**ICE R+D Enabling Fund**

**Guidance Document**

This document outlines the types of project that the ICE research and development enabling fund are particularly interested in receiving applications on. These fall into two key areas;

1. Calls for funding – key areas of industry need as identified by ICE’s research, development and innovation panel.
2. ICE campaigns – ongoing strategic goals as identified by ICE’s thought leadership activity.

Applications that fall outside of these areas are still welcome and will be reviewed on a case by case basis.

# Current Calls for Funding

## Resource Security and Scarcity

While resource usage naturally influences a civil engineers’ daily activities, the broader compelling issue lies in current and future resource scarcity and resource security – it is an issue that affects every aspect of civil engineering and, importantly, cuts across the ‘engineering silos’ of expertise; yet it is an issue that is in danger of being neglected. A graphic example is provided by the fact that construction, indeed reinforced concrete production alone, accounts for more than half of all global resource extraction.

A workshop to help frame this call for funding was held with invited individuals who are leading thinkers on this topic and the following questions for the civil engineering industry emerged:

### Key Questions

* What is the interplay between resource scarcity, criticality, security and efficiency?
* What roles, responsibilities and capabilities do (or should) engineers have to improve resource efficiency, enhance resource security and reduce resource scarcity? How can civil engineers be empowered to be ambassadors for responsible resource use?
* If current undervaluing of resources contributes to their overuse and dispersion, do we need to change the units we use to value resources, the parts of the life cycle we place a value upon, and/or our business models to more accurately reflect holistic valuing of resources? How do (and should) codes and standards mandate or encourage responsible resource use?
* Resources have a hierarchy of potential (potable water versus toilet flushing, virgin aggregates versus recycled aggregates), therefore can industrial symbiosis and/or circular economy principles be applied to enable more responsible resource use? How can what we currently consider ‘waste’ become more routinely and universally a resource, and how can we prevent the production of low-value co-products?
* What would ‘Fairtrade’ look like for civil engineering resource procurement? Can an efficiency rating be created for civil engineering resource use?
* The UK has an opportunity to set the standard and provide a world lead in this area, and export the thinking to developing countries whose resource use is yet to peak – how is this best achieved? Conversely, is there good practice to be drawn from other countries?

## Engineering the Future of Cities

Call to go out May 2018

# ICE Campaigns

As well as the above ICE is also interested in receiving applications that support its current strategic campaigns.

## Digital Transformation

Productivity - How can digital transformation deliver a more productive nation, where regional differences in productivity are addressed through improved connectivity?

Behaviours - How can people, processes and technology be used to optimise and secure the use of digital technology and data? How do behaviours need to change to embed a long term approach to digital transformation?

Resilience – How do we realise the greater resilience offered to us via greater connectivity, whilst also adapting to the fresh security and resilience challenges which have the potential to adversely impact the performance of our assets and networks.

## Productivity

As well as embracing digital infrastructure to increase productivity the UK must do more to increase construction productivity in general. Since the early 1990s productivity in the UK has lagged behind other major economies such as France, Germany and the US. In the construction industry productivity growth has been even weaker; from 1997 to 2008 it grew by just 0.8%.

## Energy Resilience and Climate Change

SDG 6: Clean Water and Sanitation

Water scarcity affects more than 40% of people around the world, an alarming figure that is projected to increase with the rise of global temperatures as a result of climate change. Although 2.1 billion people have gained access to improved water sanitation since 1990, dwindling supplies of safe drinking water is a major problem impacting every continent.

SDG 7: Affordable and Clean Energy

Between 1990 and 2010, the number of people with access to electricity has increased by 1.7 billion, and as the global population continues to rise so will the demand for cheap energy. A global economy reliant on fossil fuels and the increase of greenhouse gas emissions is creating drastic changes to our climate system. This is impacting every continent.

SDG 9: Industry, innovation and infrastructure

Investment in infrastructure and innovation are crucial drivers of economic growth and development. With over half the world population now living in cities, mass transport and renewable energy are becoming ever more important, as are the growth of new industries and information and communication technologies.

SDG 11: Sustainable Cities and Communities

More than half of the world’s population now live in urban areas. By 2050, that figure will have risen to 6.5 billion people, two-thirds of all humanity. Sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces

SDG 13: Climate ACTION

There is no country in the world that is not experiencing first-hand the drastic effects of climate change. Greenhouse gas emissions continue to rise, and are now more than 50 percent higher than their 1990 level. Further, global warming is causing long-lasting changes to our climate system, which threatens irreversible consequences if we do not take action now.