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2. Project contact details

2.1 Lead authority name

Wakefield Metropolitan District Council

2.2 Details of the person leading this application

Paul Maddison

Role

Flood Risk Manager

Email address

pmaddison@wakefield.gov.uk

Phone number

2.3 Details of a senior stakeholder from lead authority

Role

Email address

2.4 Details of a Section 151 Officer from lead authority

Role

Email address

2.5 List your project partners and provide a single point of contact for each organisation.

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Project partner organisation	Name of single point of contact	Role of single point of contact	Email address of single point of contact	Phone number of single point of contact
Leeds City Council				
Kirklees Council				
iCASP				
NEXUS				

3. Your project proposal

3.1 Project title

Exploring the use of "smart" technologies to deliver a Connected Places environment, a Long Range Wide Area Network (LoRaWAN) solution is be assessed to address the need for a real time surface water flood warning system

3.2 Project description

Long Range Wide Area Networks (LoRaWAN) are a low energy, low-frequency network allowing the transfer of data from remote, battery powered sensors to user friendly dashboards.

This project will focus surface water level monitoring, such as new bollard sensors, rain fall, soil moisture and gully sensors.

This project will appoint a consultant to map catchment areas, identify flood risk sites and propose LoRaWAN gateways and sensor locations for an early warning system for floods

3.3 How much funding are you applying for?

97000

4. Project assessment

4.1 Describe the problem that your discovery project seeks to investigate.

Surface water flooding is a growing problem across West Yorkshire, disrupting residents and businesses, causing damage, costs and safety risks. Current flood response is reactive rather than proactive and there is no early warning system in place. LoRaWaN offers a possible solution via a network of sensors which transmit real-time surface water levels to a central hub, creating an early warning system available to all local authorities, including Flood Risk Management, Highways, Emergency Planning and Digital Programme Teams. The early warning system will allow flood teams to direct resources in advance of flooding and communicate with communities at risk allowing greater preparation and mitigation to be in place, thereby reducing the impact on communities.

This project will enable knowledge exchange of LoRaWaN and sensor networks between local authorities and partners. It will assess the potential costs and benefits of using this system, and scope feasibility for their installation and data exchange; as flooding is shared problem, this project proposes a shared solution across West Yorkshire. Improved data and data sharing will enable downstream areas to better prepare and warn citizens.

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4.2 Describe the outcomes and outputs you aim to achieve by the end of the project.

This discovery project will enable knowledge exchange of the LoRaWaN network, including how the network connects with sensors, and how sensor data may communicate flood risk. The project will also investigate the viability of an early warning system for improved flood resilience. Measures of viability include:

- 　Cost of network and sensor installation and maintenance.

o　Spatial extent of the network required

- 　Whether surface water data can be meaningfully translated into a flood warning system.

- 　What an early response system may look like

o　Priority contacts, steps and measures to implement

- 　The extent of possible change in response time to a flood event.

- 　An initial cost-benefit analysis of current flood response compared to the proposed sensor-based response. If resources were deployed earlier, would that make a tangible impact?

- 　Identification of priority areas for sensors and where a future scoping study may occur

Outputs will be achieved through a series of workshops run by Yorkshire Integrated Catchment Solutions Programme (iCASP) through the West Yorkshire Flood Innovation Programme. Workshops will enable collaboration between partners for sharing of technical expertise and experience in practical flood response. Outputs include:

- 　A business case for delivery detailing concept viability, including cost-benefit analysis, of an early warning system for flooding across West Yorkshire

- 　[if viable] Development of an Alpha-phase plan which will test proof of concept.

4.3 Tell us how your project will make local government services safer, more resilient and/or cheaper to run in the context of the problem area.

Improved data and data sharing through a sensor network would improve efficiency and coordination of response to flooding within and between local authorities. Current flood response is mainly reactive. Flood reports, which are often received after flooding has occurred, are required to receive specific location and extent information. A network of sensors would provide real time data without the need for time-consuming on-site assessment.

An earlier response would increase service efficiency, improving safety and infrastructure resilience, and reducing costs. Prior to storm events, vulnerable locations may be prepared. Where infrastructure and assets are at risk, early warning would allow sandbags to be deployed, traffic to be rerouted, and persons advised to evacuate if necessary. There is potential for a cellular alert system to be created.

All three local authorities work closely with BDUK (part of DCMS) to roll out gigabit capability and "Smart Cities" environments for the future.

4.4 Tell us about your project stakeholders and how you plan to engage them.

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The Local Authorities are currently members of the West Yorkshire Flood Innovation Programme (WYFLIP), which is run through iCASP and provides a platform for knowledge exchange. WYFLIP will act as a central hub for this project through which all stakeholders can coordinate. iCASP will be responsible for organising workshops, collating outputs, and tracking project development.

There are four primary stakeholders: Political (councillors and MPs), Emergency services, Businesses and Residents.

Council officers will be responsible for communicating project development internally.

Emergency services will be engaged through the Local Resilience Forum via members of the Emergency Planning teams (Leeds/Wakefield/Kirklees).

Businesses will be engaged via the Business and Skills team newsletter.

Residents Action Groups and Flood Action Groups will be contacted.

Comms teams from each organisation (councils/iCASP/NEXUS) will communicate project plans and outputs to each stakeholder group.

4.5 Tell us about any local government sector engagement you've carried out or intend to carry out.

The Project will be assisted by the West Yorkshire Flood Innovation Programme (WYFLIP) which has an established engagement process through its main board and steering groups. This discovery project falls under an existing theme: 'Enhanced Flood Warning Systems', led by Wakefield Council.

This project would engage with the West Yorkshire Combined Authority, West Yorkshire Flood Risk Partnership (YRFCC; Defra appointed), and, within each council, the Housing and Neighbourhoods, and Highways teams.

The project will use specialist advice from the NEXUS Community of Innovators and entrepreneurs at Leeds University.

Further details of the WYFLIP can be found at [Projects – Yorkshire Integrated Catchment Solutions Programme (iCASP)](#)

4.6 How will the project budget be used?

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Item (e.g backfill staff time, buy in user researcher, software, hardware and others)	Time/quantity	Total cost/value £	Where will the funding come from? (e.g Local Digital funding or a particular project partner)
Data gathering/advertising/consultations	various depending on needs of project	£3000.00	LDF
Project Workshops	3no incl venue hire/catering	£6000.00	LDF
Skills workshops	max 4no (incl room hire)	£3000.00	LDF
ICASP project management/facilitation	10hrs/week for duration of project (inc. offices/equipment)	£15,000.00	LDF
Consultant services(to be procured)	Duration of project	£46,000.00	LDF
Wakefield/Leeds/Kirklees Flood Risk Teams (backfill staff time)	5 officers (1 week each)	£10,000.00	LDF
Wakefield/Leeds/Kirklees IT Team (backfill staff time)	3 officers (1 week each)	£6000.00	LDF
Wakefield/Leeds/Kirklees Highways (backfill staff time)	2 officers (1 week each)	£4000.00	LDF
Wakefield/Leeds/Kirklees Procurement/Legal/Finance (backfill staff time)	2officers (1 week each)	£4000.00	LDF

4.7 Tell us about your delivery plan.

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If successful in January 2023 the Project would aim to meet the following milestones:

February 2023: Workshop 1 - Wakefield, Leeds and Kirklees Councils will meet to agree final brief and procurement methodology of consultant(s)

March 2023 Procurement of consultant(s)

End March 2023: Workshop 2 - Initiation meeting with successful applicant(s)

April 2023: Consultant(s) conduct workshops, interviews, desktop and consultation with individual local authorities

April/May 2023: Workshop 3: Consultants intermediary report and findings

End May: Workshop 3: Final draft report

June: Project report delivery

There are five main project partners: Wakefield Council, Leeds City Council, Kirklees Council, NEXUS and iCASP (University of Leeds).

The Local Authorities are currently members of the West Yorkshire Flood Innovation Programme (WYFLIP), which is run through iCASP and seeks to provide a platform for knowledge exchange. WYFLIP will act as a central hub for this project through which all stakeholders can coordinate. iCASP will be responsible for organising workshops, collating and communicating outputs, and tracking project development.

Council representatives will be responsible for area-specific collation and reporting of relevant information to WYFLIP, and for communicating project outputs with internal council boards.

In addition to workshops, concept design for a practical early warning system will be developed through use of Trello, an online collaborative platform. Trello is accessible to all organisations involved, and enables users to share, edit and produce outputs while tracking changes. This will ensure all team members are able to share project progress and outputs with the sector.

4.8 Describe how your project team will have the skills and time available to deliver the project in an iterative, agile and user-centred way.

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Flood Risk Management is an ever evolving area, no two storms are the same and the Flood Risk Teams in each Council constantly learning and evolving to meet the needs of the public.

The project will use the existing skills of the Council's in-house specialist for the procurement of a specialist consultant to deliver the scope provided to look at the provision of the LoRaWAN network and sensors.

The project will draw upon the knowledge of NEXUS to guide us during the scope setting stage of the project.

We intend to deliver a number of skills workshops during the project to help those involved understand the requirements of the project and make sure that the consultant engaged understand the needs of the services that the project will benefit. Specific skills workshops on LoRaWAN and Flood Risk will be delivered.

We will take advice from the Council's procurement teams as to whether early supplier engagement may benefit the development of the discovery phase to the next level.

4.9 Define the governance structure of your project.

The Working Group for this discovery project has existing relationships through the WYFLIP and its governance structures. As an established programme, WYFLIP seeks funding and collaboratively works to solve common problems under five key themes. falls under one of WYFLIP's existing themes, 'Enhanced Flood Warning Systems', led by Wakefield Council; this discovery project will fall under that theme.

Two governing structures will ensure that this discovery project engages with stakeholders and partners. A board will maintain the interests of partners and stakeholders in decision making, supporting effective communication between groups. A Steering group will actively engage with the stakeholders (see 4.4), bringing their expertise into the analysis and proposed design of a network-based early warning system for flooding.

Further details of the WYFLIP can be found at Projects – Yorkshire Integrated Catchment Solutions Programme (iCASP)

4.10 Outline the risks to project success.

There are four primary risks to creating a conceptual early warning system for flooding in West Yorkshire:

1. No definitive recommendations are made during the discovery phase
2. That installing and maintaining the network will be found more costly than the potential savings
3. False or inaccurate recommendations from consultants
4. Failure of the appointed consultants

All risks to a discovery phase are mitigated against through a well-managed procurement process with due diligence on successful applicant, coupled with strong governance and reporting intervals.

4.11 Describe how project monitoring and evaluation will happen.

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4.11 Describe how project monitoring and evaluation will happen.*

Prompts:

- What existing performance monitoring and evaluation data do you have?

- This could include an overview of the "as is" situation, failure demand, opportunity for efficiency gains and non-financial benefits.

- If none exists what approach would you take to collecting this data?

(Max character count 1500)

The project brief and procurement methodology agreed during workshop 1 will include key performance indicators to allow the project team to monitor the performance and outputs of the appointed consultant.

The project team will hold a number of progress meetings with the appointed consultant to monitor their progress against the KPI's.

Workshops 2 and 3 will be used to evaluate the findings of the consultant prior to the completion of the final report.

There is a small academic research project taking place in Kirklees that will help guide and steer the practical application of a LoRiWAN network and Leeds Council has already installed a number of Gateways to provide its own LoRiWAN network and their Digital Transformation Team can help to assess the performance of our project consultant.

The project will also draw on the expertise of members of the NEXUS Community at Leeds University.

4.12 Describe the benefits and savings your project is likely to deliver.

A network-based system of sensors, used as an early warning system for flooding, may reduce costs through improved preparation in advance of a storm event, and response time during an event. Examples include:

- Targeted maintenance of trash screen and drainage systems in vulnerable areas, instead of scheduled maintenance
- Social and economic benefits from improved early warning for residents and businesses.
- Improved reputation and trust in the local authority.
- Faster response time of services (highways/emergency) to flood incidences
- Use of LoRaWAN network for a wide range of sensors within Councils e.g air quality, environmental, water quality.

This Discovery phase will seek to quantify and qualify these benefits for the business case.

5. Agreement with DLUHC

5.1 Please confirm that you commit to delivering the project outputs listed below. Please tick the box to agree.

- I agree

5.2 Agreements with DLUHC

Please tick the box to agree.

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- I agree