**Order Schedule 20 (Order Specification)**

This Schedule sets out the characteristics of the Deliverables that the Supplier will be required to make to the Buyers under this Order Contract

**Overview of requiremenT**

The next National Infrastructure Assessment will include recommendations to government on the role of the waste sector in reaching net zero targets and moving towards a more circular economy.

To support this work, the Authority requires specialist waste sector research and modelling. This procurement will be a key input into the development of the Commission’s recommendations to government addressing the challenge outlined in 1.3.

Over the lifespan of the Contract this will require (as a minimum) delivery of research, analysis and modelling related to **two workstreams.** Workstream 1 assesses how the waste sector will meet net zero while Workstream 2 assesses how a net zero waste sector can reduce its environmental impact further through greater circularity. The Authority expects a model of the waste sector to be used in these workstreams. Suppliers should also set out an approach, including costings, for Workstream 3 (optional for the Authority) which assesses the effectiveness of policy instruments to achieve increases in circularity.

Delivering on these workstreams will ensure the Supplier answers the key questions of the analysis. These questions are provided under the following workstream descriptions.

**Workstream 1 – Net Zero Pathways:** Assess the current performance of the waste sector in terms of capacity, cost, environmental impact and circularity. Develop and model the least cost infrastructure pathway for the waste sector to meet the sixth carbon budget by 2035 and net zero by 2050 across different arisings scenarios. This should include quantification of required infrastructure capacity, assumed timings for delivery of that capacity, its costs and benefits.  The scope of this workstream is all waste streams and sources except hazardous and nuclear waste.

**Workstream 2 – Enhanced Circularity Pathways**: Gather evidence to identify waste streams with the greatest a) negative environmental impact of extraction and processing and b) potential for circularity. Model the capacity and mix of infrastructure, otherwise known as enhanced circularity pathways, required to deliver different circularity targets for each waste stream. Part of this assessment will include developing a cost-effectiveness metric for each target related to greatest avoided environmental damage per pound spent. This will allow the Authority to determine the preferred circularity target for each identified waste stream. The circularity target for each waste stream will be fed back into each net zero pathway from workstream 1 to determine an overall level of circularity.

**Workstream 3 – Assessment of Policy Effectiveness**: An assessment of the strengths and weaknesses of current and proposed policy instruments in improving the circularity of the waste system.

Workstream 3 is optional for the Authority. Bidders should include this workstream in their proposals; the Authority will decide whether or not to proceed following submission of initial results from workstreams 1 and 2.

The initial scope of requirements is described in Section 5. The Authority and Supplier will agree the detailed scope of each project specified in sections 3.5 - 3.7 in a discrete Statement of Works.

The Supplier will not provide recommendations or policy formulation in their reporting.

As an outcome of this procurement the NIC will be able to:

* + - provide an assessment of the capacity and type of waste infrastructure needed to meet the sixth carbon budget by 2035 and net zero by 2050, for all waste streams and sources excluding hazardous and nuclear waste
    - assess the potential to increase circularity in the waste sector
    - assess the affordability of different GHG reduction and circularity measures.

**Definitions**

| **Expression or Acronym** | **Definition** |
| --- | --- |
| The Authority | means the National Infrastructure Commission: this includes the Commissioners and the Secretariat |
| NIA2 | means the Commission’s second National Infrastructure Assessment |
| Supplier | means the Supplier who is awarded the contract to deliver the services set out in this specification |
| Statement of Works | means the terms, final agreed price and an overview of the methodology to be applied for each project called off within the awarded contract |
| National | refers to England only |
| Waste Sources | Local Authority Collected Waste (LACW), Commercial and Industrial Waste (C&D), Construction and Demolition Waste (C&D) |
| Waste Stream | Material-related waste streams (such as metals or plastics) and product-related waste streams (such as electronic waste and end-of-life vehicles and appliances) |
| Waste Material | The materials of which waste streams are composed e.g. the waste stream metals includes the materials copper, iron, steel. |
| GHG reduction targets | Gross emissions should be consistent with:   * sixth carbon budget by 2035 [CB6] * net zero by 2050   Negative emissions, whether directly generated by waste infrastructure (e.g. biowaste with CCS) or offsets from reduced virgin material use, are accounted for separately and the waste sector cannot score them in getting to CB6 nor net zero. |
| Government commitments | Defra’s existing targets such as the commitment to zero avoidable plastic waste by 2042 and to recycle 65 per cent of all waste by 2035, and draft targets, including 50 per cent reduction in residual waste by 2042. |
| Net Zero  Pathways | Described by the capacity mix of infrastructure which can be scaled to different waste arising scenarios to meet GHG reduction targets. Each pathway will describe a mix of different types of infrastructure and will be defined by the different proportions of each waste stream that are recycled, incinerated, landfilled and treated by other methods (e.g. anaerobic digestion, pyrolysis). All pathways will be developed from the same menu of infrastructure technologies. |
| Menu of technologies | Described as the waste infrastructure technologies and associated emission abatement technologies which enable the waste sector to reach GHG reduction targets. |
| Enhanced Circularity Pathways | Described by the capacity and mix of infrastructure which can be scaled to increase circularity to a certain level (target) for a specific waste stream. |
| Circularity of waste (metric) | The reuse/recycling rate in tonnes of a given waste stream, measured at the point it re-enters the productive economy.  The benefits of circularity consider reused/recycled materials which displace raw materials in the productive economy and generate environmental impacts as a result of avoided raw material extraction and processing. In some instances the recycled material may have a different form or use to the source material (e.g. plastics may be recycled into textiles, or glass into aggregates). In these cases the avoided raw materials should be substitutable for the recycled material. |
| Circularity targets | A specific level of the circularity of waste metric which enhanced circularity pathways achieve. |
| Avoided environmental damage per pound spent | A metric estimated to determine the preferred circularity target for each waste stream identified in workstream 2. Avoided environmental damage relates to the avoided damage associated with raw materials achieved through enhanced circularity pathways. Per pound spent refers to the cost of enhanced circularity pathways to meet a circularity target. |
| Costs | Capital and operating expenditure (unless otherwise specified), as specified in the Authority’s Common Analytical Standards. |
| Benefits and disbenefits | The benefits and disbenefits associated with the identified infrastructure pathways and enhanced circularity pathways which should focus on environmental impacts. |
| Environmental impact | Environmental impacts can be ‘global’ – relating to raw materials extraction and processing, and ‘domestic’ – relating to the waste sector’s infrastructure. They should, as a minimum, include: air quality, water quality and biodiversity impact. They may also include natural capital impact. All impacts are to be defined and agreed using a recognised framework (e.g. DEFRA Environmental Reporting Guidelines, or UNEP ESSF or equivalent) |

**Scope of requirement**

The points below present the boundaries of scope across the analysis:

**Geography**: England

**Time period**: from 2025-2055

**Waste streams**: Hazardous and nuclear waste are not in scope. The Authority would like consideration of all other waste streams in workstream 1, disaggregated by waste stream where relevant. Workstream 2 will only focus on an agreed number of waste streams – these streams will be selected by the authority based on evidence provided by the Supplier. The Supplier may also recommend disaggregating significant waste materials within a stream for independent consideration (for example steel, aluminium or other metals).

**Waste arisings**: Infrastructure pathways and circularity measures should focus on processing waste streams from the point of collection as non-hazardous LACW, C&I, C&D.

**Waste sector infrastructure technologies:** Disposal (landfill); Disposal with energy recovery (EfW, with and without CCS); Sorting and bulking (Mechanical Biological Treatment (MBT), Materials Recovery Facility (MRF), other bulking); Reprocessing (Composting, Anaerobic Digestion (AD), Material-specific reprocessing, pyrolysis).

**Emissions abatement technologies:** These are applied to waste infrastructure technologies to reduce emissions generated by the technology itself or the waste stream which is processed by the technology. They include but are not limited to recycling/reuse, EfW with CCS**,** reduced landfill methane generation, landfill methane capture, landfill methane oxidation, composting improvements, residual waste reductions.

**Emissions:** The waste sector is not itself required to hit net zero emissions by 2050, and this project must not include identifying sources of negative emissions to offset the small positive emissions expected by 2050. Moreover, the Commission believes negative emissions (e.g. from burning waste biomass with CSS) should be counted and presented separately from the sector’s positive emissions.

**Legislative scope**: The model will be constrained to only output infrastructure pathways that meet legislative targets and government commitments. These include but are not limited to:

* sixth carbon budget by 2035
* net zero by 2050
* Defra’s existing targets such as the commitment to zero avoidable plastic waste by 2042 and to recycle 65 per cent of all waste by 2035, and draft targets, including 50 per cent reduction in residual waste by 2042.

**Benefits and disbenefits:** The benefits and disbenefits associated with the identified net zero and enhanced circularity pathways:

**Workstream 1 & 2:** There are benefits and disbenefits which should be reported to allow the Authority to make an assessment of the natural capital and lifecycle GHG impacts of each net zero and enhanced circularity pathway. These are the global environmental impacts of each pathway (as defined in section 4) from virgin raw materials extraction and processing, and domestic environmental impacts of changes in land use from different waste infrastructure and the associated emissions abatement technologies.

**Workstream 2**: The objective of this workstream is to provide analysis which allows the Authority to determine the preferred circularity levels (targets) for each waste stream identified as having circularity potential. Part of this decision will be informed by a cost-effectiveness metric. This metric is defined by the change in global and domestic environmental impact (generated through a reduction in raw material extraction and processing through increased circularity) per pound spent.

**Costs:** The net of gross costs of waste infrastructure and emissions abatement technologies and all revenues from onward sale of reprocessed waste (energy, recyclate etc.)

Gross costs associated with infrastructure pathways and circularity measures should be broken down by **capital expenditure and operating expenditure**. **This includes but is not limited to:**

Any **pre-construction costs** incurred

**Construction costs**. The Supplier should consider how land uses, land availability and disruption due to construction impact costs of waste management at a high level

**Operating costs** of infrastructure

**End of asset life costs** and residual costs if the appraisal period is shorter than asset lifespan.

Revenue from onward sale of reprocessed waste (including recyclate, biomass and bioenergy from CCUS etc.).

Gross costs and revenues should be in market cost terms (including taxes and subsidies e.g. ETS costs or tariffs on low carbon electricity) for the optimisation in workstream 1 and cost-effectiveness metric in workstream 2.

The Supplier is expected to report gross costs, revenue from onward sale of reprocessed waste and the tax and subsidy components of each separately. This will enable the Authority to determine what the cost will be to industry and to society of its recommendations.

Where the Authority identifies a need for new regulation or policy to promote/support in delivering this infrastructure (through workstream 3 or otherwise), the **administrative costs** of the policy must also be captured, as must any **other costs to business** associated with compliance. The Authority will indicate which policies the Supplier should cost.

The below are out of scope:

Modelling/assessing the impact of behaviour change relating to individual consumption (i.e. before materials enter the waste system).

Hazardous and nuclear waste

Waste water

Development of policy recommendations. The NIC will use the outputs of this procurement to support its recommendations.

**The requirement**

Sections 4 and 5 define key terms and set out the scope of the requirement. These should be referred to when reading this section.

The requirement includes **two** (as a minimum) simultaneous workstreams, both with sequential sub-workstreams, which are designed to facilitate decisions by the Authority at key moments in the contract, ensuring outputs are of maximum value to the Authority. The requirement also includes Workstream 3 which is optional for the Authority but should be included in the proposal by the Supplier.

**Workstream 1** assesses the current environmental impact of the waste sector, develops scenarios for future waste arisings and models net zero pathways. **Workstream 2** identifies and models priority materials for enhanced circularity pathways which improve the circularity level of net zero pathways identified in workstream 1. Workstream 3 (optional) assesses the effectiveness of current and proposed policy instruments in delivering greater circularity.

**Workstream 1: Net Zero Pathways**

***Current environmental impact of the waste sector***

The Supplier will report current waste arisings, broken down by the volume (measured in tonnes) of current waste sources and streams.

The Supplier is expected to report the current capacity (measured in tonnes) and cost of waste infrastructure to process waste arisings. This should be disaggregated by waste infrastructure technology (proportion of waste recycled, incinerated, landfilled and treated by other methods). Where possible, the Supplier should estimate the volume of waste from each source and stream for waste infrastructure technology.

The Authority will use current waste sector performance as a baseline comparison for the future net zero pathways identified later in workstream 1. As a result, the Supplier is also expected to provide an assessment of the waste sector’s current environmental impact and level of circularity for the waste sector as a whole and by waste stream where possible.

***Scenarios of future waste arisings and composition***

The Supplier will develop no less than three and no more than five scenarios for the possible future path of waste arisings, using the Authority’s own guidance as set out below.

These should be reported both as total waste arisings and disaggregated by

waste source (i.e. LACW; C&I; C&D) and;

waste stream.

If relevant to the type of infrastructure required to effectively manage the waste, scenarios should also consider changes in the composition of materials in each source/stream.

The Authority has published a view on how best to develop scenarios in [*Managing Uncertainty in the Second National Infrastructure Assessment*](https://nic.org.uk/studies-reports/national-infrastructure-assessment/managing-uncertainty-in-the-second-national-infrastructure-assessment/)*.* Wherever possible the principles in that paper should be followed. In outline terms, these include:

ensuring scenarios collectively cover a wide range of reasonably plausible futures

generating scenarios by varying a relatively small number of parameters, to aid transparency and avoid introducing a large number of small errors

maintaining a list of events that could take the future well outside the range described by scenarios

avoiding any suggestion that there is a ‘central’ or ‘most likely’ scenario.

The output should be a quantitative and qualitative description of each scenario and any events that could take the future outside this range, and a methods statement describing how the scenarios have been designed and challenged.

These scenarios will be the basis for net zero pathway development.

***Modelling least cost net zero pathways***

The objective of workstream 1 is to determine the ‘least-cost’ net zero pathway for the waste sector according to different waste arising scenarios.

The Supplier is expected to model the waste sector and undertake a least-cost optimisation using the menu of waste infrastructure technologies available to develop a net zero pathway.

To meet GHG reduction targets, net zero pathways will either divert waste streams to less GHG emitting waste infrastructure technologies or apply emission abatement technologies to currently more GHG emitting waste infrastructure technologies.

To determine the least cost net zero pathway for each scenario, the Supplier will model the capacity requirements and cost of each pathway. A pathway will describe the mix and capacity of different waste infrastructure and emissions abatement technology. They will be defined by the *different proportions of each waste stream* that end up recycled, incinerated, landfilled and processed by other waste infrastructure technologies. All pathways will be developed from the same menu of infrastructure technologies.

The pathways modelled must be compatible with GHG reduction targets and government commitments.

The Supplier should use reasonably plausible cost ranges for each waste infrastructure technology and associated emission abatement technology modelled. Where different points in the cost ranges alter the preference for one type of waste infrastructure over another, the Authority would expect to see that reflected in multiple net zero pathways for a given arising scenario.

The Supplier is expected to align assumptions about CCUS installation on EfW plants when developing net zero pathways with assumptions used in other work undertaken at the Commission. The constraints on CCUS are primarily related to location of EfW plants and the transportation and storage implications of CCUS installation.

The result of this optimisation will be one net zero pathway for each waste arising scenario, subject to cost sensitivities.

The net zero pathways will be presented as profile over time reflecting assumed timings to deliver the required technology mix and capacity.

For each scenario and pathway, the Supplier will report the mix and capacity of waste infrastructure and associated emission abatement technology required, benefits and disbenefits in line with 5.10.1, incremental costs (relative to today, not a future counterfactual) and total systems costs for:

All waste streams excluding hazardous and nuclear,

LACW, C&I and C&W waste sources individually, and

Waste streams identified in workstream 2

Subject to the impact of cost ranges on the optimisation, the least cost net zero pathway for each waste arising scenario is taken forward to workstream 2. There will be at least 3-5 net zero pathways analysed in workstream 2 as a result.

In order to complete workstream 2, the Supplier should provide an assessment for the level of circularity for each net zero pathway as whole and additionally for each waste stream identified in workstream 2.

**Workstream 2: Enhanced circularity pathways**

The objective for workstream 2 is to reduce raw material use through improved circularity for the net zero pathways determined in workstream 1.

For each net zero pathway determined in workstream 1, workstream 2 models the capacity and mix, **otherwise known as enhanced circularity pathways,** required to deliver at least 5 different circularity level for each priority waste stream (or material) identified as having the greatest total reduction in environmental impact through increased circularity.

The costs and benefits associated with each enhanced circularity pathway will allow the Authority to determine **the preferred level of circularity for each priority waste stream** (or material). This outcome can be integrated into an improved overall circularity level for the waste sector for each net zero pathway.

***Identify priority waste streams for circularity***

Given data limitations surrounding circularity, the scope of workstream 2 is a number of significant waste streams (or materials), rather than focusing on the waste sector as a whole as in workstream 1.

The Supplier should identify priority waste streams for circularity. The Supplier should assess all waste streams excluding biowaste, hazardous and nuclear waste, identify candidate waste streams (or significant materials within a stream) for circularity and present these to the Authority for a decision about which to take forward.

The findings should be presented in a table or other format which makes it straightforward for the Authority to compare and evaluate waste streams (or materials). The Authority will make its decision based on a) the total environmental impact (scale) avoided by bring materials back into productive use and b) the technical potential for increasing circularity through infrastructure. The requirement for this table is described under ‘Environmental impacts of raw materials table’ in the outputs section of this document.

***Development of enhanced circularity pathways***

For each net zero pathway and priority waste stream (or material) identified, the Supplier is expected to develop an enhanced circularity pathway which can be scaled to at least 5 different circularity levels.

When assessing a specific level of circularity for a given waste stream, the Supplier is not expected to model different mixes of waste infrastructure technology. This means multiple different infrastructure mixes will not be tested to achieve the same circularity level for a given waste stream and net zero pathway.

To simplify the analysis, the enhanced circularity pathways will represent a spectrum of recycling rates which achieve different circularity levels, and higher recycling is offset by reduction in the most expensive alternative treatment in the net zero pathway for that waste stream.

Enhanced circularity pathways, as a result, should be defined by the mix and capacity of waste infrastructure technology associated for each waste stream and circularity target. For each waste stream, the difference in mix and capacity of each pathway should only reflect a switch to recycling from the most expensive alternative treatment associated with different circularity targets.

***Modelling enhanced circularity pathways***

The level of circularity achieved for each least-cost net zero pathway in workstream 1 acts as a baseline level which enhanced circularity pathways aim to increase.

For a given net zero pathway selected, the Supplier is expected to model the capacity, cost and environmental impact of different circularity targets achieved through enhanced circularity pathways for each priority waste stream (or material).

Workstream 2 must provide the Authority with sufficient information to identify its preferred ‘level of circularity’ to target for each priority waste stream (or material) and net zero pathway. This should reflect the benefits and disbenefits set out in 5.10.

In addition, the analysis must include an estimated cost-effectiveness metric of each circularity target for each waste stream (or material) through an estimate of avoided environmental damage through reduced raw material extraction and processing per pound spent.

Reduced raw material extraction through greater circularity should consider the marginal use of recyclate and the raw materials it displaces at the point of re-entering the productive economy.

To allow for interpolation where required, the Supplier is expected to test at least 5 circularity targets (e.g. 50%, 60%, 70%) for each waste stream (or material) and net zero pathway.

The circularity targets assessed in workstream 2 through enhanced circularity pathways should not be lower than the level of circularity achieved for the relevant waste stream in the net zero pathway selected in workstream 1.

Like in workstream 1, the Supplier is expected to test sensitivities related to emerging technologies and costs where applicable.

All enhanced circularity pathways must meet net zero GHGs constraints. Negative emissions from reduced use of virgin materials should not be included in this calculation.

Integrating the preferred level of circularity for each priority waste stream (or material) into workstream 1 allows for a final assessment of the circularity level associated with each net zero pathway.

For example, if steel is identified as a priority material in workstream 2, workstream 1 will ensure the Authority has knowledge of a) an estimate of the circularity level of steel for each net zero pathway and b) an estimate of circularity of the waste sector as a whole. Workstream 2 will describe the enhanced circularity pathway required to reach the preferred circularity target for steel for each net zero pathway. This change in circularity of steel can then be integrated into the overall circularity of the waste sector for each net zero pathway in workstream 1.

**Workstream 3: Assessment of policy effectiveness**

The Authority would like the Supplier to set out its approach, including costings, for a third workstream, which is optional for the Authority. The Authority will decide whether or not to proceed following submission of initial results from workstreams 1 and 2.

This workstream would be carried out alongside Workstreams 1 and 2 and would take the form of a systematic policy review to assess the strengths and weaknesses of current and proposed policy instruments in increasing the circularity of the waste system

The minimum requirement would be for a robust qualitative treatment of the pros and cons of available policy instruments. Suppliers may also propose quantitative analysis drawing on existing performance data.

**Inputs**

The Supplier will agree its approach to the analysis with the NIC. Analysis should have the capability to adopt and vary the assumptions/parameters shown below. The Supplier should use existing empirical evidence, or other sources, to refine and test assumptions and parameters which are uncertain or have yet to be developed.

The NIC is preparing for its second National Infrastructure Assessment and will need to ensure that the analytical standards and assumptions (e.g. CCUS installation) used for this project are consistent with those being developed for this, and its wider portfolio of work. This applies to assumptions that apply across infrastructure such as population growth, climate change, measures of economic growth and technological change. The Supplier will work with the NIC to align assumptions as far as feasible, using the NIC’s Common Analytical Standards.

The assumptions and parameters below apply to all workstreams and will be provided by the Authority in the first instance and further agreed with the Supplier in the inception report outlined in section 7, deliverable 2.

| **Assumption and constraints** |
| --- |
| **Constraints:**   * **GHGs:** net zero, sixth carbon budget * **Waste targets:** environmental target of 50 percent reduction in residual waste by 2042; 65 per cent household waste recycled by 2035 |
| **Assumptions:**   1. Avoidable plastic waste will be eliminated by 2042 2. plastic waste exports to non-OECD countries are banned |

The input table below specifies the workstream and format of the data the Supplier will provide in the first instance which will then be approved by the Authority.

|  |  |  |
| --- | --- | --- |
| **Input** | **Measure / description** | **Workstream** |
| **Waste arising Scenarios** | Three to five waste arising scenarios from 2025 to 2055. This should be reported annually as a total for the waste sector and disaggregated by waste source and waste stream. | 1 |
| **Technology costs** | The unit cost ranges of each waste infrastructure and emissions abatement technology. CCUS cost ranges should be in line with costs used in other Commission projects. | 1&2 |

**Outputs**

The outputs of both workstreams will form the basis of the Authority’s final recommendations. They should both include a) provision for the Authority to discuss with the contractor how best to interpret results and limitations from this analysis, and b) a report produced by the Supplier summarising the analysis and results.

As part of the next National Infrastructure Assessment, the Authority will assess the impact of its recommendations. This includes costs to the public sector and businesses, impacts on distributional outcomes, natural capital and lifecycle GHGs. A set of analytical tools are being developed to quantify and monetise these impacts. The table below specifies the additional outputs that are required to run the Commission’s impact tools. There may be additional outputs required subject to changes in the Authority’s impact tools which can be agreed following contract award.

Outputs from the evidence gathering and modelling will be provided to the NIC in a format suitable for further manipulation and dissemination.

A suitable format to provide evidence, modelling and cost outputs will be Microsoft Excel. A suitable format for written reports will be Microsoft Word and Adobe PDF.

| **Output** | **Measure / description** | **Workstream** |
| --- | --- | --- |
| **Current assessment of the waste sector** | In a spreadsheet:   * Current waste arisings, broken down by the volume (measured in tonnes) of current waste sources and streams. * Current capacity (measured in tonnes) and cost of waste infrastructure to process waste arisings. This should be disaggregated by waste infrastructure technology (proportion of waste recycled, incinerated, landfilled and treated by other methods). Where possible, the Supplier should estimate the volume of waste from each source and stream for each waste infrastructure technology. * Current environmental impact and level of circularity for the waste sector as a whole and by waste stream where possible. | 1 |
| **Net zero pathways database** | The database/spreadsheet should provide a summary table detailing the least cost pathway(s) for each scenario and how much waste by source and stream is going to each waste infrastructure technology (recycling, incineration, landfill and other methods).  In addition, the spreadsheet should also detail the following for each pathway and scenario:  **(Market) Costs:**   * Annual gross costs, opex and capex separately, as they are incurred (i.e. no amortisation etc. applied), and amortised costs as they would appear in a bill in real terms, using the Authority’s preferred deflators where required. * Taxes and subsidies related to annual gross costs and annual revenues from reprocessed waste e.g. ETS costs, tariffs for low carbon electricity should be reported separately. * Costs of capital should also be stated where relevant, as should assumptions about depreciation period, to facilitate consistency in assumptions across the wider programme of work for NIA2. * Both total system costs and incremental costs * Aggregate costs and costs per tonne   In order to run the Authority’s analytical impact tools, the following data is required:   * Size of waste facility (measured in tonnes of waste per year) * Construction year * Asset life of infrastructure * WACC   **Environmental impacts:**   * The volume and value of GHG, other air and water pollutants, natural capital impacts and biodiversity impacts. * Positive and negative impacts should be reported separately. * Consider the impact of change in land use where applicable   The Supplier should also provide an assessment for the level of circularity for each net zero pathway as whole and for each waste stream identified in workstream 2. | 1 |
| **Environmental impacts of raw materials table** | For all waste streams (or significant waste materials as identified by the Supplier), a table presenting:   * The volume of waste arisings in tonnes * The volume of raw material in tonnes * The volume and value of GHG, other air and water pollutants, natural capital impacts and biodiversity impacts associated with raw material extraction and processing * The volume of raw material avoided per tonne recycled * The technical potential for bringing the material back into use and the market potential for the recycled product including costs, energy needs and environmental impacts. | 2 |
| **Enhanced circularity pathways database** | The database/spreadsheet should provide a summary table detailing:   * the enhanced circularity pathway which delivers the most cost-effective circularity target for each waste stream-net zero pathway combination. * How the preferred circularity targets for each waste stream (or material) increase the overall level of circularity achieved by net zero pathways.   In addition, the spreadsheet should also detail the following for each enhanced circularity pathway, circularity target, waste stream (or material), and net zero pathway combination:   1. **Avoided environmental damage per pound spent metric** where**:**     1. avoided environmental damage relates to the reduction in raw materials extracted through enhanced circularity pathways.    2. per pound spent refers to the **market cost** (including taxes and subsidies) of enhanced circularity pathways to meet a circularity target. 2. **Market costs are:**  * Annual gross costs, opex and capex separately, as they are incurred (i.e. no amortisation etc. applied), and amortised costs as they would appear in a bill in real terms, using the Authority’s preferred deflators where required. * Taxes and subsidies related to annual gross costs and annual revenues from reprocessed waste e.g. ETS costs, tariffs for low carbon electricity should be reported separately. * Costs of capital should also be stated where relevant, as should assumptions about depreciation period, to facilitate consistency in assumptions across the wider programme of work for NIA2. * Both total system costs and incremental costs * Aggregate costs and costs per tonne   In order to run the Authority’s analytical impact tools, the following data is required:   * Size of waste facility (measured in tonnes of waste per year) * Construction year * Asset life of infrastructure * WACC  1. **Environmental impacts** are as defined in section 3but include**:**  * The volume and value of GHG, other air and water pollutants, natural capital impacts and biodiversity impacts, * Positive and negative impacts should be reported separately. * Consideration of the impact of change in land use where applicable. | 2 |
| **Technology mix of infrastructure report** | In a single report covering both workstreams 1 & 2:   * **Workstream 1:** The technology mix of waste infrastructure (capacity) required to meet net zero according to different scenarios, otherwise known as the **net zero pathways.** * **Workstream 2:** The technology mix of waste infrastructure (capacity) required to achieve a level of circularity for each priority waste stream (or material) identified, otherwise known as the **enhanced circularity pathways**. | Workstream 1 & 2 |
| **Policy effectiveness report** | A qualitative report assessing:  The evidence on the strengths and weaknesses of current and proposed policy instruments in increasing the circularity of the waste system.  This output is optional depending on the decision of the Authority. | Workstream 3 |

**Key milestones and Deliverables**

The following Contract milestones/deliverables shall apply:

| **Milestone Number** | **Milestone/Deliverable Description** | **Timeframe or Delivery Date** |
| --- | --- | --- |
| 1. 1 | 1. Project inception meeting with the NIC to include draft inception report to be provided by the Supplier and agreed by the NIC. The inception report should clarify the approach to be taken and propose data sources to meet the Commission’s requirements. The report should also plan key milestones and dates for deliverables, quality assurance processes, risks and how these will be managed. | Within week 1 of Contract Award |
| 1. 2 | 1. Final inception report submitted to the NIC outlining the methodology, milestones, deliverables, quality assurance, risks, and mitigation. | Within week 2 of Contract Award |
| 1. 3 | 1. Update meetings (virtual or in-person) to discuss findings and progress. Email updates when agreed appropriate. | Weekly up until the submission of deliverable 7 unless agreed otherwise |
| 4 | Draft environmental impacts of raw materials table and current assessment of waste sector spreadsheet shared with the Authority for review. NIC comments shared within one week. | Within week 8 of Contract Award |
| 5 | Final environmental impacts of raw materials table and current assessment of waste sector spreadsheet. | Within week 10 of Contract Award |
| 6 | Draft presentation of key model inputs (scenarios for waste arisings and agreement on net zero and enhanced circularity pathway composition) to the Authority for review. NIC comments shared within one week. | Within week 14 Contract Award |
| 7 | Final presentation of key model inputs (scenarios for waste arisings and agreement on net zero and enhanced circularity pathway composition). | Within week 16 Contract Award |
| 8 | Draft final reports, net zero pathway database and enhanced circularity database shared with NIC for review and comments. NIC comments shared within one week. | Within week 22 of Contract Award |
| 9 | Final submission of reports and databases in a publishable format to the NIC following adjustments from any comments made by the NIC. | Within 6 months of Contract Award |

Timings for workstream 3 will be agreed at point of award.

**Management information / reporting**

The Supplier will provide the NIC with a weekly update on project governance, to include progress against plan, changes in delivery, risks, mitigations and issues.

**Volumes**

Not applicable.

**Continuous improvement**

Changes to the way in which the Services are to be delivered must be brought to the NIC’s attention and agreed prior to any changes being implemented.

**Sustainability**

Not applicable

**Quality**

Responsibility for the quality of outputs sits with the Supplier, whether outputs are produced directly by the Supplier or whether work has been subcontracted to a third party. To reflect this responsibility, any report published will be published in the Supplier’s name on behalf of the NIC, which provides transparency and accountability.

Methodology and assumptions used should be communicated clearly and be open to interrogation rather than in a ‘black-box’. Analysis should be documented, and documentation made available to the NIC.

Assumptions logs should be provided, listing for each key assumption, for example: what the assumption is, its effective date, source, level of certainty, materiality, and the sensitivity of output to changes in the assumption. All facts, figures and evidence used must be correctly sourced, appraised and referenced and subject to internal peer review.

Outputs of analysis should be reconciled with previous outputs from the Supplier (or sub-contractor) if these exist, as well as against outputs of related analysis published by third parties and differences explained.

The Supplier should provide details of how their analysis will be quality assured in a quality assurance plan to be agreed with the NIC at the project inception meeting.

This plan should specify someone, independent of the project, who will take overall responsibility for the Supplier’s quality assurance. Evidence of the Supplier’s quality assurance process being followed should be made available, including detail of the quality assurance checks undertaken, and the Supplier may be asked to present their analysis to the NIC and its relevant experts and answer detailed questions on the analysis and quality assurance undertaken. The Supplier should complete a quality assurance log.

The NIC will use its internal resource, and an expert adviser (as required), to undertake quality assurance and provide advice at key milestones. The Supplier will work with the NIC and expert advisers (through the NIC) in support of this and take into consideration feedback provided.

Appropriate time for quality assurance is expected to be built into the project plan throughout the project lifecycle, and, in discussion with the NIC, time and resource should be allocated to joint review meetings (as noted above).

**Price**

The NIC has a budget of up to £96,000 (including VAT) for delivering the project as scoped in sections 5 and 6. This will be split into £76,000 until 31 March 2023 and **REDACTED TEXT under FOIA Section 43 Commercial Interests**. from 1 April 2023 to project completion and milestones should be costed accordingly.

Any bids that are received above the value of £**REDACTED TEXT under FOIA Section 43 Commercial Interests**. will be disqualified and deemed non-compliant.

Prices are to be submitted via the e-Sourcing Suite (Attachment 4 – Price Schedule) excluding VAT and including all other expenses relating to Contract delivery.

**Staff and customer service**

The Supplier shall provide a sufficient level of resource throughout the duration of the Contract to consistently deliver a quality service.

The Supplier’s staff assigned to the Contract shall have the relevant qualifications and experience to deliver the Contract to the required standard.

The Supplier shall ensure that staff understand the NIC’s vision and objectives and will provide excellent customer service to the NIC throughout the duration of the Contract.

**Service levels and performance**

The NIC will measure the quality of the Supplier’s delivery against the requirements set out in this Statement of Requirements.

**Security and confidentiality requirements**

The deliverables of the Contract should not be shared beyond the NIC and the Supplier.

**Payment and invoicing**

Payment can only be made following satisfactory delivery and completion of each of the milestones stated in section 7.

Before payment can be considered, each invoice must include a detailed elemental breakdown of work completed and the associated costs.

Invoices should be submitted to **REDACTED TEXT under FOIA Section 40, Personal Information**.

The NIC will provide the Supplier with a Purchase Order number which is to accompany all invoices.

**Contract management**

Attendance at meetings shall be at the Supplier’s own expense.

**Location**

The location of the Services will be carried out at Supplier’s address unless otherwise agreed.

**Please provide an organogram including bios of the proposed team for this requirement, including their relevant experience and how that experience will add value to the requirement.**

**Your attachments should not exceed 2 sides of A4 in line with the guidance set in the questionnaire.**

**REDACTED TEXT under FOIA Section 43 Commercial Interests**.

**Please demonstrate how your agency is equipped to deliver the aims and objectives of the research project as outlined in Attachment 3 Statement of requirements, including providing up to three (3) examples of analytical projects your agency has conducted similar to this one and how any lessons learned will add value to the requirement.**

**Your attachments should not exceed 3 sides of A4 in line with the guidance set in the questionnaire.**

**REDACTED TEXT under FOIA Section 43 Commercial Interests**.

**Please demonstrate your understanding of the requirements for this analysis as per section 6 of Attachment 3 Statement of Requirements. This should include:**

**• A brief description of any modelling which might be in workstreams 1 & 2. This would include not least the type of modelling, parameters used, key drivers, outputs and objectives.**

**• Your approach to managing uncertainty in terms of future infrastructure costs and developing waste arising scenarios. This should include the number of scenarios and the variables used to develop the scenarios.**

**• Your approach to developing a table presenting the environmental impacts of raw materials which are analysed in workstream 2.**

**• Your approach to ensuring the robustness of the outputs including how you will manage data gaps and assumptions and how you will report on the overall robustness of the analysis. Please answer this question by providing 2-3 examples illustrating how you will address key data gaps in the analysis and how this may affect the robustness of the outputs.**

**Your attachments should not exceed 5 sides of A4 in line with the guidance set in the questionnaire.**

**REDACTED TEXT under FOIA Section 43 Commercial Interests**.

**Please outline how your organisation will manage this project. This should include but is not limited to:**

**• How the project team will be structured**

**• An outline of the time spent on each of the key stages of the project (in full time equivalent days) for each member of the team.**

**• Details of how quality will be monitored throughout the research activities**

**• An outline of your organisation’s internal peer review process**

**• How emerging risks and issues will be escalated, especially where these impact scope, quality or time**

**• How your organisation will evaluate and respond to changes requested by the Contracting Authority**

**• Your approach to ensuring workstreams 1&2 progress simultaneously, including how outputs from workstream 1 will be used in workstream 2.**

**Your attachments should not exceed 4 sides of A4 in line with the guidance set out in the questionnaire.**

**REDACTED TEXT under FOIA Section 43 Commercial Interests**.