Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Nov 2019

Project Reference Number

NIA_WWU_061

Project Registration

Project Title

Safe Removal of Concrete from Underground Assets

Project Reference Number

NIA_WWU_061

Project Licensee(s)

Wales & West Utilities

Project Start

November 2019

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Robert Williams

Project Budget

£26,921.00

Summary

A project to identify a novel solution that will allow Wales & West Utilities to safely expose any utility pipes and cables that are surrounded by concrete without damaging those underground assets

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

There is currently a challenge when working on live underground gas mains which must be exposed to undertake necessary repairs and maintenance activities. Whilst carrying out these operations there is a high risk of striking cable clusters or damaging gas pipes which are often encased in concrete.

In an instance where an electrical cable or gas pipes are struck there is high risk of injury and damage to neighbouring assets. Currently, the mitigating actions taken to reduce risk of cable strikes are:

- Identify buried assets using existing identification tools;
- Apply 300mm clearance either side of an identified cable;
- Remove concrete using breaking or fracturing techniques e.g. still saws and concrete breakers.

The desired improvement is to provide a solution that will allow gas engineers to safely remove concrete without needing to use breaking or fracturing techniques and to explore new and innovative ways to expose gas pipes without damaging the underground assets.

Method(s)

Initial research has identified several alternative technologies including Air, Water, Vacuum and Vibratory methods that may be transferable to this application. The application of water or air for demolition with vacuum technology for safe removal seems

promising in this industry. Stage 2 of the project will aim to refine our current understanding of these methods in use in various forms of excavation. The adaptation may necessitate a bespoke design. Testing would be required to evaluate the techniques for processing the various substrates that cover the buried assets. We envisage the design would be a powered, vehicle-mounted system, which can be transported and set up in different locations. Safety would be a critical consideration with a focus on human factors as well as safe excavation. Ideally, the design solution will be operable without the need for specialist training, however, subject to the scoring of the concepts considered, it may be that a more efficient system would require some additional training if those operational improvements were considered to outweigh training and other non-mandatory requirements.

Scope

The overall aim of the project is to deliver a tested prototype over 5 distinct stages. It should be noted that this registration document only deals with the first three stages of the project. The cost of and timetable for stages 4 and 5 will be issued during or on completion of stage 3.

1. Requirements capture;
2. Market review;
3. Concept design;
4. Design development (future project);
5. Prototype and testing (future project).

Stage 1: Frazer-Nash Consultancy will hold a workshop with potential users and generate a suitable set of high-level requirements.

Stage 2: Frazer-Nash Consultancy will increase the knowledge and understanding of the potential, currently identified solutions to understand feasibility.

Stage 3: Frazer-Nash Consultancy will produce a number of high-level concept designs along with simple appropriate calculations. An ‘optioneering’ workshop will then be held to select a preferred concept.

Not in scope
Stage 4: Frazer-Nash Consultancy will produce a design of suitable detail to allow for prototype manufacture.

Stage 5: A prototype will be assembled from predominately off the shelf parts to enable functional testing to determine whether the design should be progressed further.

Objective(s)

To produce a concept design for a tool which could be taken forward to a design development stage in a future project

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Success will be to understand if current methods can be improved upon or if current methodologies are best working practices

Project Partners and External Funding

Project partners: Frazer Nash Consultancy

The project will wholly funded by NIA

Potential for New Learning

By pulling in information and techniques from similar, comparable but different applications innovation can be achieved. The project is not constrained to a single solution, technology or method of working so can provide maximum benefit and incorporated learning.

Scale of Project

The scale of the project will be to conduct a market review and produce a concept design which is appropriate for this project

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The problem is not constrained to any geographical area.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External Cost: £20,191
Internal Cost: £6,730

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

n/a

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

A new methodology for breaking concrete near to pipes and cables may result in cost saving through reducing the time taken for operational teams to gain access to the required assets. However the main driver for the project will be an increase in safety for our operatives.

Please provide a calculation of the expected benefits the Solution

Research Project

Please provide an estimate of how replicable the Method is across GB

The method would be replicable for all utility companies.

Please provide an outline of the costs of rolling out the Method across GB.

A unit price at this early stage is unclear, so isn't possible to estimate roll out cost.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

☑ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).

☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)

☐ A specific novel operational practice directly related to the operation of the Network Licensees system

☐ A specific novel commercial arrangement

RIIO-2 Projects

☐ A specific piece of new equipment (including monitoring, control and communications systems and software)

☐ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven

☐ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)

☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology

☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution

☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

All networks will encounter the need to excavate on or near pipes and cables that are encased in concrete. The learning generated could be used by all networks to reduce cable strikes and improve safety.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

n/a

☑ Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

☑ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

All networks were made aware of our intention to proceed with this project and no concerns were raised.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

n/a

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

The current method of removing concrete has been in place for many years and is standard across the industry, a new solution would be truly innovative and benefit all GDN's. Wales & West Utilities are always looking to improve our reduction in cable strikes and this project should help us achieve this.

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

This project did not form part of the RIIO GD1. It requires funding outside of this.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

We do not have the in-house capabilities to allow us to complete this project without the support of NIA funding. Also the use of NIA funding means learning will be shared with all networks potentially benefiting customers throughout the UK.

This project has been approved by a senior member of staff

☑ Yes