128718.

The development and validation of non-targeted analytical techniques are areas which have been subject to much discussion in recent times due to the lack of guidelines or standardisation covering these types of tests. There have been a couple of publications which have tried to address the lack of guidelines governing both the development and validation of non-targeted methodologies in relation to spectroscopy[30] and mass spectrometry[31] (QUB co-authors on both publications). These studies reviewed and assessed the current state of the art with regards to the non-targeted analysis of food for the purposes of fraud detection and proposed harmonised workflows for these types of applications.

Since the publication of these papers were published the European standardization CEN has set up a technical committee on food authenticity 460 and a number of working groups to standardise methods in relation to food authenticity; WG 5 is producing a harmonized standard on "Validation of non-targeted testing methods in food and feed authenticity — General considerations and definitions", which is in the preliminary stages.

In addition, the availability of reference materials and proficiency testing schemes for herbs and spices will be documented. This will be achieved by conducting searches on the following databases:

- **Reference materials:** COMAR is an internet based information service that has been developed to assist users in finding the reference materials they need.
- **Proficiency testing schemes:** EPTIS is a cooperation of around forty partner organisations from all continents (most of them are national metrology institutes, testing institutes or accreditation bodies) who offer proficiency testing schemes.

**Sub-task 5: Draft interim report (1)**

A draft interim report (1) will be produced detailing the work conducted in sub-tasks 1- 4, consisting of stakeholder engagement, literature review, a summary table of new and existing methods for herbs and spices analysis and discussions on the reliance of databases, method transferability, use of targeted and non-targeted approaches, and the availability of reference materials and proficiency testing schemes, which will be submitted to the FSA.

FSA will be given two weeks to review the report and feedback their comments. The Project Team will organise a virtual meeting at which it will present the key findings to FSA and Defra colleagues, and other colleagues from FSS, NFCU and SFCIU as FSA deem appropriate to invite, and agree on methods to take forward into WP2 and WP3.

**Objective/Task: 3 - Work Package 2: Carry out a desktop scoping exercise on the transferability of methods selected from Work Package 1 into PA OLs.**
**Start date: T0 + 8 weeks** **End date: T0 + 12 weeks**

LGC performs a number of national roles through which it gains intelligence on UK official laboratory (OL) capability and gaps:

- The aforementioned GC statutory referee function
- Association of Public Analysts (APA) Training Officer role
- National Reference Laboratory (NRL) function in designated areas.

Through discussions with FSA, The GC conducted a survey of PA OLs in England and Wales (PA OLs in Scotland were surveyed in June 2022 by FSS) to identify gaps in capability, which could pose an immediate or future threat to UK official control capability; one of the gaps identified was 'rapid screening approaches for adulteration of herbs and spices'. Findings from the GC OL survey formed part of a paper that was presented to the FSA board in September titled 'Public Analyst Official Laboratory System: Our Approach to Building a Resilient System'.

LGC is the National Reference Laboratory for GMOs in food and feed and as part of this role, at the request of FSA, LGC is actively engaging with specific PA OLs in the UK to help provide support for acquisition and maintenance of GMO analytical capability. This support is being provided through regular meetings and advice on technical analysis, accreditation, example methods, provision of consumables, PT scheme availability, instrument costs and availability, and reference material availability. Through these contacts and experiences, LGC is well

[30] What are the scientific challenges in moving from targeted to non-targeted methods for food fraud testing and how can they be addressed? –Spectroscopy case study, Terry F. McGrath, Simon A. Haughey, Jenny Patterson, Carsten Fauhl-Hassek, James Donarski, Martin Alewijn, Saskia van Ruth, Christopher T. Elliott,
Trends in Food Science & Technology, 76, 2018, 38-55.
[31] Cavanna, D., Righetti, L., Elliott, C., & Suman, M. (2018). The scientific challenges in moving from targeted to non-targeted mass spectrometric methods for food fraud analysis: A proposed validation workflow to bring about a harmonized approach. Trends in Food Science & Technology, 80, 223–241

positioned to continue to engage and provide advice with UK Official Laboratories in terms of training and best measurement practice guidance.

In addition, QUB, Bia Analytical Ltd and the PA OLs are currently engaged in determining whether databases and methods developed for herb and spice authenticity in QUB can be transferred to multiple PA OLs. This will involve method transfer, instrument set up in multiple sites, analysis of reference materials and analysis of the data generated in this inter-laboratory study. These discussions have already highlighted a number of challenges to the transfer of non-targeted methods to PA OLs, which are of direct relevance to this project. The Project Team will use these learnings and experience in the delivery of this project.
The Project Team will build on the GC OL survey to understand the current capability of each of the nine PA OLs for the analysis of herbs and spices and their adulterants of importance to the UK market. This will be done by telephone interviews with the heads of the PA OLs using a template guide of questions, which will be developed in conjunction with FSA, and is anticipated to include but not be limited to the following:

- Current capability:
  - Existing technology – specification and age of instruments.
  - Staff skills, knowledge and training in required technologies and approaches e.g. use of non-targeted methods
- Appetite of their Local Authorities to undertake tests for herb and spice authenticity.
- Future capex budget for purchase of new equipment.
- Capacity to undertake tests for herb and spice authenticity.

This will be done by arranging virtual meetings with all nine PA OLs covering the four nations of the UK plus the Isle of Man Government Laboratory:

Plus Isle of Man Govt Lab – Rose Sandilands.

Using the information obtained a capability map across the PA OLs, for the methods identified in the literature review, will be prepared.
The project team will draw on the outputs of WPs 1 and 2 to:

**1. Scope out the suitability for transferring the methods identified in the literature review to individual PA OLs.**

The suitability of transferring methods to PA OLs will be dependent on a number of factors such as availability of required equipment, experience of staff on required method / technology.

The information will be presented in a matrix grid of methods (this type of approach was successfully used for the Defra food fraud project) by OL, where the suitability of transferring each method will be rated e.g. high/medium/low so that relative differences between methods is apparent.

Based on this analysis, the most suitable method(s) and PA OLs to transfer methods to will be identified and a plan of implementation will be suggested that draws on all the Project Team's aforementioned experience.

**2. Identify any practical barriers or limitations to the application of the methods (to include costs) and how these could be mitigated.**

The Defra POC project[18], which identified a range of practical barriers to uptake of POC technologies; chief factors amongst these included expense (instrument cost, maintenance and servicing, test costs), analytical capability (reliability, maintenance, sensitivity, costs, performance, lack of quantitative capability), availability of instrument/training/expertise, size, weight and portability, time to result, and complexity of sample preparation, sample size and representativeness. The project also noted that the efficacy of all analytical technologies is dependent upon the availability of appropriate reference materials and databases, and POC instrumentation was no exception.

In addition to the barriers identified above, some additional barriers anticipated are:

- Staff experience of and capability in selected methods.
- The requirement to access reference databases – open access or privately owned?
- Is there sufficient demand for a capability to be established in all nine PA OLs? Or should they collaborate and agree that capability is only needed in a number of PA OLs that have the conditions to make the transfer of methods most easily?
- Differences in results from different methods.
- The cost of validation.
- The cost of gaining and maintaining UKAS accreditation.
- The ability of the methods / technologies to be applicable to non-food matrices.

The Project Team will use and build on learnings from this project to identify barriers or limitations to the application of methods that are specific to the analysis of herbs and spices for authenticity.

**3. Suggest practical solutions for transferring methods that use reference databases.**

The open access DNA websites GenBank[21] and BOLD[22] have already been discussed and how they provide an excellent corner-stone, underpinning comparability and confidence in DNA based sequencing results. Nothing similar exists on an open access basis for chemical identification, which is a barrier to the uptake and effective deployment of food authenticity methods.

Using the Project Team's direct experience of helping / transferring methods to PA OLs, practical strategies for transferring methods that use reference databases will be developed, examples include:

- Identifying suitable commercial DNA kit based methods for herbs and spices that can it be transferred to PA OLs.
- Seeking collective agreements with database owners for PA OLs.
- Sharing technologies among PA OLs based on experience, capability and availability of instruments so that collaboratively the range of methods required to verify herb and spice authenticity is covered.

Thus in addition to providing practical solutions for transferring methods that use reference databases, the Project Team will make recommendations for all the support mechanisms required to help uptake of methods by PA OLs.

Based on LGC's expertise used to deliver Defra project (FA0178 ) "Assessment of Point of Contact Testing Technologies to Verify Food Authenticity"[18] (publication pending), recommendations for support mechanisms included the need for:

- appropriate and accessible reference materials and curated/open-access databases
- further involvement of regulatory authorities
- harmonised terminology
- establishment of well-defined and independent method validation
- provision of protocols and SOPs
- increased availability of instrumentation
- training, webinars, etc.

**4. Make any further comparisons between the different methods assessed, where used for analysis of the same herbs and spices.**

The pros and cons of methods commonly used to authenticate herbs and spices is documented in the Spices Chapter of the FoodIntegrity Handbook authored by staff at QUB. The current limitations of NGS for quantitative application to food authenticity has already been discussed above and that the ESA white paper quotes "Reference methods like classical microscopy or validated non-targeted chemical/physical methods (using NMR, NIR/MIR spectroscopy, mass spectroscopy,) or a combination of them should be used as primary analyses to prove herb and spice authenticity." The review by LGC[8], provided an overview of the state-of-the-art the science and methods which were being used for authenticity testing in herbal medicinal products.

Whilst a lot of the findings in the above work by the Project Team still remain valid, it will be updated in line with current technologies, methods and best measurement practice guidance advice using the outputs of Work Package 1 and specifically the literature review.

**Deliverable: A draft interim report (2) detailing assessment of suitability of transferring methods into PA OLs and comparing their performance, limitations, and transferability will be submitted to the FSA.**

A draft interim report (2) will be produced detailing assessment of suitability of transferring methods into PA OLs and comparing their performance, limitations, and transferability, which will be submitted to the FSA.

FSA will be given two weeks to review the report and feedback their comments. The Project Team will organise a virtual meeting at which it will present the key findings to FSA and Defra colleagues, and other colleagues from FSS, NFCU and SFCIU as FSA deem appropriate to invite.

**Objective/Task: 4 - Work Package 3: Make recommendations for future work in this area**
**Start date: T0 + 12 weeks** **End date: T0 + 16 weeks**

The Project Team will combine the interim reports (1) and (2) to produce a final project report for the FSA that includes recommendations for future work, which will include:

1. **Evidence-based recommendations on the most-suitable methods for testing of herbs and spices for enforcement purposes, based on the literature review and scoping exercise.**

The Project Team will illustrate:

- The herbs and spices of most commercial importance to the UK.
- The methods / technologies that are required for verification of herb and spice authenticity.
- What methods / technologies lend themselves to be transferred to PA OLs and which particular PA OLs this would be the easiest to achieve in.
- Whether the transfer of these methods will equip the PA OLs with enforcement level capability.
- A capability gap analysis of what is required vs what can be achieved in PA OLs.

2. **Make recommendations on how to roll out and validate the recommended methods within PA OLs.**

The Project Team will illustrate what can be achieved for a sliding scale of budget available for commodities of importance to the UK using oregano as a case study example. The implementation plan will include the investment required (instruments and people), training, development, validation, the cost of gaining and maintaining UKAS accreditation, provision of an analytical service, and how the PA OLs can work together to achieve a UK enforcement level capability in the analysis of herbs and spices for authenticity.

Method validation is key to method robustness and successful transfer and adoption of methods and technologies. The National Measurement Laboratory at LGC is an expert in method validation as a training provider and the Designated Institute for Chemical and Bio-measurement. Method validation and transferability are at the core of our measurement research activities. As a training provider, LGC has been running method validation and measurement uncertainty courses for the past 25 years (755 Organisations in 47 countries and 4,820 delegates). With such an experience, the Project Team is well aware of challenges around sample matrices, sensitivity and selectivity, validation status, costs (for set up, accreditation and maintenance of testing), transferability (including training, ease of use), availability of reference materials and proficiency testing. This experience will be used to describe the requirements for validation that are that are fit for purpose for an enforcement level capability in PA OLs and as well as what will be required for a screening service.

3. **Make further recommendations for the research and development of any current or emerging methods identified as suitable for the testing of herbs and spices.**

Using the outputs of Work Packages 1 and 2, the projects conducted by the Project Team and the capability gap analysis of what is required vs what can be achieved in PA OLs (see 1. above), the Project Team will make further recommendations for the research and development of any current or emerging methods, identified as suitable for the testing of herbs and spices, to produce a more robust evidence base that would allow for the effective enforcement of herbs and spices in the UK.

This will also include any additional support mechanisms required for the uptake of herb and spice authenticity methods by PA OLs; any requirements identified for training can potentially be facilitated through the Joint Knowledge Transfer Framework for Food Standards and Food Safety Analysis that LGC operates (see section 4 – LGC Training).

**Objective/Task: 5 – Final report**
**Start date: T0 + 16 weeks** **End date: T0 + 16 weeks**

LGC will organise a virtual final project meeting with FSA and Defra colleagues, and other colleagues from FSS, NFCU and SFCIU as FSA deem appropriate to invite, to present the key findings of the project.

The draft final report will be submitted to the FSA prior to this meeting. FSA will be given two weeks to review the report and feedback their comments. However, the Project Team understands that the final report will be subject to external peer review, following which further amendments may be required. On submission of the final project report, the Project Team will agree the timetable for reporting and publication with the FSA project officer.

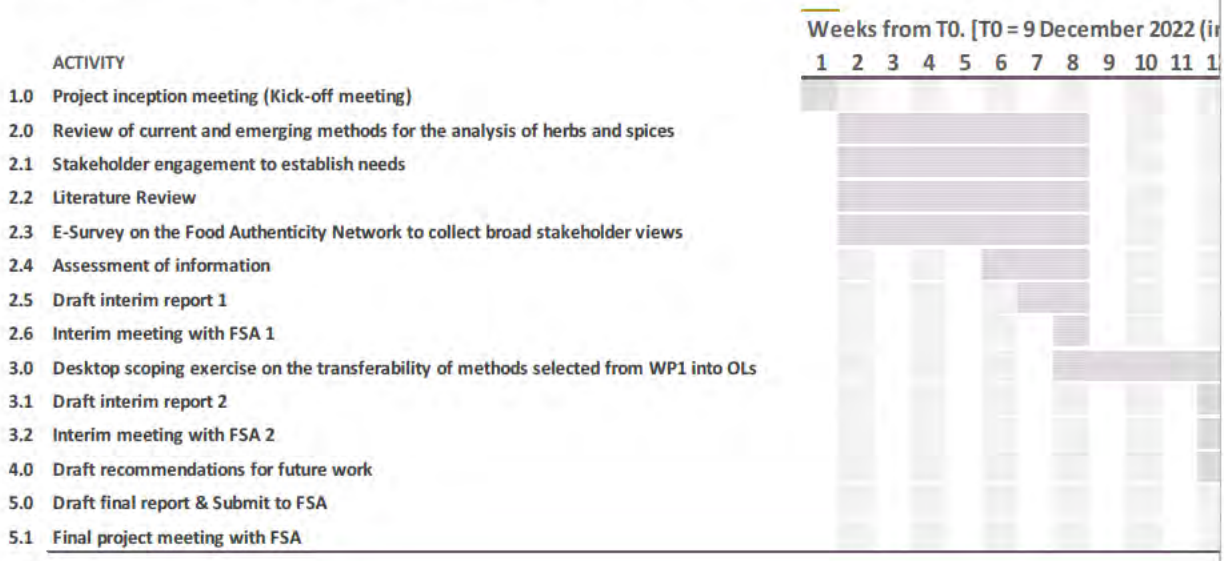



**Figure 4: Project Gantt chart**

**Accessibility**
All reports submitted as part of this project will be formatted in accordance with FSA accessibility guidelines.

## B. DELIVERABLES

Please outline the proposed project milestones and deliverables. Please provide a timetable of key dates or significant events for the project (for example fieldwork dates, dates for provision of research materials, draft and final reporting). Deliverables must be linked to the objectives.
For larger or more complex projects please insert as many deliverables /milestones as required.
Each deliverable should be:

i. no more 100 characters in length
ii. self-explanatory
iii. cross referenced with objective numbers i.e. deliverables for Objective 1 01/01, 01/02 Objective 2 02/01, 02/02 etc

Please insert additional rows to the table below as required.

A final deliverable pertaining to a retention fee of 20 % of the total value of the prosed work will automatically be calculated on the financial template.

| DELIVERABLE NUMBER OR MILESTONE IN ORDER OF EXPECTED ACHIEVEMENT | TARGET DATE | TITLE OF DELIVERABLEOR MILESTONE |
|---|---|---|
| 01 | T0 + 8 weeks | A draft interim report (1) consisting of a stakeholder engagement, literature review, e-Survey results, and a summary table of new and existing methods for herbs and spices analysis. |
| 02 | T0 + 12 weeks | A draft interim report (2) detailing assessment of suitability of transferring methods into PA OLs and comparing their performance, limitations, and transferability. |
| 03 | T0 + 16 weeks | A final project report incorporating interim reports (1) and (2) with recommendations for future work. |
| | | |
| | | |
| | | |

## 4: ORGANISATIONAL EXPERIENCE, EXPERTISE and STAFF EFFORT

### A. PARTICIPATING ORGANISATIONS' PAST PERFORMANCE

Please provide evidence of up to three similar projects that the project lead applicant and/or members of the project team are currently undertaking or have recently completed. Please include:

- The start date (and if applicable) the end date of the project/(s)
- Name of the client who commissioned the project?
- Details of any collaborative partners and their contribution
- The value
- A brief description of the work carried out.
- How the example(s) demonstrate the relevant skills and/or expertise.
- What skills the team used to ensure the project (s) were successfully delivered.

**Example #01**

**Contractor:** QUB
**Contract Name:** Field-Deployable Analytical Methods to Assess the Authenticity, Safety and Quality of Food
**Contract Number:** Coordinated Research Project (CRP): D5.20.40/ G4.20.07
**Organisation name:** INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

[redacted] **demonstration of relevant skills and expertise, and what skills the team used to ensure the project was successfully delivered:**

The dried herbs market is growing in terms of both volume and price. It is expected to reach US$ 4.1 billion by 2026. As such it is an attractive market for those criminals looking for financial gain through economically motivated adulteration. Rapid laboratory-based techniques are one of the weapons in the arsenal of those looking to prevent food fraud.

The Institute for Global Food Security (IGFS) at Queen's University Belfast led a global project under the auspices of the IAEA to investigate the possibility of using multiple handheld NIR instruments and chemometrics to determine oregano authenticity. An interlaboratory study was undertaken involving 27 globally, with varying levels of expertise in spectroscopy, using 34 unique devices to investigate model transferability and instrument standardisation. The results indicate that using the appropriate standardisation strategy, the model and portable devices could be used as a rapid screening tool for identifying oregano adulteration in the field.

**Outputs:**

- This study shows that using device standardization, it is possible to transfer a model for oregano authenticity across 34 SCiO devices.

- Tested by individuals, with varying degrees of expertise, globally.
- It also shows that such devices, when made in a user-friendly manner, can be deployed with minimal training and support.
- Manual intervention was needed with the chemometric models; however this manual processing can be overcome through appropriate software programming.
- Peer-Reviewed publication: The Potential of Handheld Near Infrared Spectroscopy to detect food adulteration: Results of a global, multi-instrument inter-laboratory study, McGrath, T. F., Haughey, S. A., Islam, M. & Elliott, C. T., Food Chemistry, 2021, 353, 128718.

**Example #02**

**Contractor:** QUB
**Contract Name:** The Detection of Economically Motivated Adulteration in the Herb and Spice Industry
**Contract Number:** PhD External Sponsorship Contract
**Organisation name:** Herb and Spice Consortium. Consortium Members: Queen's University Belfast, McCormicks, British Pepper & Spice, Bart's, Tesco, ASDA, Marks & Spencer, Sainsbury's, Waitrose

[redacted]

**A brief description of the work carried out, demonstration of relevant skills and expertise, and what skills the team used to ensure the project was successfully delivered:**
The Institute for Global Food Security (IGFS) at Queen's University Belfast brought together a consortium to help in the development of rapid tests for Herb and Spice authenticity through the sponsorship of a PhD student. The shared approach, with most of the major herb and spice processors, and all of the major retailers involved, meant that costs are lower for all parties, and all this sector benefitted. All of the partners very much saw fraud as a shared industry problem that is pre-competitive. Much could be achieved more quickly by collaborating on projects such as this, providing new tools to detect fraud and ultimately leading to a stronger and more secure UK food industry. Four products were prioritised with regard to their risk of economically motivated adulteration (EMA), as determined by members of the herb and spice industry. These herbs and spices were sage, paprika, garlic and black pepper. Each of these herbs and spices have their own individual risks with regard to adulterants. These adulterants are often morphologically similar or can be blended in ground form into the herb or spice. Comparisons could also be carried out in this study between NIR and FTIR benchtop instrumentation and portable vs benchtop NIR. There is need for increased research in the rapid detection of adulteration of herbs and spices. The development of rapid techniques will allow greater control over the supply chain and reduce the risks of adulteration. The aim is to have methods that will allow large numbers of samples to be rapidly screened at low cost. This will help prevent both the herb and spice industry and the consumer from becoming victims of food fraud. The development of methods using portable technology will advance the science in this area even further and introduce even greater regulation of the industry and its supply chains.

**Outputs:**
- Unique consortium of processors, retailers and academia working together.
- PhD obtained at QUB by Mrs Pamela Galvin-King
- Two peer reviewed publications and a book chapter.
- UKAS accreditation ISO 17025 of two methods

**Example #03**

**Contractor:** LGC
**Contract Name:** Coordinator Role for Virtual Food Authenticity Network
**Contract Number:** 21694
**Organisation name:** Department for Environment, Food & Rural Affairs (Defra)

[redacted]

**Contract Value (£):** £ 52,000
**A brief description of the work carried out, demonstration of relevant skills and expertise, and what skills the team used to ensure the project was successfully delivered:**
The Food Authenticity Network (FAN) (www.foodauthenticity.global) was initially set-up in 2015 as a direct response by the UK government to address Recommendation 4 of the Elliott Review on "Laboratory Services:

Those involved with audit, inspection and enforcement must have access to resilient, sustainable laboratory services that use standardised, validated approaches".
FAN is the only network dedicated to food authenticity testing globally. It gathers information, in a structured manner and disseminates via its open access website (successfully set up by LGC), which can help to build a more resilient food supply chain by raising awareness of the tools available to check for mislabelling and food fraud so that ultimately, consumers can have greater confidence in the food they buy.

Since the project completion in April 2017, FAN was jointly funded by Defra, the Food Standards Agency and Food Standards Scotland until December 2018. Since January 2019, FAN has operated by LGC as a public private partnership that shares best practise information on food authenticity testing and food fraud mitigation helping to raise standards globally in this area and as such, plays a valuable role in the global fight against food fraud and positively influences food safety and security. Membership is now at over 3,432 members from 93 countries, and in 2021, over 34,000 unique users from 165 countries accessed information on the website.

FAN provides demonstrable evidence of an excellent tool with global reach and inclusive networking capability to help ensure resilience and security in our food supply chains.

Herb and spice authenticity is a popular topic on FAN, through the horizon scanning activities of the FAN Executive Team, 74 news blogs relating to spices, 35 to herbs and 29 that relate to both, have been posted from 2015 to date.

**Additional LGC Experience**

LGC provides a range of consultancy and research services in support of Government policy. These include statutory functions such as the GC Function. The role of the UK GC has existed formally since the 1875. Under the provisions of many Acts of Parliament, but significantly the Food Safety Act 1990 and the Agriculture Act 1970, the GC acts as an independent referee in cases of dispute between enforcement authorities and industry.

LGC also delivers National Reference Laboratory (NRL) functions for the following areas:
- Genetically modified organisms (GMOs) in food and feed – control and authorisation;
- Added water in poultry;
- Feed Additives – Authorisation;
- Feed Additives – Control;

Consequently, LGC staff are very familiar with the enforcement system in the operation in the UK for chemical contaminants because of the statutory and advisory responsibilities of the GC. LGC staff are in regular dialogue with Port Health officials, Trading Standards Officers, PAs, Agency officials and industry representatives in relation to possible, impending or actual official action regarding food contaminants.

Furthermore, the GC regularly produce documents in the form of guidance notes or other briefing notes that offer advice and procedure to reinforce current practice, examples include published papers on evaluation of data in the absence of statutory limits, a toolkit for adopting a weight of evidence evaluation procedure (in production) and guidance on sampling of rice and rice products for genetically modified organisms.

Method validation is key to method robustness and successful transfer and adoption of novel methods and technologies for routine applications. The NML is an expert in method validation as a training provider and the Designated Institute for Chemical and Bio-measurement. Method validation and transferability are at the core of our measurement research activities. As a training provider, we have been running method validation and measurement uncertainty courses for the past 25 years (755 Organisations in 47 countries and 4820 delegates). With regards, to laboratory expertise, our scientists develop and validate analytical methods for a wide range of applications such as diagnostics, therapeutics, food and environment. Those methods are developed and validated in accordance with ISO17025 or follow its principles. Over the years, we have validated 100s of methods that were published or transfer to third party laboratories. Below are some examples.
- Newborn screening.
- Horse in Beef (2013) – LGC contribution in (1) establishing adulteration threshold, (2) evaluation of testing method, (3) production of reference material, (4) provision of proficiency schemes and (5) training to ensure successful transfer of the method to testing lab to enforce regulation.
- Other commercial projects for Pharma from metals and organics in therapeutics, raw materials, and biological materials.
- Organisation of numerous international Interlaboratory studies for assessing the performance methods e.g. in 2021, LGC led the first international ring trial that demonstrates capability of laboratories to measure Cannabidiol and Controlled Cannabinoids in consumer products.

With such an experience, we are well aware of challenges around sample matrices, sensitivity and selectivity, validation status, costs (for set up, accreditation and maintenance of testing), transferability (including training, ease of use), availability of reference materials and proficiency testing.

The housing of the GC and the National Measurement Laboratory and Designated Institute for Chemical and Bio-measurement (NML) in the same organisation is of enormous benefit as they are synergistic statutory roles. In addition, the NRL and GC functions have been mutually complimentary and have augmented each other in terms of provision of expert advice and guidance: for the Chinese GM rice issue (EU Commission Implementing Decision 2011/884) the NRL position provided the knowledge regarding the legislation and guidance on the approved approaches for analysis, whilst the GC function has provided advice regarding the hands-on and practical application of the techniques required for analysis and the associated experience from experimental application. The resultant combined advice and experience, uniquely facilitated through the collective knowledge of the NRL and GC functions, has been disseminated to the benefit of stakeholders within the UK, and as the NRL, LGC is assisting in the upskilling of PA OLs in relation to GMO measurement capability.

LGC deploying the statutory functions of GC, NML for chemical measurements and NRL avoids technical duplication thus offering an efficient use of Government funds.

**Additional QUB Experience**

QUB provide expertise in both qualitative and quantitative research. Qualitative research is a method of inquiry employed across a variety of academic disciplines. It is, however, most traditionally situated in the social sciences. Qualitative research tends to favour a more exploratory, interactive exchange between the researcher and the subject with the purpose of gaining a deeper understanding of the social world. Quantitative research tends to favour the use of statistics in order to make generalisable statements. A quantitative approach uses measureable data to convey facts and discover patterns. The core principles of a qualitative and quantitative research project are outlined below:

| | Qualitative | Quantitative |
|---|---|---|
| **Aim** | To achieve an in-depth, interpretive analysis of the issue investigated. | To create generalisable and reliable statistical explanations of the issue examined. |
| **Research Design** | Research design and research question are roughly developed in advance but may change and emerge further in the course of the research process. | Research design is precisely developed in advance and geared to answer the research questions and all hypotheses which should not change in the course of the research process. |
| **Data** | Qualitative data encompasses words, pictures and objects. This makes qualitative data richer, but at the same time less prone to be generalised. | Quantitative data has the form of numbers. This makes quantitative data more efficient, although it may misses out contextual detail. |

**Additional activities at LGC that will benefit the project**

**Programme Management and Commercial team & Key Account Management team**

[redacted]

The Programme Management and Commercial Team is part of the National Measurement Laboratory (NML) and is office-based providing programme, contract and commercial management to support to LGC's national roles as the NML and the GC. The team is composed of very experienced programme and project managers, commercial service managers (measurements, training and consultancy) and a continuous improvement manager. The team manages large Government programmes (>£12m per year) i.e. monitoring cost/progress, reporting and invoicing using our Enterprise Resource Management system. The team also deals with more than one hundred commercial projects per year, facilitating all the steps i.e. initial discussion, quotation, delivery, reporting and invoicing for the NML products and services. The delivery of this contract will be supported by this team.

[redacted]

**Horizon scanning**

At LGC, the GC programme conducts a review of food and agriculture legislation to assess the likely impact on the analytical capabilities required by the GC, with key changes and developments captured in quarterly reports to the UK Department for Business, Energy & Industrial Strategy (BEIS). As part of the horizon scanning activities, the GC also monitors worldwide food notifications for emerging trends. These reports provide a review of developments in food and feed law and related scientific and regulatory issues that affect the UK, and are easily accessible via the GC website at:
https://www.gov.uk/government/organisations/government-chemist
This allows LGC to keep up-to-date on impending revision of legislation and intelligence on emerging legislative issues regarding contaminants and safety, which might impinge on market acceptability of products.

**LGC Training**

LGC has been providing first-rate training courses for analytical scientists worldwide for over 20 years. Our long history and role as the UK's National Measurement Laboratory for chemical and biomeasurement means that we have a wide range of expertise in analytical techniques such as chromatography, mass spectrometry and hyphenated techniques. We offer both live face-to-face (COVID-19 restrictions allowing) and virtual courses, as well as web based eLearning modules. Our courses cover topics such as quality systems, statistics, method validation and measurement uncertainty. We offer a scheduled programme of courses, as well as delivering training at customer sites (both in-person and virtually). Examples of our training material can be downloaded from the training resource centre https://www.lgcgroup.com/measurement-services/training-and-consultancy/our-training-courses/

LGC also operates the Joint Knowledge Transfer Framework for Food Standards and Food Safety Analysis, which is a cross-government project (funded by the Department for Environment, Food and Rural Affairs, the Food Standards Agency, Food Standards Scotland and the GC) aimed at disseminating knowledge from government funded research to stakeholders to support UK laboratory capability and promote best practice in food safety and standards analysis. The project commenced in April 2017 and by March 2023, it is anticipated that twenty-nine knowledge transfer outputs will be delivered. Food authenticity related outputs can be found on the Training pages of the Food Authenticity Network, whilst all output (food safety and food authenticity) can be found on the Knowledge Resources section of the Government Chemist website.

## B. NAMED STAFF MEMBERS AND DETAILS OF THEIR SPECIALISM AND EXPERTISE

For each participating organisation on the project team please list:- the names and grades of all staff who will work on the project together with details of their specialism and expertise, their role in the project and details of up to 4 of their most recent, relevant published peer reviewed papers (where applicable). If new staff will be hired to deliver the project, please detail their grade, area/(s) of specialism and their role in the project team.

| Lead Applicant | LGC Limited |
|---|---|

Named staff members, details of specialism and expertise.

LGC is a leading, global life science tools company, providing mission-critical components and solutions into high-growth application areas across the human healthcare and applied market segments. Our high quality product portfolio is comprised of mission-critical tools for genomic analysis and for quality assurance applications, which are typically embedded and recurring within our customers' products and workflows and are valued for their performance, quality and range.

LGC has extensive experience in successfully managing multidisciplinary projects (at both a National and European level), with the quality of project management and analytical research assured through certification to ISO 9001.

The key personnel involved in this project will be:

[redacted]

**UK Deputy Government Chemist (Project Lead)**
[redacted] has over 30 years' experience in the analysis of food and agriculture samples working across a variety of policy areas, with government departments and different stakeholder groups, to improve standards in measurement science. She is an experienced project leader and has successfully delivered a wide range of complex projects from conception of ideas to final reports.

[redacted] has been the Chair of the UK Department for Environment, Food and Rural Affairs (Defra) Authenticity Methods Working Group since 2013. She also serves on Defra's Authenticity Steering Group and the Royal Society of Chemistry Analytical Methods Committee's Feed and Food Authenticity sub-committee. She is part of the UK delegation for the Codex Committee on Methods of Analysis and Sampling, is the UK Co-Chair of the Codex electronic working group on food fraud and is also part of the UK delegation that serves on the CEN committee for standardisation of methods for food authenticity.

[redacted] is the Executive Director of the Food Authenticity Network (www.foodauthenticity.global), led by LGC, which is an open access website that gathers information on food authenticity testing, food fraud mitigation and food supply chain integrity helping to build more resilient food supply chains. It now has over 3,284 members from ninety-three countries/territories and in 2021, over 34,000 unique users accessed the website.

[redacted] is a fellow of the Royal Society of Chemistry and the Institute of Food Science and Technology. In October 2020, Selvarani was awarded an MBE in the Queen's Birthday Honours List 2020 for services to food measurement services. [redacted] is currently part of a three-person team undertaking a review of the NFCU (June – December 2022).

**Recent publications:**

1. [redacted]

[redacted]

**Head of the Office of the Government Chemist and Referee Analyst**
**Training Officer, Association of Public Analysts (APA).**

With 24 years' experience of enforcement analytical chemistry (1995-2019), including 11 years' experience as a Public Analyst (2008-2019) and 8 years (2011-2019) as head of an official control laboratory. Prior to this [redacted] worked in environmental analysis (1991-1995), and has recent experience of the animal feed industry (2020).

[redacted] has over 20 years of experience of the day-to-day management of project work in food and feed safety and standards analysis. His technical areas of expertise include high level interpretative skills in food safety and standards, general analytical chemistry and associated issues; working knowledge of ISO 17025 (UKAS) quality issues, **ISO 9000 lead auditor qualified** and he is a specialist in food and feed law enforcement (labelling, allergens, health claims, composition, additives, GMOs, contaminants, consumer complaints). Together with his well-developed strategic and analytical skills, awareness and experience of consumer issues and the media he is able to bring this experience to contextualise advice given as part of the NRL.

[redacted] has also served on the Association of Public Analysts' training committee for over 20 years, and now as **APA Training Officer**. Thus, [redacted] has an intimate knowledge of the APA and their training and development needs, which will be vital to the successful delivery of Work Package 2.

[redacted]

**Head of GMO analytical unit and Principal Scientist**

[redacted] has had over twenty-three years' post-doctoral experience as a molecular biologist. He specialises in identification and quantitation of genetically modified ingredients in food materials, as well as using trace DNA detection methods to check for food authenticity, detect food adulteration, and to enable detection of food ingredients, allergens, and bacteria in foods. He has extensive experience in developing and validating methods for DNA analysis both at national and international level. He has written successful proposals for submission in formal tender processes, and routinely manages projects from the FSA, Defra, BEIS A4I, M4R and EU Framework Programmes. [redacted] gives regular presentations at national and international level and is a member of a number of international working groups and advisory committees. [redacted] works as an official FSA appraiser of GMO and food related tenders, including GMOSeek as part of the Safefooder call. [redacted] is LGC's representative on ENGL (European Network of GMO Laboratories), has extensive experience in external quality assessment exercises, and has published over 60 peer reviewed papers and EU guidance notes on food authenticity, GMO quantitation,

and data analysis approaches. [redacted] is regarded as a national/international expert on GMO analysis, being a leading figure on a number of related EC Working Groups (dPCR, gene editing, GMM, measurement uncertainty, etc.), regularly producing guidance notes on these subjects. He regularly provides consultancy and training courses on such topics as GMO analysis, PCR assay design, real-time PCR, method validation, measurement uncertainty estimation, application of statistics and experimental design, and DNA sequencing for food authenticity analysis. [redacted] is a member of Defra's AMWG and AMWG-TSG groups, was instrumental in preparing and developing an analytical method in response to the 2013 EU horse-meat issue which is now being considered for international standardisation and is the nominated UK representative on the ENGL Steering Committee.

In January 2021, [redacted] was acknowledged as an international independent expert in the field of GMO analysis by the European Commission, facilitation continued and consistent attendance at many ENGL meetings, workshops, working groups and training activities, post the UK transition period from the EU, irrespective of the outcome of the UK/EU trade deal.

**Recent publications:**

[redacted]

[redacted] has more than 20 years' experience in organic MS analysis for food, forensics, environmental, clinical and consumer products. [redacted] has over 50 peer reviewed publications and external presentations.

The OMS team led by [redacted] has successfully developed and validated 100's of methods for food, forensics, environmental, clinical and consumer/cosmetics products. This broad experience enables our scientists to transfer technological solutions across sectors. This expertise has been recently showcased in a study4 funded by OPSS, FSA, FSS, the Home Office and DSTL.[32] LGC shared its method and compared other methods for quantifying CBD and controlled cannabinoids in food and cosmetics among testing laboratories. The laboratories (35) participating in the ring trial could either use LGC's method or their own to analyse provided samples for CBD (at mg/g level) and, optionally, controlled cannabinoids (at trace level i.e., low part per million). The study was a successful international study i.e., there was good agreement of results between most laboratories, it demonstrated the robustness of our method and data shared including instrument types and limits of detection helped to assess the capability of testing laboratories.

[redacted]

[redacted] joined LGC from a senior Post Doctoral position at Birmingham University Cancer Studies in 2006, and currently works as a researcher alongside [redacted] Referee Analyst and Head of the Government Chemist. His current role is primarily focused on technical project management for the Joint Knowledge Transfer Framework project, although he is also involved with the development of training materials, and with the drafting of scientific papers and reports.

Examples of his relevant recent activities have included the researching and writing reports for Defra on an "Update on Global Food Fraud Definitions and Standardisation Activities" and "Food Fraud Mitigation Resources". Other activities have included delivery of knowledge exchange events for UK public analysts on the topic of "Fish

[32] Tabatha Hambidge, Government Chemist CBD Food and Cosmetic Ring Trial Final Report - Cannabidiol and controlled cannabinoids, https://www.gov.uk/government/news/cbd-and-controlled-cannabinnoids-results-from-a-ring-trial, June 2022

Speciation for Food Authenticity" and the publication of e-seminars on "An introduction to GMO detection" and "NGS Instruments, methods and Implementation".

[redacted] has over 25 years of post-doctoral experience in both the academic and industrial sectors and has specialised knowledge in the areas of genomics and gene expression as applied to areas such as food testing, and clinical and non-medical diagnostics.

[redacted]

**Business Development Manager/Project Manager**

[redacted] is an experienced Project Manager and Business Development Manager in the NML. He worked as Principal Radiochemist within the Environment, Safety and Food department (1987-2018), and has over 30 years' experience of the day-to-day management of scientific project work from customer enquiry to delivery. Since 2019, [redacted] is responsible for the management of over 100 government and private sector commercial projects worth in excess of £10m

**Current / Previous projects include:**

1. [redacted]

**Queen's University Belfast**

Within the Institute for Global Food Security (IGFS) at QUB, the ASSET Technology Centre provides leading platforms to facilitate increasingly rapid identification of feed and food contamination and adulteration. The equipment is amongst the most specialist in a UK university. The mass spectrometry element features a range of hyphenated MS instruments. Various LC-MS/MS and GC-MS are available for tailored measurements of predetermined analytes such as toxins, pesticides or targeted metabolomic, as well as high resolution accurate mass instruments (QTof) coupled to UPLC for non-targeted metabolomic analysis or equipped with an Ambient ionisation source such as REIMS, DESI or DART. MASS SPECTOMETRY - REIMS research system, incorporating 'iKnife', DART (Direct Analysis in Real Time) ionisation couple to single quadrupole detector, UPLC-QTof with associated processing software workflow suite. The ASSET Technology Centre is also at the forefront of spectroscopy applications with both lab-based and handheld instrumentation, the latter which can be used anywhere in complex supply chains. SPECTROSCOPY INSTRUMENTATION - FTIR (Fourier Transform Infra-red); NIR (Near Infrared) in benchtop and portable format; Raman. IGFS has been recognised as a 'Centre of Expertise' by the Food Authenticity Network, a Department of the Environment and Rural Affairs (DEFRA) initiative. The ASSET Technology Centre was awarded ISO 17025 Accreditation for herbs and spice authenticity testing, an industry 'gold standard' that is rare for a university lab. In 2022, QUB was rated joint 1st in the UK for Agriculture, Veterinary and Food Science in REF2021 and the ASSET Technology Centre was conferred as a Centre of Excellence in Agriculture and Food Integrity in partnership with the National Measurement Laboratory (NML).

For QUB, the key personnel involved in this project will be:

- [redacted]

[redacted]
BSc, PhD, FRSC, FRSB, MRIA

[redacted] is currently Professor of Food Safety and founder of the Institute for Global Food Security at Queen's University Belfast. He served as Pro Vice Chancellor responsible for the Medical and Life Sciences Faculty between 2015 and 2018.
He has published more than 520 peer review articles, many of them relating to the detection and control of agriculture, food and environmental related contaminants. His main research interests are in the development of innovative techniques to provide early warning of food integrity issues across complex food supply systems. Protecting the integrity of the food supply chain from fraud is also a key research topic and [redacted] led the independent review of Britain's food system following the 2013 horsemeat scandal. [redacted] has worked closely with many government departments/agencies such as DEFRA, FSA, Department of Health and the Home Office, in addition to having very strong collaborations with large sectors of the UK food industry and the UK animal feed industry. Strong links have been retained with all these sectors. [redacted] also provides scientific support to UN agencies such as the IAEA and World Food Programme. Over the years he has developed a high level network of collaborators across Europe, the United States, the Middle East and Asia. He is a visiting Professor at the China Agriculture University in Beijing and the Chinese Academy of Sciences, a recipient of a Winston Churchill Fellowship and is an elected Fellow of the Royal Society of Chemistry and Royal Society of Biology. [redacted] has received numerous prizes and awards for his work. In 2017 he was awarded the Royal Society of Chemistry Theophilus Redwood Prize and was also awarded an OBE by Her Majesty Queen Elizabeth II. He was elected a member of the Royal Irish Academy in 2020.

[redacted]
BSc, PhD, FRSC
[redacted] is a Senior Research Fellow within the Institute for Global Food Security at Queen's University Belfast and is the manager of the ASSET Technology Centre. He has a B.Sc. (Hons) in Pure and Applied Chemistry and a PhD in Organic Chemistry. He has published more than 75 scientific papers. He spent more than 8 years as a Senior Research Scientist in industry where his activities included research, product development and manufacturing of in vitro diagnostic kits for use on SPR technology. His current research interests include spectroscopic fingerprinting techniques (e.g. RAMAN/NIRS/FT-IR) and food/feed quality and safety, food/feed authenticity/fraud/provenance. He is a Chartered Chemist (CChem) and Fellow of the Royal Society of Chemistry (FRSC).

**QUB Relevant Publications**

1. [redacted]

## C. STAFF EFFORT

In the table below, please detail the staff time to be spent on the project (for every person named in section above) and their role in delivering the proposal. If new staff will be hired in order to deliver the project please include their grade, name and the staff effort required.

| Name and Role of Person where known/ Role of person to be recruited | Working hours per staff member on this project |
|---|---|
| [redacted] | [redacted] |
| [redacted] | [redacted] |
| [redacted] | [redacted] |

| | |
|---|---|
| [redacted] | [redacted] |
| [redacted] | [redacted] |
| [redacted] | [redacted] |
| [redacted] | [redacted] |
| | |
| [redacted] | [redacted] |

## 5: PROJECT MANAGEMENT

Please fully describe how the project will be managed to ensure that objectives and deliverables will be achieved on time and on budget. Please describe how different organisations/staff will interact to deliver the desired outcomes.
Highlight any in-house or external accreditation for the project management system and how this relates to this project.

The concept and practice of project management is well established within LGC and the organisation considers its implementation to be fundamental to the successful planning, execution and delivery of work programmes to complete customer satisfaction. LGC has accumulated considerable experience in the management and delivery of complex work programmes for its customers. LGC's proven track record of good delivery on customer projects owes much to careful planning and the systems in place for monitoring progress towards objectives.

LGC uses the following mechanisms for performance monitoring/measuring:

- Project Management Tools (IFS)
- Specific milestones and performance targets
- Contingency plans (including a Business Continuity Plan)

By comparing actual against planned progress on a frequent basis, (by regular meetings of Team Leader, project managers and other relevant staff) responsible staff are able to assess progress towards deliverables and, if necessary, make any adjustments to the resources required to ensure delivery within the specified time frame of the project as a whole.

In addition to the formal monitoring of project progress, all LGC staff work to an annual individually tailored forward job plan (FJP) agreed with their line managers. These in turn are linked to the business objectives and targets of the company and individual Teams. Individual objectives in a forward job plan at the team level will include work on specific customer programmes, expected outputs, and key performance indicators to monitor performance against the objectives set. FJPs are reviewed periodically and if necessary adjusted so that they remain aligned to our business and the services we provide to our customers.

Running in parallel to the operational performance programme, the financial performance of the project is monitored on a regular basis so that we remain competitive and provide value for money to the customer. LGC's financial reporting tools allow project managers to obtain detailed information on all financial aspects of each project.

Project management processes will adhere to the LGC Group Quality Manual and applicable local quality procedures. These set out the scope, objectives, responsibilities, and procedures required to delivered effective project management. To support this the NML operates a regime of regular internal audits conducted by our pool trained auditors to ensure that all quality control and quality assurance requirements are fully implemented.

All staff at LGC are trained following documented knowledge transfer programs and procedures. Their training and development needs are regularly reviewed. All instrumentation at LGC is appropriately calibrated and maintained. Local work instructions (WIs) are used in laboratories to provide detailed instructions for the calibration and operation of equipment such as daily temperature checks on fridges and freezers, daily balance checks and also to assess the suitability of use.

All of LGC's activities are registered under BS EN ISO 9001 (2002). The majority of analyses routinely offered by LGC are accredited by UKAS to ISO 17025 and specific areas are compliant with Good Laboratory Practice. The quality procedures followed by LGC are in line with the guidelines outlined in the Joint Code of Practice for Research.

**Project Management Team**

[redacted]

The Project Leader will manage the overall project and be responsible for the day-to-day delivery, planning and decisions associated with delivery of the project. The Project Leader will be the key contact with the Food Standards

Agency's Project Officers. The head of the Office of the Government Chemist will provide technical oversight and consultancy on the scientific activities carried out under this project. Principal Scientists from the relevant technical areas (Organic MS & Molecular Biology) will provide expert consultancy.

Timothy Wilkes will provide technical project management support, and Gary Bird will provide financial project management support.

LGC will engage experts from Queen's University Belfast throughout the project lifetime to deliver the project.

**Project Management at QUB**

Day to day running of the project will be performed by the Research Assistant who will have access daily to their supervisor for support.

Dr Simon Haughey will provide a supervisory role for the work and have daily contact with the research assistant. Informal meetings will be held on an "as needed" basis. He will take responsibility for the timely completion of milestones and deliverables for the project. He will be point of contact for LGC during the project.

Professor Chris Elliott will provide an oversight role and will be consulted on activities. He will be kept informed of progress to enable him to help advice through his extensive network of contacts.

**Collaborative approach**

Progress meetings will be held between LGC and QUB every 2 weeks and any issues that arise will be addressed and appropriate knowledge shared. Minutes of these meetings will be internally recorded. In the case of major deviations, the leadership team will inform FSA to analyse the situation and the appropriate corrective action will be undertaken. Deliverables will be submitted during the lifetime of the project and meetings with the FSA will be held to complement these. This will allow the FSA to monitor progress closely throughout the project lifetime.

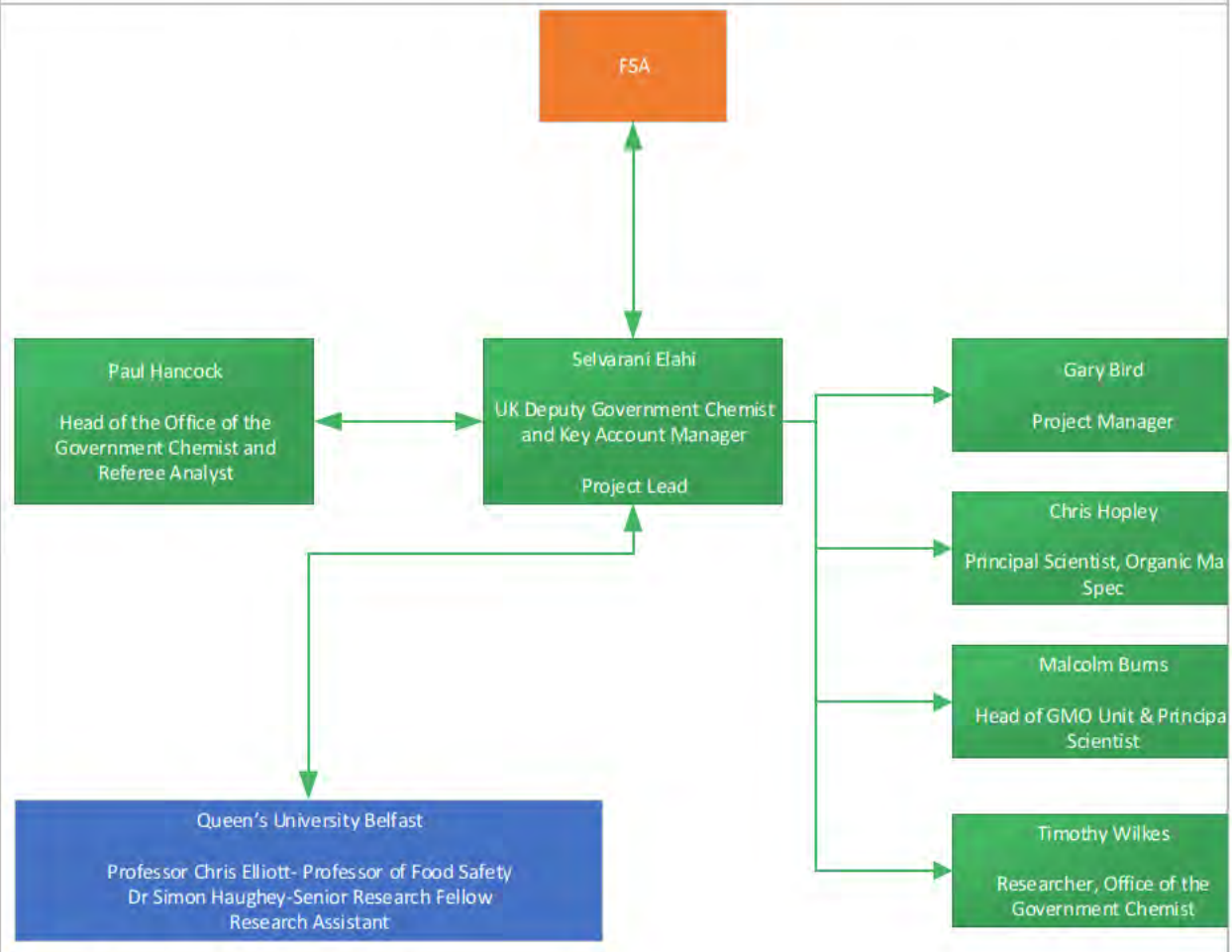



***Figure 5 – Project delivery organogram***

## 6. RISK MANAGEMENT

In the table provided, please identify all relevant risks in delivering this project on time and to budget. Briefly outline what steps will be taken to minimise these risks and how they will be managed by the project team.
Please add more lines as required

| Identified risk | Likelihood of risk (high, medium, low) | Impact of Risk (high, medium, low) | Risk management strategy |
|---|---|---|---|
| Personnel | low | medium | No difficulties in personnel availability are foreseen at the current time. However, a deputy project lead (Paul Hancock) will be appointed in case of the primary project lead being unavailable. LGC possesses broad technical expertise to allow evaluation of methods across multiple techniques and platforms, and this expertise does not lie exclusively with those named in this tender. As such alternative experts will be able to assist if required. |
| Insufficient capacity due to COVID-19 absences | low | medium | 1. Staff provided with laptops and secure 2-step log in (including independent user verification stage) so able and encouraged to work from home if necessary, minimising footfall on site.<br>2. LGC encouraging staff to adhere to national self-isolation/quarantining requirements. LGC has introduced a global policy allowing employees to request up to 10 days paid emergency leave to deal with exceptional, unplanned emergency situations that arise out of COVID-19. |
| Catastrophic incident | low | high | LGC maintains corporate and local registers to regularly review, prevent and mitigate the impact of anticipated risks, including critical supplier or facility loss. Approved secondary suppliers are in place for key items. LGC is a global business with multiple UK and international sites and could if necessary relocate delivery capabilities (staff, kit and consumables) to alternative location(s). As indicated above, staff are provided with laptops and remote access to LGC system to enable homeworking. Laboratory facilities are not required for this project. |
| IT system failure | low | medium | LGC's Risk Steering Committee conducts a quarterly review of risk-related matters, including cyberattacks. Extensive measures are in place to prevent system failure (e.g. firewalls, Forcepoint web filtering, Sophos anti-malware, 'Splunk' network traffic monitoring, Darktrace network scanning), SOP3956 'IT Disaster Recovery and Contingency Planning' sets out LGC's approach. Commvault software manages a 3 tier data backup: daily on-site disk storage, daily replication between 2 physical data centres, monthly backups copied to Amazon Web Services (AWS) for long term retention.<br><br>More broadly, LGC's in-house IT Team has over 20 years of experience of working with LIMS systems and is part of our day-to-day practical processes at LGC. Once an issue has been resolved, a ticket is released to the team informing them that the system is now fully functional and can be used.<br><br>The National Laboratories Division, where this project will be conducted, also has a dedicated IT manager to provide support on a local basis. |
| Availability of stakeholders for interviews | Low | Medium | A number of stakeholders have been pre-contacted and have indicated their agreement in principle to participate in the project. By pre-contacting stakeholders, the Project Team will ensure the relevant people will be available within the project timeframe and are engaged with supporting the project. In cases where a personal contact cannot is not available, an alternate person will be sought through personal contacts or the relevant trade association / professional body. |

| | | | |
|---|---|---|---|
| | | | Virtual meetings will be used in order to facilitate the widest possible stakeholder engagement. |
| Under performance/ lack of cohesion in partners not engaging, underperforming, missing deadlines, unable to fulfil their projected capacity/contribution | Low | Medium | QUB and LGC are experienced in working together and with a range of stakeholders and contacts globally. The partners will work together to ensure smooth delivery of the project, identifying any problems and issues that arise and intervening at an early stage to address them. |
| | | | |

LGC has a set of techniques and standards which are used to assess and mitigate risks across its business. These include:

- Managing Risk Management - version 1.1
- LGC Risk Management Process (based on ISO31000:2009 Risk Management Process)
- LGC Security Management System Policy and Arrangements
- LGC DPL Policy: Dealing with Denied Persons, Politically Exposed Persons and other sanctions lists.
- Anti-corruption and Anti-Bribery Policy*
- Risk register for National Laboratories
- Business Continuity Disaster Recovery plan (BCDR) for Office of the Government Chemist team
- Sub-contracting process
- LGC group ISMS 2001 – Data Privacy and processing Policy 2021*
- LGC NML Cyber arrangements*

Documents marked * are included as supplementary documents to this tender. Others are available on request.

LGC's risk management infrastructure and implementation are managed by two key appointments; the Senior Information Risk Owner and the Group Head of Security. They are supported by a Risk Steering Committee, which has representation from key functions across LGC. LGC's National Laboratories' Teams are experienced in the management of risk for government Customers and stakeholders and have enhanced their risk monitoring and mitigation activities as a response to the challenges posed by the COVID-19 pandemic and EU Exit transition.

**Security**
LGC's security policy is included as a supplementary document to this tender.

## 7. QUALITY MANAGEMENT

### A. QUALITY MANAGEMENT

Please provide details of the measures that will be taken to manage and assure the quality of work. You should upload your Quality Assurance policy in the supporting documents section of your application.

This should include information on the quality assurance (QA) systems, , which have been implemented or are planned, and should be appropriate to the work concerned. All QA systems and procedures should be clear and auditable, and may include compliance with internationally accepted quality standards specified in the ITT e.g. ISO 9001 and ISO17025.

Specific to science projects and where relevant, applicants must indicate whether they would comply with the Joint Code of Practice for Research (JCoPR). If applicants do not already fully comply with the JCoPR please provide a statement to this effect to provide an explanation of how these requirements will be met. The FSA reserves the right to audit projects against the code and other quality standards

The lead principle investigator is responsible for all work carried out in the project; (including work supplied by sub-contractors) and should therefore ensure that the project is carried out in accordance with the Joint Code of Practice.

LGC's reputation is built on quality. The services required for this contract can best be fulfilled effectively by an organisation with a commitment to total quality and a track record of delivering impartial advice. LGC's track record of, and commitment to, quality is reflected in its being among the first laboratories to achieve accreditation under:

- **BS EN ISO 9001:2015 (BS5750 Part 1)**
  Granted March 1994, all Laboratory activities are covered, i.e. both scientific and support activities, e.g. customer relations and financial services.
- **ISO17034:2016**
  Granted in 2006 (ISO Guide 34) for the general requirements for the competence of Reference Materials producers
- **Additional UK Accreditation Service, UKAS**

  Granted April & November 1984 (testing & calibration respectively), LGC was one of the first laboratories to achieve this foremost assurance of analytical quality and reliability, and now has one of the most extensive scopes of accreditation to the requirements of ISO/IEC 17025:2015 of any laboratory in Europe.
    - LGC is also accredited by UKAS for the provision of proficiency testing (PT) schemes to ISO Guide 1743:20101, and for the production of Certified Reference Materials (CRMs) to ISO/IEC 17025:2015 in combination with ISO 17034:2016, being in the first tranche of accredited organisations for both these activities.
    - LGC has ISO17025 accreditation to provide statements of opinions and interpretation in relation to referee analyst. This accreditation covers the interpretation of analytical data derived from prescribed methods of analysis and the expression of opinions with regard to product compliance with the relevant legislation.

The quality systems are formally documented in a Quality Manual as Quality Procedures and Work Instructions. Although these are controlled documents their inspection by customers and other interested parties can be arranged on request.

The Total Quality approach to all aspects of LGC's work is also characterised by:

- All of LGC's operations comply with the requirements of ISO 9001:2015;
- Recognition of LGC as the Government's Referee Analyst and cited explicitly in Acts of Parliament;
- Management of, and participation in, proficiency testing schemes, such as Aquacheck, CONTEST, FAPAS, Toytest, Quartz, Aims, DAPS, BAPS, UKNEQAS, UKFSLG, CTS, EUPTS and Asia
- Production, and use, of certified reference materials (CRMs) for traceability and calibration;
- A continuous improvement cycle to all aspects of service, including technical, commercial and customer relations;
- Regular internal audits to ensure that the highest standards of quality are maintained.

LGC is committed to continual improvement in quality and efficiency through a system of regular internal audits. These programs aim to identify areas where procedures can be improved to meet the needs of our customers and other stakeholders more effectively. In working towards continual improvement LGC is following the EFQM Excellence model to identify gaps and possible solutions.

The quality of the results we provide to our customers is a cornerstone of the service LGC provides. To help protect this high quality of service LGC ensures that competent staff are recruited to conduct its work. Further, a comprehensive training program is in place for all employees.

LGC is further committed to promoting QA within the whole of the analytical community. As the UK's designated Institute for chemical and biochemical measurements, LGC has a major role to play in helping to improve the accuracy and reliability of chemical and bio-measurements that are important to the UK's industrial competitiveness and quality of life. LGC's measurement science is recognised throughout the world and many of our experts represent UK metrology interests on European and international organisations.

Copies of LGC's UKAS and BS EN ISO 9001 certification, ISO 17025 for testing and certification laboratories (UKAS_17025_testing_&_calibration (quality assurance)) the UKAS testing schedule (Schedule of accreditation (quality assurance)), and LGC's ESG Policy (LGC's policies and management systems) have been submitted as part of this tender as additional attachments. The LGC Quality Manual is a controlled document but can also be made available for inspection upon request.

LGC fully complies with the Joint Code of Practice for Research (JCoPR). In the case of this contract, no laboratory work is envisaged – therefore the JCoPR would only apply to any laboratory work undertaken in response to an emerging issue.

**Research Quality at QUB**

The Research Excellence Framework (REF) is a UK-wide assessment that provides a robust and thorough assessment of the quality of universities' research in all disciplines, providing accountability for public investment in research and demonstrating the benefits of that investment. The assessment is conducted by panels of academics and international experts. The most recent results have been published in May 2022, and have confirmed QUB as a

world-leading university. The results demonstrated research excellence across a range of disciplines, putting QUB in the top 20 per cent of all UK universities. 99% of the research environment at QUB was assessed as world-leading or internationally excellent. The university was ranked 1st in the UK for Agriculture, Veterinary and Food Sciences which is related to the research carried out in the Institute for Global Food Security and School of Biological Sciences.

Compliance with Joint Code of Practice for Research:
QUB are fully aware and committed to the principles of Joint Code of Practice for Quality Assurance in Research. QUB is a long-standing research provider and is highly recognised internationally for the quality of its outputs. The university has a policy that places the development of internationally recognised quality assurance standards very high in its priorities. QUB is committed to ensuring through best practices as documented under its 'Research Governance' that all research performed will meet the standards of the code. With respect to the Joint Code of Practice for Quality Assurance in Research we operate in line with Good Laboratory Practice and Good Scientific Practice and have Risk and COSHH assessments and Standard Operating Procedures in place for every project/activity

The ASSET Technology Centre within IGFS is unique for a university in that is has methods for herb authenticity that have received ISO/IEC 17025 accreditation (lab UKAS accreditation number 10515, accreditation certificate included as a supporting document to this tender).

**Specific quality management requirements for this project**

To help ensure the quality of the outputs throughout the project, LGC will:

1. Ensure that the outcomes of the **literature review** are robust in the following manner:
   - Using sources that will detect both UK and international items.
   - The findings of the literature review will be stored in an Excel database giving the details, key findings/conclusions and methods used for each document reviewed.
   - The literature review will be validated by peer review within QUB. The initial data collection by the Research Assistant will be checked for completeness by the investigators at QUB.
   - The robustness of the findings from the literature review and will be cross-checked with the other outputs of Work Package 1.
   - Comprehensive key search terms intended to be used, including but not limited to:
     - Herb
     - Spice
     - Authenticity
     - Methods
     - Validation
     - Targeted
     - Non-targeted
     - Untargeted
     - Analysis
     - Commercial test
     - Fraud
   - The search terms will be applied across a range of scholarly databases and the internet to ensure that both academic and grey literature publications are captured.
2. **Stakeholder focus groups**
   - The stakeholder focus groups will be conducted in a manner that is compliant with the General Data Protection Regulation.
   - The final list of organisations to be invited to attend the stakeholder focus groups will be agreed with FSA.
   - Five stakeholder focus groups will be conducted to cover the following range of stakeholder categories to cover the food industry, local authorities, central government, instrument manufacturers and testing laboratories.
   - The stakeholder focus groups will be conducted, using topic guide questions as guidance (to be agreed with FSA), to identify the required information on herb and spice authenticity.
   - All stakeholder focus groups will be recorded, subject to the agreement of the participants, and transcribed (non-attributed) to formally document the data collected.
     Two researchers will be involved in the stakeholder focus groups and interpreting the data collected to enhance the trustworthiness and credibility of the qualitative analysis.

## B. ETHICS

Please identify the key ethical issues for this project and how these will be managed. Please respond to any issues raised in the Specification document. Please describe the ethical issues of any involvement of people, human samples, animal research or personal data in this part. In addition, please describe the ethical review and governance arrangements that would apply to the work done.

Applicants are reminded that, where appropriate, the need to obtain clearance for the proposed project from their local ethics committee. This is the responsibility of the project Lead Applicant. However, if a sub-contractor requires such clearance the project Lead Applicant should ensure that all relevant procedures have been followed. If there are no ethical issues please state this.

All activities undertaken by LGC will be conducted under the LGC Code of Ethics (a copy of which is included in the appendices to this tender). This code places the LGC values of "integrity" and "respect" at the heart of LGC's mission of "Science for a Safer World" and outlines the high ethical standards expected by LGC from its employees, consultants, and contractors.

A commitment to high ethical standards has been at the heart of LGC since we started as the UK 'Laboratory of the Board of Excise' testing the integrity of products in 1842. Today, as an international leader in the extended life sciences sector it is important our commitment to the highest professional and ethical standards is understood and embedded throughout our business. We expect our employees, consultants and contractors to do the right thing. This is integral to our purpose of "Science for a Safer World" and is reflected in our core values of "integrity" and "respect".

Our commitment to high ethical standards:

- Raise a concern
- Following laws and regulations
- Anti-bribery and corruption – including gifts and hospitality and charitable and political donations and sponsorship
- Fair competition – anti-trust and competition
- Trade sanctions
- Handling information – personal data and customer inside information
- Financial records – accurate records which do not mislead or misrepresent
- Anti-facilitation of tax evasion
- Supplier management - what we expect from our suppliers
- Treating people with respect – harassment, bullying, victimisation and discrimination
- Our staff responsibility.

LGC also has a central Bio-Ethics Committee to provide consistent and formal advice to staff on the compliance of all work undertaken with respect to the Human Tissue Act the in the UK. However, there are no bio-ethical issues ethical anticipated under this project.

All stakeholder interviews will be conducted in compliance with the General Data Protection Regulation (see 'QUALITY MANAGEMENT' above, and 'DATA PROTECTION' below).

## C. DATA PROTECTION

Please identify any specific data protection issues for this project and how these will be managed. Please respond to any specific issues raised in the Specification document.
Please note that the successful Applicant will be expected to comply with the Data Protection Act (DPA) 2018 and ensure that any information collected, processed and transferred on behalf of the FSA, will be held and transferred securely.

In this part please provide details of the practices and systems which are in place for handling data securely including transmission between the field and head office and then to the FSA. Plans for how data will be deposited (i.e. within a community or institutional database/archive) and/or procedures for the destruction of physical and system data should also be included in this part (this is particularly relevant for survey data and personal data collected from clinical research trials). The project Lead Applicant will be responsible for ensuring that they and any sub-contractor who processes or handles information on behalf of the FSA are conducted securely.

To protect its business information and that of its customers, LGC's official Information Security Policy ensures that information assets (internal and external) are protected from threats and used appropriately. LGC is well versed in dealing with confidential information. All staff are bound by confidentiality agreements and LGC's long history of customs and forensic science work makes security and confidentiality arrangements commonplace.

LGC operates a policy of performing suitability checks on new staff to ensure their eligibility for appointment. This includes checks to ensure suitability, integrity and experience and the methods employed are:

- Character references
- Health declaration form, supplemented as required by examination/referral to occupational health service
- Nationality, birth certificate, passport and other relevant certificates such as marriage, alien etc.
- Education and professional attainment – relevant certificates of qualification

In certain cases, LGC staff involved in particularly sensitive activities are cleared to Security Check (SC) or Developed Vetting (DV) level as appropriate. It is recognised that for the delivery of this contract, background checks on new staff will need to be implemented.

Job descriptions exist for each category of role and there is a clear differentiation between the job responsibilities, the skills required to carry out the role, and the purpose of the specific role. Access to sensitive data is managed according to the individual's role and authorisation level.
It is also recognized that access to mobile devices might be prohibited for staff delivering unless encrypted devices are used.

Sub-contractors/Consultants are required to sign a comprehensive Consultancy Agreement containing Confidentiality and Non-Disclosure clauses and consultants' access to facilities and material is controlled. Subcontractors, including maintenance staff, who are not able to demonstrate that they have suitable security clearance are supervised at all times whilst on site. Selection of subcontractors will be in accordance with LGC HS&I quality procedure 'QM MI 006', a copy of which can be provided upon request.

Control of documents including (but not limited to) Standard Operating Procedures, Work Instructions, Experimental Data, and reports will be undertaken in accordance HS&I quality procedure 'QM QI 001', a copy of which can be provided upon request. Documents under ISO 9001, 17025, and 17034 will created, issued, and controlled in accordance with the requirements of the management systems in operation.

**GDPR policy**

We perform Personal Information Assessments and Risk Assessments for all our contracts and arrangements are summarised in QM MI 018 GDPR Management

**Information security**
LGC uses its information systems to process a range of commercially sensitive information. As such, the information systems and the data processed therein are to be afforded a level of protection commensurate with its sensitivity. The purpose of the information systems is to collect, store and allow the authorised retrieval of data. It is therefore imperative that the confidentiality, integrity and availability of the information systems and associated data are protected at all times.

- LGC has a well-established security organisation and information security management system which is supported by senior management and is aligned with the principles of ISO 27001.
- LGC holds a Cyber Essentials certificate, a copy of which is included as a supplementary document to this tender.
- LGC's Enterprise Risk Steering Committee is responsible for management of risk throughout the organisation. It is chaired by the Group CFO who acts as Senior Information Risk Owner.
- The Computer Security Incident Response Team is responsible for responding to cyber security incidents and reporting outcomes to the Enterprise Risk Management team. Incident details are reported to the LGC Board on a monthly basis.
- Cyber security is embedded within LGC's IT processes, including change management.
- LGC has a well-defined security architecture and associated technologies.
- A multi-layer vulnerability management programme is in operation with regular assessments conducted by both internal personnel and external specialists.
- LGC operates a comprehensive staff security training and awareness programme, including mandatory annual refresher training and monthly phishing simulations.

LGC's IT and cyber security arrangements are summarised in QM MI 017 'LGC IT and Cyber arrangements', a copy of which is included as a supporting document to this tender.

**Specific GDPR requirements for this project:**
LGC will comply with General Data Protection Regulation (GDPR) and ensure that any information collected, processed and transferred on behalf of the FSA will be managed, held, handled and transferred securely. LGC understands that it will be assigned the role of 'Data Processor' for the duration of the contract and the FSA will act as the 'Data Controller'.

Compliance with GDPR will be an agenda item for the project kick off meeting. All subcontractors will be asked to attend this meeting to ensure that they are aware of their obligations. GDPR requirements from the header contract between LGC and FSA will be flowed down to subcontracts as appropriate.

The Data Processor (LGC) will:
- Process any personal data only on the documented instructions of the Controller (the FSA).
- Comply with security obligations equivalent to those imposed on the Controller (implementing a level of security for the personal data appropriate to the risk).
- Ensure that persons authorised to process the personal data have committed themselves to confidentiality or are under an appropriate statutory obligation of confidentiality.
- Only appoint Sub-processors with the Controller's prior specific or general written authorisation, and impose the same minimum terms imposed on it on the Sub-processor; and the original Processor will remain liable to

the Controller for the Sub-processor's compliance. The Sub-processor must provide sufficient guarantees to implement appropriate technical and organisational measures to demonstrate compliance. In the case of general written authorisation, Processors must inform Controllers of intended changes in their Sub-processor arrangements.

- Make available to the Controller all information necessary to demonstrate compliance with the obligations laid down in Article 28 GDPR and allow for and contribute to audits, including inspections, conducted by the Controller or another auditor mandated by the Controller - and the Processor shall immediately inform the controller if, in its opinion, an instruction infringes GDPR or other EU or member state data protection provisions.
- Assist the Controller in carrying out its obligations with regard to requests by data subjects to exercise their rights under chapter III of the GDPR, noting different rights may apply depending on the specific legal basis for the processing activity (and should be clarified by the Controller up-front).
- Assist the Controller in ensuring compliance with the obligations to implementing a level of security for the personal data appropriate to the risk, considering the nature of processing and the information available to the Processor.
- Assist the Controller in ensuring compliance with the obligations to carry out Data Protection Impact Assessments, considering the nature of processing and the information available to the Processor; and
- Notify the Controller without undue delay after becoming aware of a personal data breach.

For this contract, it is proposed to use a Microsoft 365 platform (SharePoint online or Teams, as appropriate) to exchange information between FSA, LGC, and subcontractors Access to this be granted only to authorised staff. LGC's M355 solution ensures that data will be stored within one of three different Microsoft UK data centres and backed-up to different physical location within the UK. LGC uses Microsoft's 365 portal to authenticate user accounts. Use of Multi-Factor Authentication (MFA) is mandatory on all user accounts used to access LGC's network. MFA is via text message or an authentication app.

## D. SUSTAINABILITY

The Food Standards Agency is committed to improving sustainability in the management of operations. Procurement looks to its suppliers to help achieve this goal. You will need to demonstrate your approach to sustainability, in particular how you will apply it to this project taking into account economic, environmental and social aspects. This will be considered as part of our selection process and you must upload your organisations sustainability policies into the eligibility criteria in Bravo.
Please state what(if any) environmental certification you hold or briefly describe your current Environmental Management System (EMS)

Summaries of LGC's Environmental and Sustainability policies are included below. The full policy is included as a supporting document to this tender.

**LGC Environmental Policy**
LGC is a company with 175 years' experience in analytical science acting on behalf of both government and private sector clients. As such, LGC is aware of and accepts the environmental responsibilities placed upon it, in particular those that relate to the operation of laboratories. LGC is committed to the continual improvement of its environmental performance and operates an Environmental Management System (EMS) aligned with ISO 14001 principles. This Environmental Management System provides the framework for setting and reviewing environmental objectives and targets. LGC is committed to complying with all legal and other environmental requirements, as well as with ISO 14001 standards. LGC is also committed to the prevention of pollution and to minimising the environmental impact of its business operations. LGC has an Environmental Team with a remit to advise on and monitor compliance with statutory requirements, instigate the adoption of best practice, actively manage LGC's waste streams and seek ways in which LGC can reduce its environmental impact. The control of both energy and materials consumption, along with the responsible management of our waste are key to LGC's efforts to improve environmental performance and reduce its Carbon Footprint. LGC endeavours to match its energy usage to its business requirements, making sure that loss is minimised and patterns of demand are optimised. All staff are required to play a full part in reducing energy consumption. The laboratory operates a waste minimisation and segregation policy. Where possible, waste is sent for re-cycling rather than landfill. The reduction in the generation of waste materials, particularly chemicals and solvents, is at the forefront of LGC's operating procedures in reducing our impact on the environment. The Environmental Policy is communicated to all employees and made publicly available.
LGC helps its customers respect the environment and reduce waste by providing accurate measurement and quality control systems. We also work to reduce the impact of our own activities have on the environment, including energy consumption and waste production. LGC's commitment to maintaining and enhancing the environment is captured and governed by the following policies and systems: the LGC Environmental Policy; LGC's Sustainability Policy and Group EP2005 Sustainable Procurement; CRC reporting.

**LGC Sustainability Policy**

LGC is committed to a policy of sustainable development that meets the needs of the present, without compromising the ability of future generation to meet their own needs. LGC has set specific goals and targets for sustainability. LGC recognises that its activities have the potential for both positive and negative impacts upon the environment at local, national and global levels. LGC acknowledges the importance of delivering a sustainable service that will contribute to an increase in the quality of life and of the environment. To deliver our goals and strategies LGC will: Communicate LGC's Sustainability Policy and strategy to staff and stakeholders and raise awareness of their sustainability responsibilities and the requirement to commit to environmental improvements; Set continuous improvement targets by which LGC's performance can be measured, demonstrated and reported to LGC's Board; Identify opportunities and take action where practicable to improve the sustainability of LGC's activities, products and operations; Reduce waste created and where possible reuse and recycle before responsible disposal of surplus materials; Comply fully and where possible exceed standards set in relevant UK, EU and international regulatory requirements and agreements; Deliver a travel plan to implement measures to encourage walking, cycling, the use of public transport and a car share scheme as the principle means for commuting to LGC sites; Provide the right level of advice, awareness and competency to staff and to our contractors' employees; Work with our suppliers to ensure that goods and services procured by LGC are sourced in a sustainable manner. LGC recognises that is has an important part to play in society in the way that it carries out its business. Much of our work is aimed at improving the quality of life within society. LGC has a significant role in the analytical chemistry community as well as having an effect on the safety of society. In order for LGC to behave in a socially responsible manner, it is vital that staff are aware of LGC's current activities and take an active part in developing LGC's sustainability activities. **The importance of being able to deliver a reliable and continuous service to customers is guided and governed by LGC's ESG Policy (please see attachments).**

**LGC COMMITMENTS TOWARDS REDUCING CARBON FOOTPRINT**

- We are in the process of setting a 2050 carbon net zero target.
- We currently working with an external agency to measure our group carbon footprint, this will include
    - Direct emissions e.g. from use of natural gas (scope 1)
    - Indirect energy emissions e.g. from electricity (scope 2)
    - Wider emissions associated with our supply chains and business activities (Scope 3)
- We will report on our carbon footprint annually
- Renewable electricity: Currently, at UK sites where LGC is responsible for purchasing electricity 100% of electricity is from certified renewable sources.
- Energy efficiency investment is a priority across LGC, examples include
    - installation of carbon filtered ventilation hoods for workstations. This helps in two ways. First it significantly lowers the amount of electricity required to heat and cool the facility which reduces our carbon footprint. The second is that it traps the VOC's in the carbon media instead of releasing them into the environment.
    - New fume hoods with technology that allows flow rates to be turned down by 40%,Natural gas saving of 70,210 Mw/year

**LGC BUILDING SUSTAINABILITY INTO OUR ANALYTICAL METHODS, LAB CONSUMABLES, AND TECHNOLOGY**

In our analytical laboratories, we focus on developing shorter, more efficient methods, to actively reduce the amount of electricity, gasses and solvents used. Examples of specific projects include:

- Corporately funded development project concerning the use of Hydrogen as a carrier gas for gas chromatography to reduce impact on the dwindling global Helium supply
- Implementation of a GMP compliant SFC system to aid the migration away from normal phase LC.
- The use of UPLC to reduce solvent consumption relative to HPLC.
- Energy efficient equipment, for example
    - Planned replacement of chillers This work is essential to allow lab temperature to be kept within correct working and process approved range and will later allow removal of redundant split units. The proposed new chillers will have an energy efficiency of about 3.3, the existing at best are running at 2 so for every kW of cooling we need to put in 1/3$^{rd}$ less power to achieve this.
- increasing our recycling capacity
- monitoring site electric and water usage
- working with suppliers to reduce packaging
- working with building contractors to improve sustainability of new builds
- weekly environmental awareness emails and much more.
- Energy survey – to understand the energy demands of different equipment and identify opportunities to improve energy management
- Motion sensors – to ensure lights are not on unnecessarily (and reminder labels to turn off lights)
- Recycling of gloves
- Recycling of pipette tips
    - Replacement of taps with push ones that automatically turn-off to reduce water waste
    - Introduced our Sustainability Ninja tips
    - Replaced inefficient boilers and associated pumps to reduce energy consumption

- Currently investigating a green labs certification program
- Corporate LGC project investigating the installation of electric vehicle charge points

**LGC ESG silver award**
In 2022, LGC have been awarded a silver medal for improving our ESG score, as part of our 2022 EcoVadis sustainability assessment. The award places LGC in the top 25% of the 90,000+ companies assessed by EcoVadis.

Established in 2007, EcoVadis is an evidence-based online platform for evaluating and rating sustainable business and procurement practices. Their methodology is built on international sustainability standards, including the Global Reporting Initiative (which we use for our latest ESG report), the United Nations Global Compact and ISO 26000. The assessment covers approximately 200 questions, each which require an evidence-based answer, across four areas: environment, labour and human rights, ethics, and sustainable procurement. Read more on the EcoVadis website to learn more about the assessment (https://ecovadis.com/).

**QUB Environmental Policy**
Queen's University Belfast recognises that its activities impact on the environment at local, regional and global levels. The University acknowledges that the protection of the environment is fundamental to the future health and well-being of all those involved with the institution and the wider community. The University acknowledges its responsibility of demonstrating sustainable leadership in environmental protection and enhancement through its actions as an institution. In providing high quality educational, research, workplace facilities, outreach and engagement, the University is committed to ensuring its environmental impact is minimised. The University also accepts its responsibility to make sure it grows and develops in a sustainable way with continuous improvement in environmental performance embedded into its business model and the culture of the University.

In support of these principles, the University is committed to:
- Complying (and where possible exceeding) with all relevant environmental legislation, regulations and other requirements
- Setting environmental objectives and targets and publicly reporting performance on the Queen's University website
- Communicating our environmental policies and performance to staff, students and other stakeholders
- Monitoring, controlling and improving its environmental performance
- Mitigating the University's negative impact on climate change through the development and implementation of our pathway to Net Zero Carbon emissions
- Embracing the United Nations Sustainable Development Goals across all our activities, including our research, teaching and learning, operational and outreach activities
- Reducing waste created and increasing recycling, reusing and repurposing through the development of effective resource and waste management strategies
- Avoiding or limiting, wherever practical, the use of environmentally damaging substances, materials and processes
- Incorporating sustainable construction principles and practices into the development and refurbishment of the estate
- Promoting sustainable modes of transport including walking, use of public transport, car-sharing and cycling through the implementation of the Travel Plan
- Managing the University's grounds to protect and enhance biodiversity
- Influence our suppliers and contractors to ensure that good, services and works procured support the environmental policy
- Integrating environmental considerations into University policies and procedures, and assessing those policies and performance against environmental and carbon goals
- Working with local, regional and national partners to realise sustainability projects.
- Promoting environmental awareness and responsibility amongst all staff and students and other university stakeholders

QUB SUSTAINABILITY STRATEGY
A Net Zero future is Queen's University Belfast's main sustainability goal, with our new Net Zero Strategy in development.

NET ZERO JOURNEY
The University Carbon Management Plan, which commenced in 2010, sets out the University strategic commitment to reduce carbon emissions across the institution, setting a carbon target of 21% by 2021. This target was achieved in 2017-2018 with a 22.71% reduction in emissions, an important achievement as part of the University's journey to become a net zero organisation. We are planning the next stage in our sustainability journey and the development of a new University Climate Strategy. This Strategy will see the University set a more ambitious target of net-zero emissions by a defined date. To inform and develop our Strategy we will be

commencing a 'Net Zero Conversation' across the University, we would encourage staff, students and members of the general public to join that conversation and share their thoughts, views and ideas on how we shape our journey to Net Zero.

THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)
We are a signatory to the UN Accord, which recognises the key role that global universities have in nurturing a culture of sustainability and achieving the Sustainable Development Goals (SDGs) by 2030 through research, education and operations. We are committed to embedding them in every aspect of our Estate.

STRATEGY 2030
Strategy 2030 sets out Queen's University's ambition for the next 10 years to shape a better world through life-changing education and research across our disciplines, investing in our people, both students and staff, to ensure excellence and impact. Since 1845, Queen's University staff, students and alumni have made a difference to societies locally, nationally and internationally. Today, we are one of the UK and Ireland's leading universities and continue to shape and serve the world around us through our research and teaching.
Strategy 2030 includes four strategic priorities: Education and Skills, Research and Innovation, Global Reputation and Partnerships, Social and Civic Responsibility, and Economic Prosperity.

FINANCE AND DIVERSITY & INCLUSION
The university has a Responsible Investment Policy which sets out the university's aims to divest from fossil fuels, as committed to within our 2030 Strategy. The university is dedicated to transparency across all operations, and report annually on their financial investments via the release of annual reports and statements. Queen's University Belfast is committed to the promotion of equal opportunities, creating an environment that celebrates staff, student and community diversity. This is aided by Queen's Equality, Diversity and Inclusion Policy. The university are dedicated to playing an active role in ensuring all individuals, no matter their background, have access to education and Queen's University Belfast. The Widening Participation Team within Queen's are committed to ensuring that those most able but least likely to participate in Higher Education should have an equal opportunity to do so. A number of initiatives are undertaken, including the provision of numerous scholarships, including an Asylum Seeker Scholarship.

SUSTAINABILITY ENGAGEMENT
Sustainability engagement with staff, students and the local community is a priority at Queen's. We offer multiple programmes and training courses which encourage staff, students and the wider Queen's community to engage in sustainability conversations and activities. Our sustainability programmes aim to create positive behaviour change within the Queen's community. Examples of engagement programmes include Carbon Literacy Training and the Environmental Leadership Programme. Our Staff and Student Sustainability Engagement Strategy can be found on our Environmental Policies page. Our engagement strategy is currently under review and will be developed alongside our Net Zero Strategy to ensure maximum participation from staff and students in sustainability events. This will be reviewed annually and updated as required.

## E. DISSEMINATION AND EXPLOITATION

Where applicable please indicate how you intend to disseminate the results of this project, including written and verbal communication routes if appropriate. Applicants are advised to think carefully about how their research aligns with the FSA strategy, what is the impact that their research has on public health/ consumers and decide how the results can best be communicated to the relevant and appropriate people and organisations in as cost-effective manner as possible. Please provide as much detail as possible on what will be delivered. Any costs associated with this must be documented in the Financial Template.

The applicant should describe plans for the dissemination of the results for the project team as a whole and for individual participants. Details should include anticipated numbers of publications in refereed journals, articles in trade journals etc., presentations or demonstrations to the scientific community, trade organisations and internal reports or publications. Plans to make any information and/or reports available on the internet with the FSA's permission are also useful, however, this does not remove the requirement for Tenderers to think how best to target the output to relevant groups.
If a final report is part of the requirement, please make sure, as part of the executive summary, that aims and results are clear to the general audience and that the impact of the research on public health/consumers and it's alignment to FSA priorities is clearly stated.

Please note that permission to publish or to present findings from work supported by the FSA must be sought in advance from the relevant FSA Project Officer. The financial support of the FSA must also be acknowledged.

Please indicate whether any Intellectual Property (IP) may be generated by this project and how this could be exploited. Please be aware the FSA retains all rights to the intellectual property generated by any contract and where appropriate may exploit the IP generated for the benefit of public health.
In this part Applicants should demonstrate the credibility of the partnership for exploitation of the results and explain the partnership's policy in respect of securing patents or granting licenses for the technology (if applicable).

It should deal with any possible agreements between the partners to extend their co-operation in the exploitation phase and with relevant agreements with companies, in particular users, external to the partnership

The work of the National Measurement Laboratory at LGC addresses the measurement challenges facing the UK and the wider world. We have a strong track record in disseminating and exploiting our work to influence policy, protect consumers, and enhance quality of life.

The below table (**NML Indicators 2016 – 2021**) summarises the centrality of dissemination to the NML's mission.

| Theme | | Indicator | AIM | ACHIEVED | 2021 | 2020 | 2019 | 2018 |
|---|---|---|---|---|---|---|---|---|
| Research | 1.1 | Number of academic collaborators | Grow | | 141 | 136 | 105 | 74 |
| | 1.2 | Number of peer reviewed papers | Maintain | | 43 | 40 | 34 | 30 |
| Trade & Regulation | 2.1 | Number of active measurement services and reference materials | Maintain | | 142 | 128 | 120 | 126 |
| | 2.2 | Income from measurement services and reference materials | Grow | | £0.64M | £0.58M | £0.52M | £0.55M |
| | 2.3 | Publication of new or amended standards with an NMS contribution | Maintain | | 9 | 5 | 8 | 7 |
| Innovation | 3.1 | Number of business collaborations | Grow | | 217 | 143 | 150 | 105 |
| | 3.2 | Number of new active measurement services and reference materials | Maintain | | 27 | 6 | 11 | 6 |
| | 3.3 | Leveraged income from collaborative R&D and consultancy | Grow | | £3.65M | £3.29M | £3.00M | £2.83M |
| Skills | 4.1 | Number accessing measurement training through web resources | Grow | | 2650 | 1840 | 275 | 200 |
| | 4.2 | Participation in face to face training | Grow | | 223 | 171 | 446 | 370 |

***Figure 6: NML Indicators, 2016-2021***

LGC operates many technical websites (see examples below) so it is very familiar with disseminating to a wide range of different stakeholders:
The Government Chemist website: Government Chemist - GOV.UK (www.gov.uk)
The Food Authenticity Network: FoodAuthenticity
The Eurachem website: Welcome to Eurachem
The iKANN website: iKANN
The CAMS website: CAMS-UK

**Dissemination Plans for This Project**

The output of this project will be disseminated through multiple routes:

- A peer reviewed publication will be sought by QUB (not a deliverable for this project)
- Posted on the Food Authenticity Network website www.foodauthenticity.global and included in Monthly Summary Report, which is emailed to its ~3,500 members in 93 countries.
- Posted on the GC website https://www.gov.uk/government/organisations/government-chemist, which has a dissemination list of over 1,000 people.
- Subject to FSA approval, the report or a summary can be disseminated via FSA's Smarter Comms platform.
- Subject to FSA approval, the report or a summary can be sent to the UK's herbs, seasonings and spice associations.
- Subject to FSA approval, the work will be presented at relevant scientific conferences or meetings.
- An article will be written for the Food Authenticity Network newsletter.
- An article will be posted on the Food Authenticity Network social media accounts (LinkedIn and Twitter).
- An article will be written for the Association of Public Analysts newsletter.
- A presentation to Defra's Authenticity Methods Working Group.

# Post Tender Clarification Responses

1. [redacted]

# Annex 4 - Charges

| | |
|---|---|
| Tender Reference | FS900293 |

| | |
|---|---|
| Tender Title | Review of methods for the analysis of culinary herbs and spices for authenticity |

| | |
|---|---|
| Full legal organisation name | LGC Limited |

[redacted]

| **Project Costs Summary Breakdown by Participating Organisations** |
|---|
| Please include only the cost to the FSA. |

[redacted]

| | |
|---|---|
| **Total Project Costs (excluding VAT) **** | **£ 59,384.68** |

* Please indicate zero, exempt or standard rate. VAT charges not identified above will not be paid by the FSA
** The total cost figure should be the same as the total cost shown in table 4
** The total cost figure should be the same as the total cost shown below and in the Schedule of payments tab.

| **Project Costs Summary (*Automatically calculated*)** |
|---|

[redacted]

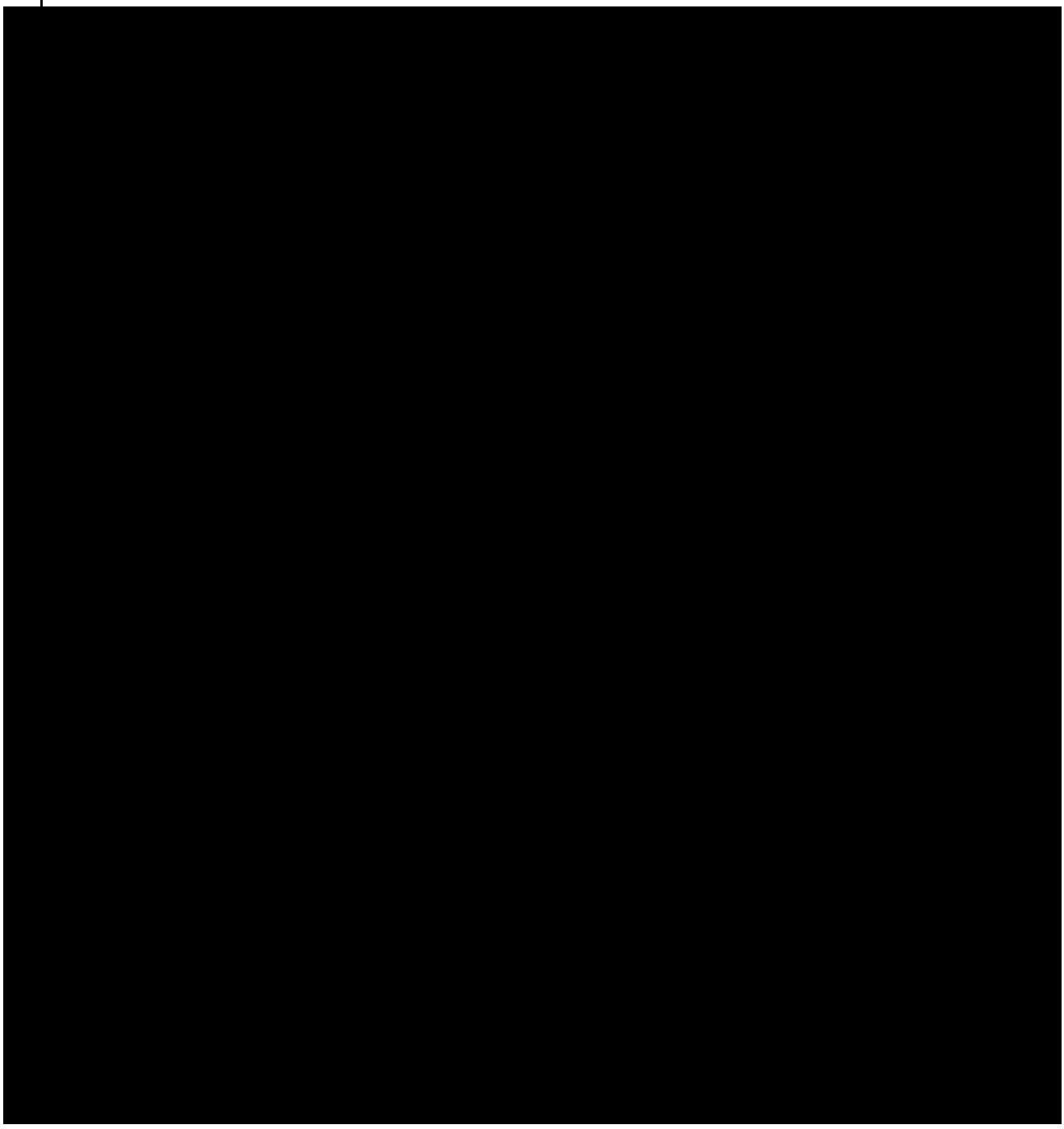
| | **£** |
|---|---|
| **Total Project Costs** | **59,384.68** |

## Staff Costs Table

*This should reflect details entered in your technical application section 4C.

**Please insert as many lines as necessary for the individuals in the project team.**

Please note that FSA is willing to accept pay rates based upon average pay costs. You will need to indicate where these have been used.



[redacted]

## The Pricing Schedule

Please complete a proposed schedule of payments below, **excluding VAT** to be charged by any subcontractors to the project lead applicant. This must add up to the same value as detailed in the Summary of project costs to FSA including participating

organisations costs.

Where differing rates of VAT apply against the deliverables please provide details on separate lines.
Please link all deliverables (singly or grouped) to each payment. Please ensure that deliverable numbers are given as well as a brief description e.g. Deliverable 01/02: interim report submitted to the FSA, monthly report, interim report, final report
Payment will be made to the Contractor, as per the schedule of payments upon satisfactory completion of the deliverables.

[redacted]

[redacted]

| | |
|---|---|
| **Total** | **£ 59,384.68** |

* Please insert the amount to be invoiced net of any VAT for each deliverable
** Please insert the applicable rate of VAT for each deliverable
*** 20% of the total project budget is withheld and will be paid upon acceptance of a satisfactory final report by the agency.
§The number of weeks after project commencement for the deliverable to be completed

**Summary of Payments**

[redacted]

# Short form Terms

## 1. Definitions used in the Contract

In this Contract, unless the context otherwise requires, the following words shall have the following meanings:

| | |
|---|---|
| **"Central Government Body"** | means a body listed in one of the following sub-categories of the Central Government classification of the Public Sector Classification Guide, as published and amended from time to time by the Office for National Statistics:<br>a) Government Department;<br>b) Non-Departmental Public Body or Assembly Sponsored Public Body (advisory, executive, or tribunal);<br>c) Non-Ministerial Department; or<br>d) Executive Agency; |
| **"Charges"** | means the charges for the Deliverables as specified in the Order Form; |
| **"Confidential Information"** | means all information, whether written or oral (however recorded), provided by the disclosing Party to the receiving Party and which (i) is known by the receiving Party to be confidential; (ii) is marked as or stated to be confidential; or (iii) ought reasonably to be considered by the receiving Party to be confidential; |
| **"Contract"** | means the contract between (i) the Buyer and (ii) the Supplier which is created by the Supplier's counter signing the Order Form and includes the Order Form and Annexes; |
| **"Controller"** | has the meaning given to it in the GDPR; |
| **"Buyer"** | means the person identified in the letterhead of the Order Form; |
| **"Date of Delivery"** | means that date by which the Deliverables must be delivered to the Buyer, as specified in the Order Form; |
| **"Buyer Cause"** | any breach of the obligations of the Buyer or any other default, act, omission, negligence or statement of the Buyer, of its employees, servants, agents in connection with or in relation to the subject-matter of the Contract and in respect of which the Buyer is liable to the Supplier; |
| **"Data Protection Legislation"** | (i) the GDPR, the LED and any applicable national implementing Laws as amended from time to time (ii) the Data Protection Act 2018 to the extent that it relates to processing |

| | |
|---|---|
| | of personal data and privacy; (iii) all applicable Law about the processing of personal data and privacy; |
| **"Data Protection Impact Assessment"** | an assessment by the Controller of the impact of the envisaged processing on the protection of Personal Data; |
| **"Data Protection Officer"** | has the meaning given to it in the GDPR; |
| **"Data Subject"** | has the meaning given to it in the GDPR; |
| **"Data Loss Event"** | any event that results, or may result, in unauthorised access to Personal Data held by the Supplier under this Contract, and/or actual or potential loss and/or destruction of Personal Data in breach of this Contract, including any Personal Data Breach; |
| **"Data Subject Access Request"** | a request made by, or on behalf of, a Data Subject in accordance with rights granted pursuant to the Data Protection Legislation to access their Personal Data; |
| **"Deliver"** | means hand over the Deliverables to the Buyer at the address and on the date specified in the Order Form, which shall include unloading and any other specific arrangements agreed in accordance with Clause [ ]. Delivered and Delivery shall be construed accordingly; |
| **"Existing IPR"** | any and all intellectual property rights that are owned by or licensed to either Party and which have been developed independently of the Contract (whether prior to the date of the Contract or otherwise); |
| **"Expiry Date"** | means the date for expiry of the Contract as set out in the Order Form; |
| **"FOIA"** | means the Freedom of Information Act 2000 together with any guidance and/or codes of practice issued by the Information Commissioner or relevant Government department in relation to such legislation; |
| **"Force Majeure Event"** | any event, occurrence, circumstance, matter or cause affecting the performance by either Party of its obligations under the Contract arising from acts, events, omissions, happenings or non-happenings beyond its reasonable control which prevent or materially delay it from performing its obligations under the Contract but excluding: i) any industrial dispute relating to the Supplier, the Supplier Staff (including any subsets of them) or any other failure in the Supplier or the Subcontractor's supply chain; ii) any event, occurrence, circumstance, matter or cause which is attributable to the wilful act, neglect or failure to take reasonable precautions against it by the Party concerned; and iii) any failure of delay caused by a lack of funds; |

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| **"GDPR"** | the General Data Protection Regulation (Regulation (EU) 2016/679); |
| **"Goods"** | means the goods to be supplied by the Supplier to the Buyer under the Contract; |
| **"Good Industry Practice"** | standards, practices, methods and procedures conforming to the law and the exercise of the degree of skill and care, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced person or body engaged within the relevant industry or business sector; |
| **"Government Data"** | a) the data, text, drawings, diagrams, images or sounds (together with any database made up of any of these) which are embodied in any electronic, magnetic, optical or tangible media, including any of the Buyer's confidential information, and which: i) are supplied to the Supplier by or on behalf of the Buyer; or ii) the Supplier is required to generate, process, store or transmit pursuant to the Contract; or b) any Personal Data for which the Buyer is the Data Controller; |
| **"Information"** | has the meaning given under section 84 of the FOIA; |
| **"Information Commissioner"** | the UK's independent authority which deals with ensuring information relating to rights in the public interest and data privacy for individuals is met, whilst promoting openness by public bodies; |
| **"Insolvency Event"** | in respect of a person: a) if that person is insolvent; ii) if an order is made or a resolution is passed for the winding up of the person (other than voluntarily for the purpose of solvent amalgamation or reconstruction); iii) if an administrator or administrative receiver is appointed in respect of the whole or any part of the persons assets or business; iv) if the person makes any composition with its creditors or takes or suffers any similar or analogous action to any of the actions detailed in this definition as a result of debt in any jurisdiction; |
| **"Key Personnel"** | means any persons specified as such in the Order Form or otherwise notified as such by the Buyer to the Supplier in writing; |
| **"LED"** | Law Enforcement Directive (Directive (EU) 2016/680); |
| **"New IPR"** | all and intellectual property rights in any materials created or developed by or on behalf of the Supplier pursuant to the Contract but shall not include the Supplier's Existing IPR; |
| **"Order Form"** | means the letter from the Buyer to the Supplier printed above these terms and conditions; |
| **"Party"** | the Supplier or the Buyer (as appropriate) and "Parties" shall mean both of them; |
| **"Personal Data"** | has the meaning given to it in the GDPR; |

| | |
|---|---|
| **"Personal Data Breach"** | has the meaning given to it in the GDPR; |
| **"Processor"** | has the meaning given to it in the GDPR; |
| **"Purchase Order Number"** | means the Buyer's unique number relating to the order for Deliverables to be supplied by the Supplier to the Buyer in accordance with the terms of the Contract; |
| **"Regulations"** | the Public Contracts Regulations 2015 and/or the Public Contracts (Scotland) Regulations 2015 (as the context requires) as amended from time to time; |
| **"Request for Information"** | has the meaning set out in the FOIA or the Environmental Information Regulations 2004 as relevant (where the meaning set out for the term "request" shall apply); |
| **"Services"** | means the services to be supplied by the Supplier to the Buyer under the Contract; |
| **"Specification"** | means the specification for the Deliverables to be supplied by the Supplier to the Buyer (including as to quantity, description and quality) as specified in the Order Form; |
| **"Staff"** | means all directors, officers, employees, agents, consultants and contractors of the Supplier and/or of any sub-contractor of the Supplier engaged in the performance of the Supplier's obligations under the Contract; |
| **"Staff Vetting Procedures"** | means vetting procedures that accord with good industry practice or, where applicable, the Buyer's procedures for the vetting of personnel as provided to the Supplier from time to time; |
| **"Subprocessor"** | any third Party appointed to process Personal Data on behalf of the Supplier related to the Contract; |
| **"Supplier Staff"** | all directors, officers, employees, agents, consultants and contractors of the Supplier and/or of any Subcontractor engaged in the performance of the Supplier's obligations under a Contract; |
| **"Supplier"** | means the person named as Supplier in the Order Form; |
| **"Term"** | means the period from the start date of the Contract set out in the Order Form to the Expiry Date as such period may be extended in accordance with clause [ ] or terminated in accordance with the terms and conditions of the Contract; |
| **"US-EU Privacy Shield Register"** | a list of companies maintained by the United States of America Department for Commence that have self-certified their commitment to adhere to the European legislation relating to the processing of personal data to non-EU countries which is available online at: https://www.privacyshield.gov/list; |

| | |
|---|---|
| **"VAT"** | means value added tax in accordance with the provisions of the Value Added Tax Act 1994; |
| **"Workers"** | any one of the Supplier Staff which the Buyer, in its reasonable opinion, considers is an individual to which Procurement Policy Note 08/15 (Tax Arrangements of Public Appointees) (https://www.gov.uk/government/publications/procurement-policynote-0815-tax-arrangements-of-appointees) applies in respect of the Deliverables; |
| **"Working Day"** | means a day (other than a Saturday or Sunday) on which banks are open for business in the City of London. |

## 2. Understanding the Contract

In the Contract, unless the context otherwise requires:

2.1 references to numbered clauses are references to the relevant clause in these terms and conditions;

2.2 any obligation on any Party not to do or omit to do anything shall include an obligation not to allow that thing to be done or omitted to be done;

2.3 the headings in this Contract are for information only and do not affect the interpretation of the Contract;

2.4 references to "writing" include printing, display on a screen and electronic transmission and other modes of representing or reproducing words in a visible form;

2.5 the singular includes the plural and vice versa;

2.6 a reference to any law includes a reference to that law as amended, extended, consolidated or re-enacted from time to time and to any legislation or byelaw made under that law; and

2.7 the word ‘including’, "for example" and similar words shall be understood as if they were immediately followed by the words "without limitation".

## 3. How the Contract works

3.1 The Order Form is an offer by the Buyer to purchase the Deliverables subject to and in accordance with the terms and conditions of the Contract.

3.2 The Supplier is deemed to accept the offer in the Order Form when the Buyer receives a copy of the Order Form signed by the Supplier.

3.3 The Supplier warrants and represents that its tender and all statements made and documents submitted as part of the procurement of Deliverables are and remain true and accurate.

# 4. What needs to be delivered

## 4.1 All Deliverables

(a) The Supplier must provide Deliverables: (i) in accordance with the Specification; (ii) to a professional standard; (iii) using reasonable skill and care; (iv) using Good Industry Practice; (v) using its own policies, processes and internal quality control measures as long as they don't conflict with the Contract; (vi) on the dates agreed; and (vii) that comply with all law.

(b) The Supplier must provide Deliverables with a warranty of at least 90 days (or longer where the Supplier offers a longer warranty period to its Buyers) from Delivery against all obvious defects.

## 4.2 Goods clauses

(a) All Goods delivered must be new, or as new if recycled, unused and of recent origin.

(b) All manufacturer warranties covering the Goods must be assignable to the Buyer on request and for free.

(c) The Supplier transfers ownership of the Goods on completion of delivery (including off-loading and stacking) or payment for those Goods, whichever is earlier.

(d) Risk in the Goods transfers to the Buyer on delivery, but remains with the Supplier if the Buyer notices damage following delivery and lets the Supplier know within three Working Days of delivery.

(e) The Supplier warrants that it has full and unrestricted ownership of the Goods at the time of transfer of ownership.

(f) The Supplier must deliver the Goods on the date and to the specified location during the Buyer's working hours.

(g) The Supplier must provide sufficient packaging for the Goods to reach the point of delivery safely and undamaged.

(h) All deliveries must have a delivery note attached that specifies the order number, type and quantity of Goods.

(i) The Supplier must provide all tools, information and instructions the Buyer needs to make use of the Goods.

(j) The Supplier will notify the Buyer of any request that Goods are returned to it or the manufacturer after the discovery of safety issues or defects that might endanger health or hinder performance and shall indemnify the Buyer against the costs arising as a result of any such request.

(k) The Buyer can cancel any order or part order of Goods which has not been delivered. If the Buyer gives less than 14 days' notice then it will pay the Supplier's reasonable and proven costs already incurred on the cancelled order as long as the Supplier takes all reasonable steps to minimise these costs.

(l) The Supplier must at its own cost repair, replace, refund or substitute (at the Buyer's option and request) any Goods that the Buyer rejects because they don't conform with clause 4.2. If the Supplier doesn't do this it will pay the Buyer's costs including repair or re-supply by a third party.

(m) The Buyer will not be liable for any actions, claims, costs and expenses incurred by the Supplier or any third party during delivery of the Goods unless and to the extent that it is caused by negligence or other wrongful act of the Buyer or its servant or agent. If the Buyer suffers or incurs any damage or injury (whether fatal or otherwise) occurring in the course of delivery or

installation then the Supplier shall indemnify from any losses, charges costs or expenses which arise as a result of or in connection with such damage or injury where it is attributable to any act or omission of the Supplier or any of its [sub-suppliers].

**4.3 Services clauses**

(a) Late delivery of the Services will be a default of the Contract.
(b) The Supplier must co-operate with the Buyer and third party suppliers on all aspects connected with the delivery of the Services and ensure that Supplier Staff comply with any reasonable instructions including any security requirements.
(c) The Buyer must provide the Supplier with reasonable access to its premises at reasonable times for the purpose of supplying the Services
(d) The Supplier must at its own risk and expense provide all equipment required to deliver the Services. Any equipment provided by the Buyer to the Supplier for supplying the Services remains the property of the Buyer and is to be returned to the Buyer on expiry or termination of the Contract.
(e) The Supplier must allocate sufficient resources and appropriate expertise to the Contract.
(f) The Supplier must take all reasonable care to ensure performance does not disrupt the Buyer's operations, employees or other contractors.
(g) On completion of the Services, the Supplier is responsible for leaving the Buyer's premises in a clean, safe and tidy condition and making good any damage that it has caused to the Buyer's premises or property, other than fair wear and tear.
(h) The Supplier must ensure all Services, and anything used to deliver the Services, are of good quality [and free from defects].
(i) The Buyer is entitled to withhold payment for partially or undelivered Services, but doing so does not stop it from using its other rights under the Contract.

## 5. Pricing and payments

5.1 In exchange for the Deliverables, the Supplier shall be entitled to invoice the Buyer for the charges in the Order Form. The Supplier shall raise invoices promptly and in any event within 90 days from when the charges are due.

5.2 All Charges:

(a) exclude VAT, which is payable on provision of a valid VAT invoice;
(b) include all costs connected with the supply of Deliverables.

5.3 The Buyer must pay the Supplier the charges within 30 days of receipt by the Buyer of a valid, undisputed invoice, in cleared funds to the Supplier's account stated in the Order Form.

5.4 A Supplier invoice is only valid if it:

(a) includes all appropriate references including the Purchase Order Number and other details reasonably requested by the Buyer;
(b) includes a detailed breakdown of Deliverables which have been delivered (if any).

5.5 If there is a dispute between the Parties as to the amount invoiced, the Buyer shall pay the undisputed amount. The Supplier shall not suspend the provision of the Deliverables unless the Supplier is entitled to terminate the Contract for a failure to pay undisputed sums in accordance with clause 11.6. Any disputed amounts shall be resolved through the dispute resolution procedure detailed in clause 33.

5.6 The Buyer may retain or set-off payment of any amount owed to it by the Supplier if notice and reasons are provided.

5.7 The Supplier must ensure that all subcontractors are paid, in full, within 30 days of receipt of a valid, undisputed invoice. If this doesn't happen, the Buyer can publish the details of the late payment or non-payment.

## 6. The Buyer's obligations to the Supplier

6.1 If Supplier fails to comply with the Contract as a result of a Buyer Cause:

(a) the Buyer cannot terminate the Contract under clause 11;
(b) the Supplier is entitled to reasonable and proven additional expenses and to relief from liability under this Contract;
(c) the Supplier is entitled to additional time needed to deliver the Deliverables;
(d) the Supplier cannot suspend the ongoing supply of Deliverables.

6.2 Clause 6.1 only applies if the Supplier:

(a) gives notice to the Buyer within 10 Working Days of becoming aware;
(b) demonstrates that the failure only happened because of the Buyer Cause;
(c) mitigated the impact of the Buyer Cause.

## 7. Record keeping and reporting

7.1 The Supplier must ensure that suitably qualified representatives attend progress meetings with the Buyer and provide progress reports when specified in the Order Form.

7.2 The Supplier must keep and maintain full and accurate records and accounts on everything to do with the Contract for seven years after the date of expiry or termination of the Contract.

7.3 The Supplier must allow any auditor appointed by the Buyer access to their premises to verify all contract accounts and records of everything to do with the Contract and provide copies for the audit.

7.4 The Supplier must provide information to the auditor and reasonable co-operation at their request.

7.5 If the Supplier is not providing any of the Deliverables, or is unable to provide them, it must immediately:

(a) tell the Buyer and give reasons;
(b) propose corrective action;
(c) provide a deadline for completing the corrective action.

7.6 If the Buyer, acting reasonably, is concerned as to the financial stability of the Supplier such that it may impact on the continued performance of the Contract then the Buyer may:

(a) require that the Supplier provide to the Buyer (for its approval) a plan setting out how the Supplier will ensure continued performance of the Contract and the Supplier will make changes to such plan as reasonably required by the Buyer and once it is agreed then the Supplier shall act in accordance with such plan and report to the Buyer on demand

(b) if the Supplier fails to provide a plan or fails to agree any changes which are requested by the Buyer or fails to implement or provide updates on progress with the plan, terminate the Contract immediately for material breach (or on such date as the Buyer notifies).

## 8. Supplier staff

8.1 The Supplier Staff involved in the performance of the Contract must:

(a) be appropriately trained and qualified;

(b) be vetted using Good Industry Practice

(c) comply with all conduct requirements when on the Buyer's premises.

8.2 Where a Buyer decides one of the Supplier's Staff isn't suitable to work on the Contract, the Supplier must replace them with a suitably qualified alternative.

8.3 If requested, the Supplier must replace any person whose acts or omissions have caused the Supplier to breach clause 8.

8.4 The Supplier must provide a list of Supplier Staff needing to access the Buyer's premises and say why access is required.

8.5 The Supplier indemnifies the Buyer against all claims brought by any person employed by the Supplier caused by an act or omission of the Supplier or any Supplier Staff.

8.6 The Supplier shall use those persons nominated in the Order Form (if any) to provide the Deliverables and shall not remove or replace any of them unless:

(a) requested to do so by the Buyer (not to be unreasonably withheld or delayed);

(b) the person concerned resigns, retires or dies or is on maternity or long-term sick leave; or

(c) the person's employment or contractual arrangement with the Supplier or any subcontractor is terminated for material breach of contract by the employee.

## 9. Rights and protection

9.1 The Supplier warrants and represents that:

(a) it has full capacity and authority to enter into and to perform the Contract;

(b) the Contract is executed by its authorised representative;

(c) it is a legally valid and existing organisation incorporated in the place it was formed;

(d) there are no known legal or regulatory actions or investigations before any court, administrative body or arbitration tribunal pending or threatened against it or its affiliates that might affect its ability to perform the Contract;
(e) it maintains all necessary rights, authorisations, licences and consents to perform its obligations under the Contract;
(f) it doesn't have any contractual obligations which are likely to have a material adverse effect on its ability to perform the Contract; and
(g) it is not impacted by an Insolvency Event.

9.2 The warranties and representations in clause 9.1 are repeated each time the Supplier provides Deliverables under the Contract.

9.3 The Supplier indemnifies the Buyer against each of the following:
(a) wilful misconduct of the Supplier, any of its subcontractor and/or Supplier Staff that impacts the Contract;
(b) non-payment by the Supplier of any tax or National Insurance.

9.4 If the Supplier becomes aware of a representation or warranty that becomes untrue or misleading, it must immediately notify the Buyer.

9.5 All third party warranties and indemnities covering the Deliverables must be assigned for the Buyer's benefit by the Supplier.

## 10. Intellectual Property Rights (IPRs)

10.1 Each Party keeps ownership of its own Existing IPRs. The Supplier gives the Buyer a non-exclusive, perpetual, royalty-free, irrevocable, transferable worldwide licence to use, change and sub-license the Supplier's Existing IPR to enable it and its sub-licensees to both:
(a) receive and use the Deliverables;
(b) use the New IPR.

10.2 Any New IPR created under the Contract is owned by the Buyer. The Buyer gives the Supplier a licence to use any Existing IPRs for the purpose of fulfilling its obligations under the Contract and a perpetual, royalty-free, non-exclusive licence to use any New IPRs.

10.3 Where a Party acquires ownership of intellectual property rights incorrectly under this Contract it must do everything reasonably necessary to complete a transfer assigning them in writing to the other Party on request and at its own cost.

10.4 Neither Party has the right to use the other Party's intellectual property rights, including any use of the other Party's names, logos or trademarks, except as provided in clause 10 or otherwise agreed in writing.

10.5 If any claim is made against the Buyer for actual or alleged infringement of a third party's intellectual property arising out of, or in connection with, the supply or use of the Deliverables (an "**IPR Claim**"), then the Supplier indemnifies the Buyer against all losses, damages, costs or expenses (including professional fees and fines) incurred as a result of the IPR Claim.

10.6 If an IPR Claim is made or anticipated the Supplier must at its own expense and the Buyer's sole option, either:

(a) obtain for the Buyer the rights in clauses 10.1 and 10.2 without infringing any third party intellectual property rights;

(b) replace or modify the relevant item with substitutes that don't infringe intellectual property rights without adversely affecting the functionality or performance of the Deliverables.

## 11. Ending the contract

11.1 The Contract takes effect on the date of or (if different) the date specified in the Order Form and ends on the earlier of the date of expiry or termination of the Contract or earlier if required by Law.

11.2 The Buyer can extend the Contract where set out in the Order Form in accordance with the terms in the Order Form.

**11.3 Ending the Contract without a reason**

The Buyer has the right to terminate the Contract at any time without reason or liability by giving the Supplier not less than 90 days' written notice and if it's terminated clause 11.5(b) to 11.5(g) applies.

**11.4 When the Buyer can end the Contract**

(a) If any of the following events happen, the Buyer has the right to immediately terminate its Contract by issuing a termination notice in writing to the Supplier:

(i) there's a Supplier Insolvency Event;

(ii) if the Supplier repeatedly breaches the Contract in a way to reasonably justify the opinion that its conduct is inconsistent with it having the intention or ability to give effect to the terms and conditions of the Contract;

(iii) if the Supplier is in material breach of any obligation which is capable of remedy, and that breach is not remedied within 30 days of the Supplier receiving notice specifying the breach and requiring it to be remedied;

(iv) there's a change of control (within the meaning of section 450 of the Corporation Tax Act 2010) of the Supplier which isn't pre-approved by the Buyer in writing;

(v) if the Buyer discovers that the Supplier was in one of the situations in 57 (1) or 57(2) of the Regulations at the time the Contract was awarded;

(vi) the Court of Justice of the European Union uses Article 258 of the Treaty on the Functioning of the European Union (TFEU) to declare that the Contract should not have been awarded to the Supplier because of a serious breach of the TFEU or the Regulations;

(vii) the Supplier or its affiliates embarrass or bring the Buyer into disrepute or diminish the public trust in them.

(b) If any of the events in 73(1) (a) to (c) of the Regulations (substantial modification, exclusion of the Supplier, procurement infringement) happen, the Buyer has the right to immediately terminate the Contract and clause 11.5(b) to 11.5(g) applies.

**11.5 What happens if the Contract ends**

Where the Buyer terminates the Contract under clause 11.4(a) all of the following apply:

(a) the Supplier is responsible for the Buyer's reasonable costs of procuring replacement deliverables for the rest of the term of the Contract;

(b) the Buyer's payment obligations under the terminated Contract stop immediately;

(c) accumulated rights of the Parties are not affected;

(d) the Supplier must promptly delete or return the Government Data except where required to retain copies by law;

(e) the Supplier must promptly return any of the Buyer's property provided under the Contract;

(f) the Supplier must, at no cost to the Buyer, give all reasonable assistance to the Buyer and any incoming supplier and co-operate fully in the handover and re-procurement;

(g) the following clauses survive the termination of the Contract: [3.2.10, 6, 7.2, 9, 11, 14, 15, 16, 17, 18, 34, 35] and any clauses which are expressly or by implication intended to continue.

**11.6 When the Supplier can end the Contract**

(a) The Supplier can issue a reminder notice if the Buyer does not pay an undisputed invoice on time. The Supplier can terminate the Contract if the Buyer fails to pay an undisputed invoiced sum due and worth over 10% of the total Contract value or £1,000, whichever is the lower, within 30 days of the date of the reminder notice.

(b) If a Supplier terminates the Contract under clause 11.6(a):

  (i) the Buyer must promptly pay all outstanding charges incurred to the Supplier;

  (ii) the Buyer must pay the Supplier reasonable committed and unavoidable losses as long as the Supplier provides a fully itemised and costed schedule with evidence - the maximum value of this payment is limited to the total sum payable to the Supplier if the Contract had not been terminated;

  (iii) clauses 11.5(d) to 11.5(g) apply.

**11.7 Partially ending and suspending the Contract**

(a) Where the Buyer has the right to terminate the Contract it can terminate or suspend (for any period), all or part of it. If the Buyer suspends the Contract it can provide the Deliverables itself or buy them from a third party.

(b) The Buyer can only partially terminate or suspend the Contract if the remaining parts of it can still be used to effectively deliver the intended purpose.

(c) The Parties must agree (in accordance with clause 24) any necessary variation required by clause 11.7, but the Supplier may not either:

  (i) reject the variation;

  (ii) increase the Charges, except where the right to partial termination is under clause 11.3.

(d) The Buyer can still use other rights available, or subsequently available to it if it acts on its rights under clause 11.7.

## 12. How much you can be held responsible for

12.1 Each Party's total aggregate liability under or in connection with the Contract (whether in tort, contract or otherwise) is no more than 125% of the Charges paid or payable to the Supplier.

12.2 No Party is liable to the other for:
(a) any indirect losses;
(b) loss of profits, turnover, savings, business opportunities or damage to goodwill (in each case whether direct or indirect).

12.3 In spite of clause 12.1, neither Party limits or excludes any of the following:
(a) its liability for death or personal injury caused by its negligence, or that of its employees, agents or subcontractors;
(b) its liability for bribery or fraud or fraudulent misrepresentation by it or its employees;
(c) any liability that cannot be excluded or limited by law.

12.4 In spite of clause 12.1, the Supplier does not limit or exclude its liability for any indemnity given under clauses 4.2(j), 4.2(m), 8.5, 9.3, 10.5, 13.2, 14.26(e) or 30.2(b).

12.5 Each Party must use all reasonable endeavours to mitigate any loss or damage which it suffers under or in connection with the Contract, including any indemnities.

12.6 If more than one Supplier is party to the Contract, each Supplier Party is fully responsible for both their own liabilities and the liabilities of the other Suppliers.

## 13. Obeying the law

13.1 The Supplier must, in connection with provision of the Deliverables, use reasonable endeavours to:
(a) comply and procure that its subcontractors comply with the Supplier Code of Conduct appearing at (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779660/20190220-Supplier_Code_of_Conduct.pdf) and such other corporate social responsibility requirements as the Buyer may notify to the Supplier from time to time;
(b) support the Buyer in fulfilling its Public Sector Equality duty under S149 of the Equality Act 2010;
(c) not use nor allow its subcontractors to use modern slavery, child labour or inhumane treatment;
(d) meet the applicable Government Buying Standards applicable to Deliverables which can be found online at: https://www.gov.uk/government/collections/sustainable-procurement-the-government-buying-standards-gbs

13.2 The Supplier indemnifies the Buyer against any costs resulting from any default by the Supplier relating to any applicable law to do with the Contract.

13.3 The Supplier must appoint a Compliance Officer who must be responsible for ensuring that the Supplier complies with Law, Clause 13.1 and Clauses 27 to 32

13.4 "Compliance Officer" the person(s) appointed by the Supplier who is responsible for ensuring that the Supplier complies with its legal obligations;

## 14. Data protection

14.1 The Buyer is the Controller and the Supplier is the Processor for the purposes of the Data Protection Legislation.

14.2 The Supplier must process Personal Data and ensure that Supplier Staff process Personal Data only in accordance with this Contract.

14.3 The Supplier must not remove any ownership or security notices in or relating to the Government Data.

14.4 The Supplier must make accessible back-ups of all Government Data, stored in an agreed off-site location and send the Buyer copies every six Months.

14.5 The Supplier must ensure that any Supplier system holding any Government Data, including back-up data, is a secure system that complies with the security requirements specified [in writing] by the Buyer.

14.6 If at any time the Supplier suspects or has reason to believe that the Government Data provided under the Contract is corrupted, lost or sufficiently degraded, then the Supplier must notify the Buyer and immediately suggest remedial action.

14.7 If the Government Data is corrupted, lost or sufficiently degraded so as to be unusable the Buyer may either or both:

(a) tell the Supplier to restore or get restored Government Data as soon as practical but no later than five Working Days from the date that the Buyer receives notice, or the Supplier finds out about the issue, whichever is earlier;

(b) restore the Government Data itself or using a third party.

14.8 The Supplier must pay each Party's reasonable costs of complying with clause 14.7 unless the Buyer is at fault.

14.9 Only the Buyer can decide what processing of Personal Data a Supplier can do under the Contract and must specify it for the Contract using the template in Annex 1 of the Order Form (*Authorised Processing*).

14.10 The Supplier must only process Personal Data if authorised to do so in the Annex to the Order Form (*Authorised Processing*) by the Buyer. Any further written instructions relating to the processing of Personal Data are incorporated into Annex 1 of the Order Form.

14.11 The Supplier must give all reasonable assistance to the Buyer in the preparation of any Data Protection Impact Assessment before starting any processing, including:

(a) a systematic description of the expected processing and its purpose;

(b) the necessity and proportionality of the processing operations;

(c) the risks to the rights and freedoms of Data Subjects;

(d) the intended measures to address the risks, including safeguards, security measures and mechanisms to protect Personal Data.

14.12 The Supplier must notify the Buyer immediately if it thinks the Buyer's instructions breach the Data Protection Legislation.

14.13 The Supplier must put in place appropriate Protective Measures to protect against a Data Loss Event which must be approved by the Buyer.

14.14 If lawful to notify the Buyer, the Supplier must notify it if the Supplier is required to process Personal Data by Law promptly and before processing it.

14.15 The Supplier must take all reasonable steps to ensure the reliability and integrity of any Supplier Staff who have access to the Personal Data and ensure that they:
(a) are aware of and comply with the Supplier's duties under this clause 11;
(b) are subject to appropriate confidentiality undertakings with the Supplier or any Subprocessor;
(c) are informed of the confidential nature of the Personal Data and do not provide any of the Personal Data to any third Party unless directed in writing to do so by the Buyer or as otherwise allowed by the Contract;
(d) have undergone adequate training in the use, care, protection and handling of Personal Data.

14.16 The Supplier must not transfer Personal Data outside of the EU unless all of the following are true:
(a) it has obtained prior written consent of the Buyer;
(b) the Buyer has decided that there are appropriate safeguards (in accordance with Article 46 of the GDPR);
(c) the Data Subject has enforceable rights and effective legal remedies when transferred;
(d) the Supplier meets its obligations under the Data Protection Legislation by providing an adequate level of protection to any Personal Data that is transferred;
(e) where the Supplier is not bound by Data Protection Legislation it must use its best endeavours to help the Buyer meet its own obligations under Data Protection Legislation; and
(f) the Supplier complies with the Buyer's reasonable prior instructions about the processing of the Personal Data.

14.17 The Supplier must notify the Buyer immediately if it:
(a) receives a Data Subject Access Request (or purported Data Subject Access Request);
(b) receives a request to rectify, block or erase any Personal Data;
(c) receives any other request, complaint or communication relating to either Party's obligations under the Data Protection Legislation;
(d) receives any communication from the Information Commissioner or any other regulatory authority in connection with Personal Data processed under this Contract;
(e) receives a request from any third Party for disclosure of Personal Data where compliance with the request is required or claims to be required by Law;
(f) becomes aware of a Data Loss Event.

14.18 Any requirement to notify under clause 14.17 includes the provision of further information to the Buyer in stages as details become available.

14.19 The Supplier must promptly provide the Buyer with full assistance in relation to any Party's obligations under Data Protection Legislation and any complaint, communication or request made under clause 14.17. This includes giving the Buyer:
(a) full details and copies of the complaint, communication or request;
(b) reasonably requested assistance so that it can comply with a Data Subject Access Request within the relevant timescales in the Data Protection Legislation;
(c) any Personal Data it holds in relation to a Data Subject on request;
(d) assistance that it requests following any Data Loss Event;
(e) assistance that it requests relating to a consultation with, or request from, the Information Commissioner's Office.

14.20 The Supplier must maintain full, accurate records and information to show it complies with this clause 14. This requirement does not apply where the Supplier employs fewer than 250 staff, unless either the Buyer determines that the processing:
(a) is not occasional;
(b) includes special categories of data as referred to in Article 9(1) of the GDPR or Personal Data relating to criminal convictions and offences referred to in Article 10 of the GDPR;
(c) is likely to result in a risk to the rights and freedoms of Data Subjects.

14.21 The Supplier must appoint a Data Protection Officer responsible for observing its obligations in this Schedule and give the Buyer their contact details.

14.22 Before allowing any Subprocessor to process any Personal Data, the Supplier must:
(a) notify the Buyer in writing of the intended Subprocessor and processing;
(b) obtain the written consent of the Buyer;
(c) enter into a written contract with the Subprocessor so that this clause 14 applies to the Subprocessor;
(d) provide the Buyer with any information about the Subprocessor that the Buyer reasonably requires.

14.23 The Supplier remains fully liable for all acts or omissions of any Subprocessor.

14.24 At any time the Buyer can, with 30 Working Days notice to the Supplier, change this clause 14 to:
(a) replace it with any applicable standard clauses (between the controller and processor) or similar terms forming part of an applicable certification scheme under GDPR Article 42;
(b) ensure it complies with guidance issued by the Information Commissioner's Office.

14.25 The Parties agree to take account of any non-mandatory guidance issued by the Information Commissioner's Office.

14.26 The Supplier:
(a) must provide the Buyer with all Government Data in an agreed open format within 10 Working Days of a written request;

(b) must have documented processes to guarantee prompt availability of Government Data if the Supplier stops trading;
(c) must securely destroy all Storage Media that has held Government Data at the end of life of that media using Good Industry Practice;
(d) securely erase all Government Data and any copies it holds when asked to do so by the Buyer unless required by Law to retain it;
(e) indemnifies the Buyer against any and all Losses incurred if the Supplier breaches clause 14 and any Data Protection Legislation.

## 15. What you must keep confidential

15.1 Each Party must:
(a) keep all Confidential Information it receives confidential and secure;
(b) not disclose, use or exploit the disclosing Party's Confidential Information without the disclosing Party's prior written consent, except for the purposes anticipated under the Contract;
(c) immediately notify the disclosing Party if it suspects unauthorised access, copying, use or disclosure of the Confidential Information.

15.2 In spite of clause 15.1, a Party may disclose Confidential Information which it receives from the disclosing Party in any of the following instances:
(a) where disclosure is required by applicable Law or by a court with the relevant jurisdiction if the recipient Party notifies the disclosing Party of the full circumstances, the affected Confidential Information and extent of the disclosure;
(b) if the recipient Party already had the information without obligation of confidentiality before it was disclosed by the disclosing Party;
(c) if the information was given to it by a third party without obligation of confidentiality;
(d) if the information was in the public domain at the time of the disclosure;
(e) if the information was independently developed without access to the disclosing Party's Confidential Information;
(f) to its auditors or for the purposes of regulatory requirements;
(g) on a confidential basis, to its professional advisers on a need-to-know basis;
(h) to the Serious Fraud Office where the recipient Party has reasonable grounds to believe that the disclosing Party is involved in activity that may be a criminal offence under the Bribery Act 2010.

15.3 The Supplier may disclose Confidential Information on a confidential basis to Supplier Staff on a need-to-know basis to allow the Supplier to meet its obligations under the Contract. The Supplier Staff must enter into a direct confidentiality agreement with the Buyer at its request.

15.4 The Buyer may disclose Confidential Information in any of the following cases:
(a) on a confidential basis to the employees, agents, consultants and contractors of the Buyer;
(b) on a confidential basis to any other Central Government Body, any successor body to a Central Government Body or any company that the Buyer transfers or proposes to transfer all or any part of its business to;
(c) if the Buyer (acting reasonably) considers disclosure necessary or appropriate to carry out its public functions;

(d) where requested by Parliament;
(e) under clauses 5.7 and 16.

15.5 For the purposes of clauses 15.2 to 15.4 references to disclosure on a confidential basis means disclosure under a confidentiality agreement or arrangement including terms as strict as those required in clause 15.

15.6 Information which is exempt from disclosure by clause 16 is not Confidential Information.

15.7 The Supplier must not make any press announcement or publicise the Contract or any part of it in any way, without the prior written consent of the Buyer and must take all reasonable steps to ensure that Supplier Staff do not either.

## 16. When you can share information

16.1 The Supplier must tell the Buyer within 48 hours if it receives a Request For Information.

16.2 Within the required timescales the Supplier must give the Buyer full co-operation and information needed so the Buyer can:
(a) comply with any Freedom of Information Act (FOIA) request;
(b) comply with any Environmental Information Regulations (EIR) request.

16.3 The Buyer may talk to the Supplier to help it decide whether to publish information under clause 16. However, the extent, content and format of the disclosure is the Buyer's decision, which does not need to be reasonable.

## 17. Invalid parts of the contract

If any part of the Contract is prohibited by Law or judged by a court to be unlawful, void or unenforceable, it must be read as if it was removed from that Contract as much as required and rendered ineffective as far as possible without affecting the rest of the Contract, whether it's valid or enforceable.

## 18. No other terms apply

The provisions incorporated into the Contract are the entire agreement between the Parties. The Contract replaces all previous statements and agreements whether written or oral. No other provisions apply.

## 19. Other people's rights in a contract

No third parties may use the Contracts (Rights of Third Parties) Act (CRTPA) to enforce any term of the Contract unless stated (referring to CRTPA) in the Contract. This does not affect third party rights and remedies that exist independently from CRTPA.

## 20. Circumstances beyond your control

20.1 Any Party affected by a Force Majeure Event is excused from performing its obligations under the Contract while the inability to perform continues, if it both:

(a) provides written notice to the other Party;
(b) uses all reasonable measures practical to reduce the impact of the Force Majeure Event.

20.2 Either party can partially or fully terminate the Contract if the provision of the Deliverables is materially affected by a Force Majeure Event which lasts for 90 days continuously.

20.3 Where a Party terminates under clause 20.2:
(a) each party must cover its own losses;
(b) clause 11.5(b) to 11.5(g) applies.

## 21. Relationships created by the contract

The Contract does not create a partnership, joint venture or employment relationship. The Supplier must represent themselves accordingly and ensure others do so.

## 22. Giving up contract rights

A partial or full waiver or relaxation of the terms of the Contract is only valid if it is stated to be a waiver in writing to the other Party.

## 23. Transferring responsibilities

23.1 The Supplier cannot assign the Contract without the Buyer's written consent.

23.2 The Buyer can assign, novate or transfer its Contract or any part of it to any Crown Body, public or private sector body which performs the functions of the Buyer.

23.3 When the Buyer uses its rights under clause 23.2 the Supplier must enter into a novation agreement in the form that the Buyer specifies.

23.4 The Supplier can terminate the Contract novated under clause 23.2 to a private sector body that is experiencing an Insolvency Event.

23.5 The Supplier remains responsible for all acts and omissions of the Supplier Staff as if they were its own.

23.6 If the Buyer asks the Supplier for details about Subcontractors, the Supplier must provide details of Subcontractors at all levels of the supply chain including:
(a) their name;
(b) the scope of their appointment;
(c) the duration of their appointment.

## 24. Changing the contract

24.1 Either Party can request a variation to the Contract which is only effective if agreed in writing and signed by both Parties. The Buyer is not required to accept a variation request made by the Supplier.

## 25. How to communicate about the contract

25.1 All notices under the Contract must be in writing and are considered effective on the Working Day of delivery as long as they're delivered before 5:00pm on a Working Day. Otherwise the notice is effective on the next Working Day. An email is effective when sent unless an error message is received.

25.2 Notices to the Buyer or Supplier must be sent to their address in the Order Form.

25.3 This clause does not apply to the service of legal proceedings or any documents in any legal action, arbitration or dispute resolution.

## 26. Preventing fraud, bribery and corruption

26.1 The Supplier shall not:

(a) commit any criminal offence referred to in the Regulations 57(1) and 57(2);

(b) offer, give, or agree to give anything, to any person (whether working for or engaged by the Buyer or any other public body) an inducement or reward for doing, refraining from doing, or for having done or refrained from doing, any act in relation to the obtaining or execution of the Contract or any other public function or for showing or refraining from showing favour or disfavour to any person in relation to the Contract or any other public function.

26.2 The Supplier shall take all reasonable steps (including creating, maintaining and enforcing adequate policies, procedures and records), in accordance with good industry practice, to prevent any matters referred to in clause 26.1 and any fraud by the Staff and the Supplier (including its shareholders, members and directors) in connection with the Contract and shall notify the Buyer immediately if it has reason to suspect that any such matters have occurred or is occurring or is likely to occur.

26.3 If the Supplier or the Staff engages in conduct prohibited by clause 26.1 or commits fraud in relation to the Contract or any other contract with the Crown (including the Buyer) the Buyer may:

(a) terminate the Contract and recover from the Supplier the amount of any loss suffered by the Buyer resulting from the termination, including the cost reasonably incurred by the Buyer of making other arrangements for the supply of the Deliverables and any additional expenditure incurred by the Buyer throughout the remainder of the Contract; or

(b) recover in full from the Supplier any other loss sustained by the Buyer in consequence of any breach of this clause.

## 27. Equality, diversity and human rights

27.1 The Supplier must follow all applicable equality law when they perform their obligations under the Contract, including:

(a) protections against discrimination on the grounds of race, sex, gender reassignment, religion or belief, disability, sexual orientation, pregnancy, maternity, age or otherwise;

(b) any other requirements and instructions which the Buyer reasonably imposes related to equality Law.

27.2 The Supplier must take all necessary steps, and inform the Buyer of the steps taken, to prevent anything that is considered to be unlawful discrimination by any court or tribunal, or the Equality and Human Rights Commission (or any successor organisation) when working on the Contract.

## 28. Health and safety

28.1 The Supplier must perform its obligations meeting the requirements of:
(a) all applicable law regarding health and safety;
(b) the Buyer's current health and safety policy while at the Buyer's premises, as provided to the Supplier.

28.2 The Supplier and the Buyer must as soon as possible notify the other of any health and safety incidents or material hazards they're aware of at the Buyer premises that relate to the performance of the Contract.

## 29. Environment

29.1 When working on Site the Supplier must perform its obligations under the Buyer's current Environmental Policy, which the Buyer must provide.

29.2 The Supplier must ensure that Supplier Staff are aware of the Buyer's Environmental Policy.

## 30. Tax

30.1 The Supplier must not breach any tax or social security obligations and must enter into a binding agreement to pay any late contributions due, including where applicable, any interest or any fines. The Buyer cannot terminate the Contract where the Supplier has not paid a minor tax or social security contribution.

30.2 Where the Supplier or any Supplier Staff are liable to be taxed or to pay National Insurance contributions in the UK relating to payment received under the Off Contract, the Supplier must both:
(a) comply with the Income Tax (Earnings and Pensions) Act 2003 and all other statutes and regulations relating to income tax, the Social Security Contributions and Benefits Act 1992 (including IR35) and National Insurance contributions;
(b) indemnify the Buyer against any Income Tax, National Insurance and social security contributions and any other liability, deduction, contribution, assessment or claim arising from or made during or after the Contract Period in connection with the provision of the Deliverables by the Supplier or any of the Supplier Staff.

30.3 If any of the Supplier Staff are Workers who receive payment relating to the Deliverables, then the Supplier must ensure that its contract with the Worker contains the following requirements:
(a) the Buyer may, at any time during the term of the Contract, request that the Worker provides information which demonstrates they comply with clause 30.2, or why those requirements do not apply, the Buyer can specify the information the Worker must provide and the deadline for responding;

(b) the Worker's contract may be terminated at the Buyer's request if the Worker fails to provide the information requested by the Buyer within the time specified by the Buyer;
(c) the Worker's contract may be terminated at the Buyer's request if the Worker provides information which the Buyer considers isn't good enough to demonstrate how it complies with clause 30.2 or confirms that the Worker is not complying with those requirements;
(d) the Buyer may supply any information they receive from the Worker to HMRC for revenue collection and management.

## 31. Conflict of interest

31.1 The Supplier must take action to ensure that neither the Supplier nor the Supplier Staff are placed in the position of an actual or potential conflict between the financial or personal duties of the Supplier or the Supplier Staff and the duties owed to the Buyer under the Contract, in the reasonable opinion of the Buyer.

31.2 The Supplier must promptly notify and provide details to the Buyer if a conflict of interest happens or is expected to happen.

31.3 The Buyer can terminate its Contract immediately by giving notice in writing to the Supplier or take any steps it thinks are necessary where there is or may be an actual or potential conflict of interest.

## 32. Reporting a breach of the contract

32.1 As soon as it is aware of it the Supplier and Supplier Staff must report to the Buyer any actual or suspected breach of law, clause 13.1, or clauses 26 to 31.

32.2 The Supplier must not retaliate against any of the Supplier Staff who in good faith reports a breach listed in clause 32.1.

## 33. Resolving disputes

33.1 If there is a dispute between the Parties, their senior representatives who have authority to settle the dispute will, within 28 days of a written request from the other Party, meet in good faith to resolve the dispute.

33.2 If the dispute is not resolved at that meeting, the Parties can attempt to settle it by mediation using the Centre for Effective Dispute Resolution (CEDR) Model Mediation Procedure current at the time of the dispute. If the Parties cannot agree on a mediator, the mediator will be nominated by CEDR. If either Party does not wish to use, or continue to use mediation, or mediation does not resolve the dispute, the dispute must be resolved using clauses 33.3 to 33.5.

33.3 Unless the Buyer refers the dispute to arbitration using clause 33.4, the Parties irrevocably agree that the courts of England and Wales have the exclusive jurisdiction to:
(a) determine the dispute;
(b) grant interim remedies;
(c) grant any other provisional or protective relief.

33.4 The Supplier agrees that the Buyer has the exclusive right to refer any dispute to be finally resolved by arbitration under the London Court of International Arbitration Rules current at the time of the dispute. There will be only one arbitrator. The seat or legal place of the arbitration will be London and the proceedings will be in English.

33.5 The Buyer has the right to refer a dispute to arbitration even if the Supplier has started or has attempted to start court proceedings under clause 33.3, unless the Buyer has agreed to the court proceedings or participated in them. Even if court proceedings have started, the Parties must do everything necessary to ensure that the court proceedings are stayed in favour of any arbitration proceedings if they are started under clause 33.4.

33.6 The Supplier cannot suspend the performance of the Contract during any dispute.

## 34. Which law applies

This Contract and any issues arising out of, or connected to it, are governed by English law.

## APPENDIX A - VARIATION REQUEST FORM

| |
|---|
| Contract / Project Title:<br><br>Contract / Project Ref No (FS /FSA No): |
| Full Description of Variation Request:<br><br>A full justification and impact assessment including any supplementary evidence must be provided. Any supporting information should be appended to this form. |
| Area (s) Impacted: -<br><br>Price ☐ Duration ☐ Price & Duration ☐ Scope of work ☐ Key Personnel ☐ Other ☐ |
| Requester:<br><br>Signature:<br><br>Team / Organisation<br><br>Date: |
| Supplier Contact Details<br><br>Supplier Name :<br>Contact Name :<br>Contact Address :<br>:<br>Telephone No :<br>Email Address : |
| **FSA Use Only (Business Area)**<br><br>Amount Approved:<br><br>Authorised By:- ☐ Cost Centre Manager ☐ Investment Board<br><br>Signed :<br><br>Date of Approval:<br><br>**Please submit this form to** [redacted] |

| |
|---|
| **Procurement Use Only (confirm contract allows for requested variation)**<br><br>Variation Request No:<br><br>Variation Request Approved by:<br><br>Date of Approval: |
| On full approval of this Request for Variation, Procurement will produce a Variation Form for agreement and approval by both parties to append to the Agreement / Contract. |

**APPENDIX B VARIATION FORM**

**PROJECT TITLE:**

**DATE:**

**VARIATION No:**

BETWEEN:

| |
|---|
| **The Food Standards Agency (hereinafter called "the Buyer") & LGC Limited (hereinafter called "the Supplier")** |

1. The Contract is varied as follows:

| |
|---|
| **Contract**<br><br>x |

2. Words and expressions in this Variation shall have the meanings given to them in the Framework.

3. The Contract, including any previous Variations, shall remain effective and unaltered except as amended by this Variation.

**SIGNED:**

| For: The Buyer | For: The Supplier |
|---|---|
| By: . . . . . .. | By: . . . . . |
| Full Name: . . . . . | Full Name: . . . . . |
| Position: . . . . . | Title: . . . . . |
| Date: . . . . . | Date: . . . . . |