CLIMATE CHANGE ADAPTATION IN CONTAMINATED LAND PROJECTS

CIRIA leads on a new climate change and contaminated land interest group

Environmental good practice for facilities management
Rock slope netting good practice guidance
BIG Biodiversity Challenge and Awards 2017
CEO comment

Having now spent just over a year here at CIRIA, I have been reflecting upon the changes I have seen across industry and within our business. The most striking thing for me has been that against the backdrop of constant change, CIRIA remains a steadfast partner in championing performance improvement across construction and the built environment, with an ever-increasing base of industry support. Over this past year, we have welcomed 17 new members, large and small and from across the sector and supply chain (p12-13). All of our members play a key role in helping CIRIA to shape its research and membership programmes, in particular through our member Council, which has just approved the appointment of a new Chair (p14).

In this issue of Evolution, I would like to extend my personal thanks to CIRIA Council Chair Doug Waters, who will be stepping down from the role after four years at the helm. The new Council Chair is Jonathan Simm from HR Wallingford, who has been a long-serving member of Council. I look forward to working with Jonathan as we set about shaping CIRIA’s plans for the forthcoming year.

This year, an unseasonal warm October has seen temperature highs of 20+C in the UK with sporadic Atlantic storms bringing much disruption to parts of UK and Ireland – weather that is linked to climate change. On p2-3 we explore the impact of climate change on contaminated land projects with a view to setting up a climate change and contaminated land interest group.

CIRIA’s collaborative and independent approach has always been the driver for the production of authoritative guidance and the next few months will see new publications such as whole-life management of rock netting systems, control of cracking caused by restrained deformation in concrete, as well the much awaited abandoned mine workings manual.

In this issue, we also offer plenty of opportunities for organisations wishing to get involved with the development of CIRIA’s good practice guidance such as environmental good practice for facilities management (p4), slopes protection and stabilisation (p8) and structural health monitoring for the management of a broad range of civil infrastructure including bridges (p9).

This September, I had the pleasure of welcoming 140+ guests at the BIG Biodiversity Challenge Awards that have continued to lead the way in raising the profile of biodiversity within construction. On p18-23, we celebrate this year’s Awards including our inaugural BIG Biodiversity Champion voted for by industry. I also want to say thank you to our sponsors. Without their generous support, none of this would of course, be possible. Plans are already underway for the launch of the 2018 Challenge on 28 February at City Hall, London, so do save the date!

CIRIA brings together stakeholders from a range of sectors and I would encourage you to look for opportunities to become involved in our activities. Details of our future projects (p27), training (p28-29) and other activities can be found throughout this magazine, or by visiting www.ciria.org.

On behalf of all at CIRIA, I offer you our best wishes for a Happy Christmas and a prosperous New Year.

Dirk Vennix
CIRIA Chief Executive
Contents

2 Infrastructure
Contaminated land and climate change

4 Sustainability
Environmental good practice for facilities management

5 Water
Susdrain

8 Infrastructure
Slopes protection and stabilisation

10 Publications

12 Membership

14 CIRIA Council update

18 Sustainability
BIG Biodiversity Challenge Awards 2017

24 Infrastructure
Design for health in construction

28 CIRIA Training
Helping you develop new skills
Today, extreme weather events are a reality, whether or not people accept that climate change is the culprit. A report by the Committee on Climate Change (2017) states that the annual average UK temperature increased by 0.9°C in 2005 to 2014, compared with temperatures of 1961 to 1990. It also notes that the UK’s sea level has risen at an estimated rate of 1.4 mm per year since 1901.

Flooding, particularly from heavy downpours, is one of the main climate change threats in the UK. This has put homes, businesses and infrastructure at greater risk of inundation from flood water (Committee on Climate Change, 2017).

CLG (2017) notes that there is a housing shortage with the government developing policies to build more homes in the UK – and quickly. This includes providing local authorities with the tools to speed up development of derelict and underused land for new homes. The National Planning Policy Framework (NPPF) (CLG, 2012) states that:

“Local plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change”

However, the main question is ‘will extreme climate incidents have any effect on how brownfield sites are currently reused, particularly those that are contaminated?’

Climate change and contaminated land management – some facts

Rising sea levels and increased storm surge events not only cause flooding, but can lead to a range of issues such as erosion, ground instability, saline intrusion and even movement of sediments exposing previously-buried contaminants including UXO.

The Environment Agency (2017) emphasises the importance of managing and protecting groundwater, particularly with rising sea levels where the loss of groundwater resources and ecological damage can occur as seawater mixes with it in low-level coastal aquifers.

Another area of concern is contaminated coastal sites. There are hundreds of known landfill, industrial and other waste sites around the coasts and estuaries of the UK (Cooper et al, 2013). These will lead to problems with public health and safety and adverse physical, chemical and biological effects on the natural environment (see Figures 1 and 2).

Heavy rainfall events could increase the risk of water contamination if sewers overflow. Microbial exposure is a concern when wastewater treatment plants, residential septic systems, municipal sanitary sewer systems, and agricultural operations are flooded. Also, contaminated flood deposits on land may affect human health via the food chain from crops or animals. In 2012, lead poisoning killed two young cattle on a farm in west Wales caused by contaminated flood deposits (Peel, 2014).

Is dynamic risk assessment the answer?

Climate data on anticipated rainfall, wind intensity, evaporation rates, or expected groundwater levels or levels of salinity,
sodicity or other physiochemical stressors on the ecosystem (including human activity) are not routinely incorporated into contaminated land assessments. Should risk assessment of contaminated land be a ‘living’ process, and uncertainties managed with incremental improvements, as more data becomes available?

Future climate change projections, such as UKCP09 (see references), should be incorporated into an environmental risk assessment through probability functions or as part of sensitivity analysis. However, one barrier is the typical timeframe for brownfield regeneration, one to five years, relative to the longer time scale over which the effects of climate change may develop.

What are the options?
Climate change is one of many risks related to contaminated land projects. Although there are still few cases where extreme climate situation have affected the land remediation process directly, the consequences of ignoring these situations could be severe.

There are still a lot of uncertainties in understanding the subject. Only a small amount of specific research has been undertaken on the effects of climate change on land contamination and approaches are generally qualitative. However, work has been done in countries such as Australia, to understand its effect on ecosystems (Figure 3).

In an industry led by regulation and client requirements, this pervasive uncertainty and lack of knowledge across the sector, and absence of published guidance, has not helped the delivery of more robust contaminated land risk assessments that take account of climate change despite the requirement to do so. This may begin to change with some long-term owners of brownfield sites, such as the major utility companies, requiring their consultants to routinely consider climate change in their risk assessments. Some regulators such as Environment Agency are already focusing on including climate change mitigation into future developments (Whitehead, 2014).

As an organisation that has been managing collaborative activities to help improve the construction industry for more than 60 years, CIRIA will continue to work to ensure that contaminated land professionals are aware of the various challenges related to the changing climate in the future.

References


Websites
UK Climate projections (UKCP09): http://ukclimateprojections.metoffice.gov.uk/21678
Keith Lasi, CIRIA Project Manager, discusses proposed new guidance and how it will assist the FM industry to meet changing client and regulatory requirements.

The British Institute of Facilities Management (BIFM) has formally adopted the definition of FM provided by CEN, the European Committee for Standardisation, and ratified by the British Standards Institute (BSI) as:

“...the integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities”.

FM encompasses multi-disciplinary activities within the built environment and the management of their impact upon people, their workplace and the environment.

The current global focus on environmental impacts and sustainability combined with the trend towards more strategic relationships in the industry is evolving the role of FM to incorporate aspects such as green procurement, carbon emissions reduction, pollution prevention and waste and materials management. Sustainability skills are fundamental to keep up with client requirements for value-added sustainable and ethical services, which help organisations meet strategic goals and respond to the changing market demand.

Key facts about FM

- The FM market is growing, with the market for out-sourced FM services expected to reach £23.2bn in 2018 (BDO, 2016).
- Contracts have evolved to transfer increased levels of compliance risk to FM providers (BDO, 2016).
- Sound ethical and environmental working practices are increasingly being seen as differentiators between organisations (Donati, 2017).
- Only two per cent of businesses are ‘very confident’ that their suppliers have the capability to make the transition to a sustainable economy (IEMA, 2015).
- Key facts about FM
- Only two per cent of businesses are ‘very confident’ that their suppliers have the capability to make the transition to a sustainable economy (IEMA, 2015).
- Key facts about FM
- Only two per cent of businesses are ‘very confident’ that their suppliers have the capability to make the transition to a sustainable economy (IEMA, 2015).
- Key facts about FM
- Only two per cent of businesses are ‘very confident’ that their suppliers have the capability to make the transition to a sustainable economy (IEMA, 2015).
- Key facts about FM
- Only two per cent of businesses are ‘very confident’ that their suppliers have the capability to make the transition to a sustainable economy (IEMA, 2015).

Supporting the industry

CIRIA’s Environmental good practice on site guide (C741) and its associated IEMA approved training course has become widely used in the construction sector. CIRIA is proposing to develop a complementary guide and one-day training course focused on environmental good practice in facilities management. This project will support organisations as they aim to meet strategic goals (environmental performance and corporate responsibility) and respond to the market demand for value-added services and evolving client requirements. The new guide will help FM practitioners and services providers understand environmental and sustainability requirements and offer cost-effective FM approaches while reducing the risk of environmental impacts.

Aims and benefits

- Help practitioners understand the key environmental issues to manage in FM.
- Support organisations to meet strategic sustainability objectives and respond to the market demand for value-added services.
- Upskill FM organisations to meet future needs for strategic, sustainability focused partnerships and capitalise on opportunities.
- Help businesses comply with legislative requirements, thus reduce their environmental impacts and risks of additional costs and prosecution, and protect their corporate reputation.
- Ensure FM professionals understand the key environmental issues to manage in FM activities and support them to overcome the ‘tick-box’ approach to environmental management.
- Ensure up-to-date environmental management processes and systems are carried out smoothly, allowing business continuity.

Get involved

For more information or to get involved in the development of the new guide contact Kimberley Lasi: Kimberley.lasi@Cira.org or tel: 020 7549 3300.
This month, susdrain celebrates its fifth birthday. So with five successful years of championing sustainable drainage under its belt, I thought I’d take some time to highlight what this committed group of partners and supporters have helped CIRIA to achieve, as well as a sneak peak at the next stage of the journey.

As the infographic shows, the community has an impressive reach, providing a wealth of resources including 65 case studies and 57 blogs designed to provide inspiration and practical help for anyone involved in the delivery of good SuDS. All of this work wouldn’t be possible without our partners and supporters from across industry, supply chain and the built environment, who work collaboratively to promote the philosophy, which CIRIA has driven for the past 20 years.

As a relative newcomer, with only three years immersion in the area (please excuse the pun!), I’m unqualified to talk about SuDS, but with 27 years of marketing and communications experience behind me, and working closely with the group, I can evaluate the work of this small(ish) community of 24 partners and five supporters.

The consistent and focused approach of susdrain has proven incredibly successful in raising awareness and building a wider community around resources, new thinking and providing an opportunity to exchange practice and knowledge. Just recently, research undertaken by CIWEM (2016) and ICE (2017) places CIRIA outputs and susdrain as the most used and respected resources on SuDS in the UK. This is quite an achievement, and for many would mark a pinnacle, but as far as the susdrain community is concerned, this is just the first phase in a continuing plan to support the delivery of high quality SuDS.

Over the past six months, I have been working with the susdrain team to shape the next stage of the susdrain journey, and I can assure you that they mean business. Having built solid foundations around accessible learning, knowledge sharing and promoting the benefits of SuDS, the team is now focusing their efforts on a more assertive strategy. One that will increase their impact and bring about the change in behaviours and approach needed to achieve their vision for high quality SuDS to be the norm. All of this, while continuing to provide an unrivalled resource of course.

The key elements of the plan are simple and targeted. They are designed to influence stages of development and, in particular; work closely with developers, clients, and approvers (pre and post-construction) to work collaboratively, and not only choose SuDS every time, but get it right every time.

Working with local planning authorities and lead local flood authorities to ensure a consistent approach to local planning policy and SuDS delivery, as well as helping clients to become more ‘intelligent’ and adopt a long-term approach, will present quite a challenge.

However, I have seen the susdrain team in action, and in the words of a fellow (albeit much more famous and glamorous) communicator, Margaret Read, “Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has”.

If you are interested in supporting susdrain or submitting materials for the knowledge base, email: paul.shaffer@ciria.org or suzanne.simmons@ciria.org or tel: 020 7549 3300. Find out more at www.susdrain.org.
Lee Kelly, CIRIA Project Manager, explains what to expect from new CIRIA guidance and the prospective topics for further research and development.

CIRIA, with the Geotechnical Asset Owners Forum (GAOF), has recognised a need to provide good practice guidance on how to make optimum use of rock netting. A two-day event in July 2013, which included a field trip to Garron Point, along the Antrim Coast Road in eastern County Antrim, organised by Transport NI (formerly the Northern Ireland Roads Service) and a workshop addressed some of the issues. The field trip presented some of the practical challenges faced by practitioners, while the workshop, further reinforced why guidance was needed. Presentations were given by representatives from Network Rail, Amey and Rope Access Scotland, which highlighted the technical aspects.

The two-day event presented CIRIA with everything needed to build a rock solid research proposal.

Structure of the new guide

The main theme of the new guide is the whole-life management of rock netting systems, and it is structured as closely to this as possible. A brief outline of the content contained in the new guide is given in Table 1.

The guide provides advice for all people concerned with rock netting, although it is recognised that some readers will focus on specific chapters that are relevant to them. However, it is recommended that the guide is reviewed as a whole, as this will enable the reader to gain a better insight into the whole-life management of rock netting systems.

Strategy for rock netting systems

Rock netting systems are composed of several components that have a variety of properties and requirements. The selection of such components needs ground information and a requirement for corrosion control and environmental considerations, to enable a whole-life management approach to be adopted.

---

Table 1: Outline and structure of guide

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Contents</th>
</tr>
</thead>
</table>
| 2 Conceptualisation| Background details, ground conditions, types and applications of rock netting systems.  
   Considerations required before planning, design and management. |
| 3 Asset management | Asset management of a rock netting system. Considers the whole life cycle and strategies for a risk-based management approach.  
   Guidance for asset owners is provided to allow for the development of an asset management strategy. |
| 4 Planning         | Planning considerations before installing a rock netting system.  
   Ground investigation to enable design. |
| 5 Environmental aspects | Environmental aspects specific to rock netting systems. |
| 6 Components       | Any system is only as strong as its weakest link, so the component properties and uses of the various elements forming a rock netting system are described. |
| 7 Design           | Design of both draped and stabilisation netting systems. |
| 8 Installation     | Conditions that will affect the installation of rock netting systems. |
| 9 Monitoring and maintenance | Methods for monitoring netting systems, as well approaches to developing site-specific monitoring and maintenance regimes. |
| 10 Further research | In researching this guide the authors found that there were clear areas of uncertainty. Some of those could be resolved, but some could not be addressed within the current state-of-the-art. This chapter summarises areas where further work or better guidance is required. |
| Appendix A1        | Detailed case studies of rock netting systems. |
| Appendix A2        | Methodology for interface friction testing on rock slopes. |
| Appendix A3        | Maintenance checklist that may be used during routine inspection of netting systems. |
Typically, rock netting systems in the UK have a design life between 60 and 120 years. Once it has been established that netting is appropriate to mitigate the risks of rockfall on a slope, an assessment should be made to determine the type of netting solution (or intervention strategy) that is appropriate for the slope.

The guide details two intervention strategies:
1. Enables material to fail and contains the failed material (referred to as a ‘draped netting’ system).
2. Stabilises the rock slope and prevents material from failing (referred to as a ‘stabilisation netting’ system).

To determine the best strategy it is important to consider:
- slope characteristics
- levels of acceptable risk to the client
- review of the potential whole-life management aspects
- design requirements.

Many netting systems are designed to work with specific manufacturer’s components and it is good practice not to mix components. If different components are being used an assessment of compatibility and the effect they may have on the netting system is strongly recommended.

However, there is no ‘one size fits all’ solution when it comes to netting rock slopes. The guide helps the reader to specify and design such systems, and enables evaluations to be made on the viability of netting solutions for any particular site.

**Further research**

In the process of developing the good practice guidance contained in Chapters 2 to 9, the authors encountered areas and concepts where there was considerable uncertainty and recognition that ‘custom and practice’ had evolved to meet needs, but that the underlying science was uncertain. Where further research is required these have been split into three categories:

1. **Environment**: deterioration rates of rock masses – limited information on this makes the design of netting systems challenging and the anticipated whole-life maintenance and monitoring costs uncertain.

   Incorporating climate change projections into the design. There are climate change components that are implicit in the design requirements. The most obvious relates to snow loading on netting systems and groundwater conditions within assets. Present climate change models are not sufficiently precise to deal with effects at an asset level and the impacts on the ground from current climate change forecasts are uncertain.

2. **Technology**: the consideration of dynamic puncture resistance of mesh systems presented challenges. The lack of a common approach or even common data led to considerable discussion and debate among PSG members.

   Accounting for interface friction in the design. In the absence of a rigorous investigation into how this is mobilised and how it can be predicted, it is difficult to use in design with confidence. If designers want to employ an interface friction, coefficient research is needed to identify how it can be done consistently and safely.

   The evolution of new strong, lightweight materials should be investigated together with a review of how mesh panels are ‘stitched’ together. The connectors of mesh panels are often viewed as the weakest link in a netting system. Are there components that could be developed to overcome this weakness?

3. **Processes**: developing a database to evaluate historical installations and their performance. Establishing such a resource would be a good step towards understanding the past performance of netting systems and their future behaviour.

   With an increased awareness of the safety of a workforce, and the need to maximise data collection in terms of time and cost efficiency, the role of remote sensing methods needs further research.

**Forthcoming guidance**

Details of the new guide will be announced via CIRIA newsletters HIGHLIGHTS and Member News. To subscribe please sign up at: www.ciria.org
Further collaborative activities with reputable manufacturers, product suppliers and specialist consultancies/contractors have shed light on other areas where CIRIA could develop improvements. CIRIA’s ground engineering heritage and reputation in demystifying some slope engineering practices would also prove useful.

In the context of slope protection and stabilisation, the techniques and products available on the market are wide-ranging. The ability for industry professionals to determine best-value or achieve good practice can be challenging with the mix of hard and soft engineered elements to choose from. Whole-life management and understanding when and how to intervene in light of any defects or deterioration can be equally as challenging.

CIRIA’s proposal

Building on CIRIA’s renowned ground engineering heritage and the information and knowledge contained in various publications such as The International Levee Handbook (C731), Guidance on embedded retaining wall design (C760) and Soil reinforcement with geotextiles (SP123), CIRIA will deliver a core programme of collaborative activities to support the development of a future research project. The proposed activities will help to raise awareness and improve an understanding on the application of particular slope protection and stabilisation measures.

The programme will include:
- an engineered slopes event
- a natural slopes event
- a research prioritisation workshop.

Collectively these activities will identify and prioritise future CIRIA research on slope protection and stabilisation systems. Research and event proposals will be drafted and finalised following delivery of the core programme.

The need for slope protection and stabilisation

Slope face and near-surface instabilities, particularly along linear assets, are a rising concern to those who manage engineered and natural slopes. Some slopes are important flood risk management assets (such as levees or natural features like dunes and cliff faces), others provide a route for infrastructure services such as roads and railways, while retail and residential developments can often be seen at the crest or toe of a slope.

The uncertainties associated with climate change and extreme weather events have resulted in widespread application of slope protection and stabilisation measures. Significant geotechnical risks associated with major infrastructure projects such as HS2, may push slope engineering and management practices even further.

CIRIA’s reputation for improving practices in slope engineering

The development of guidance on rock slope netting systems (see pages 6–7) is a great example of CIRIA tackling a relevant slope engineering and management issue, and providing guidelines to help industry assess and achieve good practice.
Lee Kelly, CIRIA Project Manager, reveals an exciting proposition to support proactive management of civil infrastructure assets.

**Structural health monitoring systems for civil infrastructure**

In early 2017, CIRIA published its guide *Hidden defects in bridges – guidance for detection and management* (C764). The guide identified the potential for structural health monitoring (SHM) to greatly assist in bridge management. Equally SHM systems can be applied to support the management of a broad range of civil infrastructure assets including waterside walls, dams and tunnels. While many techniques are available and large quantities of academic research are in existence there is currently no authoritative guidance available for asset owners to identify where SHM may be useful or how to specify it.

**What type of guidance should CIRIA develop for SHM?**

CIRIA, in partnership with TOPCON and James Fisher, held a workshop in May 2017 to identify guidance requirements for SHM. The workshop highlighted the needs of asset owners and practitioners currently using or considering how best to use the full potential of real time monitoring systems for civil infrastructure assets. In this sense it was deemed most appropriate for CIRIA to develop guidance and a framework for civil infrastructure owners and operators, client advisors, specifiers, designers, managers and maintainers, in order to ensure SHM is valued at all stages of an assets life cycle.

**What should the CIRIA guide include, and why?**

A significant proportion of those who attended the workshop in May indicated that CIRIA should develop guidance that supports the development of business cases to adopt SHM. To do this effectively, it was considered that the guide should include comprehensive information on the capabilities of SHM together with evidence on the effects of SHM and its associated benefits for asset management and operations.

The new CIRIA guide will examine the impact of SHM in three ways:

1. Design validation.
2. Assessing structural behaviour, including approaches in which SHM gives advanced warning of structural failures and reports on structural integrity following extreme events.
3. Improving asset intervention planning ie prioritising inspections, planning maintenance, managing critical components, programming major works etc.

Information gathered at the workshop also highlighted the need for the guide to include:

- a bibliography of useful resources on SHM
- applications of SHM to new and existing structures
- roles and responsibilities for SHM to be effective
- awareness of post-processing, data analytics, broader asset management systems and decision-support tools
- case studies from within and outside the construction industry, as well as recommendations for further work.

**What next?**

There are many ways to get involved in this work, and initially CIRIA is seeking project funding to secure development of the guidance. Through providing funding support, project partners will have early involvement in developing the research and have an input into shaping the project scope and research outputs.

**Get involved**

There is still the opportunity to express interest in the research contract. CIRIA invites organisations who are well placed within the industry to contribute to the guide.

For more information on the project or to express an interest, please contact Lee Kelly: lee.kelly@ciria.org or tel: 020 7549 3300.

**Figure 1:** Strain gauge to be cast in a concrete member for SHM.

**Figure 2:** SHM on Stonecutters Bridge. Image supplied courtesy of Highways Department, Hong Kong SAR.

![Diagram of sensor placement on a bridge](image-url)
With over 600 titles on offer, CIRIA has been and continues to be at the forefront of good practice guidance in the construction industry. While many back catalogue publications are still widely regarded as the best available, more recent publications are quickly being established as authoritative in their own right.

**Published 2017**

Asbestos in soil and made ground good practice site guide (C765)
Price: £80 (£40)
ISBN: 978-0-86017-780-7

Guidance on embedded retaining wall design (C760)
Price: £170 (£85)
ISBN: 978-0-86017-764-7

Minimising risk through responsible sourcing. A handbook for the construction industry (C767D)
Price: £110 (£55)
ISBN: 978-0-86017-782-1

Hidden defects in bridges – guidance on detection and management (C764)
Price: £180 (£90)
ISBN: 978-0-86017-779-1

**Web publications 2017**

Implementing Lean in construction: health and safety synergies of Lean (C769)

Starting on site (C739)
ISBN: 978-0-86017-774-6

Structural stability on site (C740)
ISBN: 978-0-86017-775-3

Geotechnical issues in construction:
X530 Short paper series and fifth conference held on 3 December 2012
(ISBN: 978-0-86017-929-0)

X531 Short paper series and sixth conference held on 9 December 2013
(ISBN: 978-0-86017-930-6)

X533 Short paper series and eighth conference held on 2 March 2015
(ISBN: 978-0-86017-931-3)

**Coming soon**

Control of cracking caused by restrained deformation in concrete (C766)
This guide provides a method for estimating the magnitude of crack-inducing strain and the risk of cracking at both early age and over the long term. Where cracking is predicted, guidance is provided on the design of reinforcement to control crack widths.
Price: £TBC

**Forthcoming titles for 2017–2018**

- Abandoned mine workings manual (C758)
- Guide to tower crane foundation and tie design (C761)
- Standardised approaches to condition monitoring and maintenance of rockfall netting (RP1021)
- Responding to lessons learnt from flooding (RP1031)
- A guide for small developments on contaminated land (RP1032)
- Green infrastructure along linear assets (RP1046)
- Fixings: methodology for the risk management and whole life of fixings (RP1036)
- Grouting in dams (RP1039)
- Biodiversity net gain: guidance for developments (RP1048)
- Deterioration and degradation modelling of infrastructure assets (RP1047)
- Contaminated sediments (RP1037)
- The management of advanced numerical modelling in geotechnical engineering (RP1058)

**How to order**
Visit: www.ciria.org
Tel: +44 (0) 20 7549 3300
Email: enquiries@ciria.org
HIDDEN DEFECTS IN BRIDGES
GUIDANCE ON DETECTION AND MANAGEMENT (C764)

The UK and Ireland’s bridges play a critical role in support of their countries’ economies and societies. As evidenced by the rarity of bridge failure, they are generally well managed and fulfil their operational requirements.

This guide collates a group of case studies demonstrating that hidden defects do exist in critical bridge components. In some cases they have threatened safety to the travelling public, and in extreme cases they have resulted in the collapse of bridges without warning.

If the risk posed by hidden defects is not managed appropriately then the likelihood of encountering such failures will increase. This guide provides methods to identify, investigate and manage many known hidden defects. It fills important gaps in knowledge and is complementary to existing bridge inspection guidance.

Price: £90 members
£180 non members

How to order
Tel: +44 (0) 20 7549 3300
Email: enquiries@ciria.org
Web: www.ciria.org/C764

GUIDANCE ON THE CONSTRUCTION OF SuDS (C768)

Over recent years SuDS delivery in the UK has steadily increased. This has improved knowledge and experience particularly around the construction of SuDS. This guide uses that experience to help those constructing SuDS to understand and avoid the common pitfalls.

The guide starts with considering SuDS in the construction planning and management of a site. The guide discusses the construction of the different SuDS components using photographs of actual site works to illustrate both good practice and what can go wrong. Case studies are provided to show how good construction has been achieved or problems resolved. The guide will be available as a free download from www.ciria.org

Printed copies price:
£60 members
£120 non members

How to order
Tel: +44 (0) 20 7549 3300
Email: enquiries@ciria.org
Web: www.ciria.org/C768
The last six months have been busy and diverse here at CIRIA, as we’ve welcomed a number of new members as well as continuing to work closely with our Member Council to improve our services. We have also said a fond farewell to our former Chair, Doug Waters, and warmly welcomed Jonathan Simm to lead the Council. You can read more from Doug and Jonathan overleaf.

One of the areas we always strive to maintain to a very high standard is our network programme, and William Gates our Network Programme Manager, covers the highlights of the past six months, as well as what’s coming up, on the opposite page.

You will have recently been asked to participate in our survey on the network programme and I’d like to thank all of you who provided feedback and ideas for future content. Listening to our members and acting upon feedback helps us to ensure we continue to deliver programmes which add real value to your organisations and wider industry. Keep an eye out for news on what the survey revealed and how we will be using this feedback to further shape the spring programme.

As always, if there is anything the team can do to help you make the most of your membership, just let us know; we’ve highlighted a few ways we can help, but are always open to suggestions.

It just remains for me to wish all of our members and readers a Happy Christmas, I look forward to seeing many of you in the New Year.

Leanne Clowting, Membership and Marketing Services Director
Email: leanne.clowting@ciria.org or tel: 020 7549 3300

CIRIA member benefits are available to every colleague in member organisations. This includes free places on networking and CPD events, to free online access to the entire catalogue of CIRIA publications and exclusive knowledge hub content, as well as training discounts.

All they need to do is create an account on the CIRIA website www.CIRIA.org which gives access to all of the exclusive content, updates and the knowledge hub.

If you think that you could benefit more from CIRIA’s services, or even if you’re not sure what is available to you, just email us membership@ciria.org and we’ll be happy to talk you through your membership.

We have recently developed a template intranet page for member organisations to help new colleagues access opportunities. Just let us know if you’d like us to work with you to develop a bespoke version.
The CIRIA Network offers an engaging platform to develop and share knowledge about specific topics relevant to CIRIA members and our wider construction and built environment stakeholders.

A key activity for the Network in 2017 has been the delivery of CIRIA’s Infrastructure Resilience event series; a programme of seminars, webinars and workshops resulting in a range of useful resources and learning for the infrastructure community.

The series has been led and advised by a steering group of selected CIRIA members who collectively make up the Infrastructure and Resilience Focus Group. I would recommend reading the series overview and outputs, all are available at www.ciria.org/IRseries.

2017 has also seen a roadshow tour of our industry good practice guidance ‘Hidden defects in bridges – guidance on detection and management’ (C764). From Bristol to London, via Solihull and Glasgow, we have been busy engaging asset managers and bridge engineering professionals across the country with this unique guidance. A word here should go to our roadshow sponsors James Fisher and Freyssinet, as well as a team of contributors from Arup, Atkins and Ramboll who have traversed the country to pass on a wealth of shared industry knowledge and wisdom. For more information go to www.ciria.org/bridges

Other highlights to note include our recent exclusive member event The future of construction: the next 30 years, and our second annual debate. The member event considered what a future construction industry might look like; an esteemed cross section of industry expressing views on changing labour models, the skills shortage and increasing ‘digitisation’ across the industry. The CIRIA annual debate is turning into one of the highlights of the year; the June event saw a fantastic range of speakers debating the future of sustainable cities. Not surprisingly all agreed that the future needs to be green, but it is very apparent that there are different views on how we get there. I’d urge all readers to look out for announcements via our monthly enews HIGHLIGHTS or via our website about the 2018 debate in the New Year.

At the time of writing we are also looking forward to welcoming members at our annual winter reception on 6 December to be hosted by Arcadis in London. And looking further forward, keep your eyes open for a mini-event series on engineered and natural slopes, the launch of the 2018 BIG Biodiversity Challenge and Awards, NERC dissemination events, a major EMSAGG conference and of course lots of events related to our research agenda. Abandoned mine workings, tower crane stability and thermal crack control, (all forthcoming CIRIA publications), will feature heavily across the CIRIA Network in the first quarter of next year. 2018 may just be one of the most diverse programmes of events and content that we have delivered in recent memory.

Get involved
CIRIA is always working to involve industry in the development of our event programme through suggesting ideas, providing speakers, hosting and sponsorship. We can work with you to develop informative events and content and profile your involvement.

So if you would like to raise your organisation’s profile in key topics for the built environment and construction sector, just let us know and we’d be happy to discuss ideas.

To find out more get in touch with William Gates, Network Programme Manager at william.gates@ciria.org or tel: 020 7549 3300.

Follow us on social media Twitter @CIRIAPosts or @CIRIAnetwork or via LinkedIn

Member Spotlight
We are keen to showcase the great work being done by our members’ right across the industry, so if you have some news or views to share, you can submit them for our Member Spotlight web area.

You can also just keep up to date with what your fellow members are working on.

If you’d like to be included email CIRIA’s marketing team at membership@ciria.org
A fond farewell
When I became Chair of CIRIA’s Council in 2013 the government had just released the Construction 2025 strategy, outlining ambitious plans to promote growth and improve the image of the sector. With major projects underway up and down the country, advances have been made, but more needs to be done if we are to deliver on those plans.

With this in mind, CIRIA continues to address common industry issues, deliver best practice guidance, training and events that enable member organisations such as mine to improve our business performance. It has been a great pleasure to work so closely with CIRIA in a uniquely collaborative spirit during this time.

All good things however must come to an end and as I will be leaving Gatwick Airport Limited in April, it is with great sadness that I step down as Chair of CIRIA’s member Council. I have greatly enjoyed my time as Chair and have many highlights. They must include the BIG Infrastructure Client Leadership Group, which came out of a discussion between myself and Bill Healy before I became Chair. The group has developed and some excellent projects have been commissioned, including the work on resilience and response to flooding events.

Another of my highlights is the National Infrastructure Client Leadership Group, which came out of a discussion between me and Bill Healy before I became Chair. The group has developed and some excellent projects have been commissioned, including the work on resilience and response to flooding events.

It has also been really rewarding to see the Council and the Executive Board working more closely, with Council now more active in shaping CIRIA’s work within industry. CIRIA is always looking to work with members to address challenges and I would like to remind members to tell them what topics they wish to work collaboratively to address. The infrastructure and resilience series is a good example of how successful these collaborations can be for all involved (P18-23).

Finally, I would like to take this opportunity to thank CIRIA for all their support during my time as Chair and wish Jonathan every success with the role, along with continued success and growth for CIRIA.

Doug Waters, Airports Commission Construction & Delivery Manager, Gatwick Airport Limited

The next chapter
Having been a long-serving member of Council I have witnessed a great deal of evolution as CIRIA works to adapt to changing environments and industry needs. I have been privileged to support this work as Chair of the Water Panel and, as Doug has mentioned, occasionally stepping into the Council Chair. I am looking forward to leading the Council and would like to extend my thanks to Doug for his contribution to the membership.

My overall vision for Council is to support the progression of CIRIA’s vision to the benefit of both CIRIA and its membership. Personally I believe there are some specific challenges that could be addressed in a collaborative manner over the next two years:

1. Seek to find new and innovative ways of engaging with members down the supply chain, including those involved in materials supply, off-site prefabrication, and supporting services such as surveying. This is linked to growing CIRIA membership into such organisations.  
2. Explore how, by delivering green infrastructure and biodiversity into the built environment, industry can actually deliver improved performance of infrastructure and not just improve our green credentials.  
3. Finally, building on the discussions over the last two years on the resilience of infrastructure, we should take a broader view of how we seek to improve engineering performance across the industry. Specifically, we should identify how we can make infrastructure better work for communities, both every day and in the crises brought on by natural and manmade extreme events.

These, and other issues of interest to members, can be explored at various levels both by discussions at council and member events, but also by identifying and implementing projects that address specific elements of these and are promoted under the auspices of our Advisory Panels. And whilst CIRIA does not normally take a lobbying role on policy or funding issues (in contrast to the engineering institutions), I would personally like to see Council supporting this process by identifying new areas of high quality collaboratively produced and peer-reviewed information and guidance that has been CIRIA’s hallmark over the years.

Jonathan Simm, CIRIA Council Chair and Chief Technical Director of Resilience, HR Wallingford

Over the past three years, the CIRIA team has worked increasingly closely with our member Council to shape our work. This progress has, in no small part, been testament to the commitment and enthusiasm of our outgoing Chair, Doug Waters.

Doug stepped down from the chair this autumn after four years at the helm, handing the baton to long-term Council member Jonathan Simm. On behalf of the CIRIA team and our members I would like to thank Doug for his considerable contribution and Jonathan for rising to the challenge of helping us shape the next of CIRIA’s chapters.

Leanne Clowting, Membership and Marketing Services Director

Doug Waters (left) and Jonathan Simm (right)

CIRIA MEMBERS’ COUNCIL
CIRIA’s focus on infrastructure resilience began with an idea generated during a lively discussion at our Member Council meeting. I had asked our council representatives to identify an area in which we could better support them, could hold an event or two around, and perhaps generate some useful discussion.

That short Council discussion led to a follow-on session at the National Infrastructure Client Leadership Group, which in turn led to the formation of a focus group. Working with the focus group, we identified that while there is increasing attention on the resilience of UK infrastructure, there were a range of challenges that needed to be addressed to ensure long-term resilience.

UK infrastructure faces increasing pressures, risks and vulnerabilities from a number of factors including frequency and severity of natural hazard events, population growth, increased interconnections between networks, and diminished maintenance budgets.

CIRIA’s infrastructure resilience series set out to explore the various approaches to implementing resilience measures to infrastructure (see Figure 1) in response to climate change impacts and identify the issues, opportunities and good practices. Although anyone involved would know that the area of resilience brings continual challenges and new issues to be explored in depth, I think we’ve made good ground, providing a platform for leading industry practitioners to share knowledge and identify priorities.

The event series offered a varied programme (see box opposite for details on how to access the wealth of resources and thinking that has been generated). CIRIA is currently working on consolidating these resources and producing a review paper, which summarises the key findings of the series, along with the areas we will be exploring next. The paper also includes contributions from the focus group on interdependencies and the catchment approach, financing, funding and insurance, and acceptable thresholds and what success looks like. The paper will be launched in December 2017 at a dedicated event.

The CIRIA team is particularly proud of the series, which brought together a range of leading industry figures and client organisations to work collaboratively, underlining our commitment to work with and for our members. CIRIA will continue to work closely with its membership to develop work programmes, and encourage discussion and knowledge sharing that adds real value, not only to them, but the industry as a whole. So, if you have a suggestion, please get in touch.

CIRIA is currently working on consolidating these resources and producing a review paper, which summarises the key findings of the series, along with the areas we will be exploring next. The paper also includes contributions from the focus group on interdependencies and the catchment approach, financing, funding and insurance, and acceptable thresholds and what success looks like. The paper will be launched in December 2017 at a dedicated event.

CIRIA is currently working on consolidating these resources and producing a review paper, which summarises the key findings of the series, along with the areas we will be exploring next. The paper also includes contributions from the focus group on interdependencies and the catchment approach, financing, funding and insurance, and acceptable thresholds and what success looks like. The paper will be launched in December 2017 at a dedicated event.

The CIRIA team is particularly proud of the series, which brought together a range of leading industry figures and client organisations to work collaboratively, underlining our commitment to work with and for our members. CIRIA will continue to work closely with its membership to develop work programmes, and encourage discussion and knowledge sharing that adds real value, not only to them, but the industry as a whole. So, if you have a suggestion, please get in touch.

Working in partnership
CIRIA would like to thank the members of the focus group, without whom, we could not have delivered such valuable events, briefings and articles. We look forward to working with them and other industry partners to further develop our work.

- Arup
- Atkins
- Black & Veatch
- British Geological Survey
- CH2M
- Gatwick Airport
- Highways England
- HR Wallingford
- Mott MacDonald
- Network Rail
- Scottish Water
- Temple Group
- UCL
- UKCIP

Get involved
For more information on CIRIA’s work on infrastructure resilience, or if you would like to work with us to shape future events, please contact lee.kelly@ciria.org or william.gates@ciria.org.

Reference
THE FUTURE IS OUT THERE – IF YOU KNOW WHERE TO LOOK

Owen Jenkins, CIRIA Director, outlines how industry challenges in the construction and asset management sectors are being resolved.

It is often the case that the approach, tools and expertise needed to address a problem (or seize an opportunity) already exist. Increasingly, these solutions come from other disciplines or industry sectors. CIRIA’s collaborative approach to producing its good practice and performance-improvement guides draw on a range of sources of expertise and knowledge.

A number of factors are contributing to the increasing attention being given in the industry to innovation including the need for productivity improvement, the burgeoning development of new technologies, the generation and access to data and an increasing recognition for collaboration – within and across disciplines and sectors. The UK’s universities and research centres provide one route to leveraging such knowledge. At the same time Research Councils UK are also undergoing change with the formation of UK Research and Innovation, which will place even greater emphasis on the exploitation of research, collaboration between industry and academia, cross-disciplinary working and on promoting opportunities for UK construction sector internationally.

This research base works within and across disciplines and sectors and provides a potential source for the innovation required to address the industry’s challenges.

While there are proven mechanism and excellent examples of industry-academic collaboration, there is also recognition that the potential for innovation is not fully exploited. One perpetual challenge is that of translation and application of research outputs to industrial challenges.

Innovation applied to practical problems

The Natural Environment Research Council’s (NERC) Innovation Programmes are an example of such collaboration and the Environmental Risks to Infrastructure Innovation programme (ERIIP) (see Evolution Spring 2017) is a specific example of this by supporting projects that seek to apply tools and knowledge developed by researchers to real and practical industry problems.

Over 50 such projects have been funded to date, and examples and the programme is already contributing solutions to some of the real problems faced in planning, constructing and maintaining UK’s vital infrastructure – the solution of which will bring economic and social benefits (see Box).
CIRIA is supporting NERC in the delivery of the ERIP programme. A recent independent review undertaken of NERC’s Innovation Programme, including ERIP, recognised its value in raising awareness among the research community of industry’s innovation needs and promoting and brokering the development of industry-research partnerships that often extend beyond the timeframe of the original project. The review also recognised the opportunity to build on these projects through sustained communication and promotion of the projects to ensure these successes are replicated more widely across the industry.

Problems seeking solutions

The ability to spot and harness opportunities that use innovation to address issues will be a significant factor in the transformation of the construction sector. Investment in the research capabilities of universities as part of the UK Collaboratorium for Research on Infrastructure Cities (UKCRIC) programme and the collaborative research trials undertaken by i3P are just two examples of how innovation – whether derived from academic research or from suggestions arising from practitioners’ experience, are helping to transform the industry.

However, innovation is not just about technology and the process of identifying how innovation can be identified, procured, adapted and applied, it is also an important aspect of an organisation’s approach to transformation.

CIRIA’s collaborative approach to improving practices resonates strongly with these principles as it continues to support its Members and wider industry to achieve performance improvement and transformation.

Further information

For a full list of awarded projects showing research organisations and partners, case studies summarising completed projects, and recordings of webinars summarising groups of projects for particular issues/sectors, visit: www.ciria.org/nerc or contact Owen Jenkins: owen.jenkins@ciria.org or Ruth Hughes: rugh@nerc.ac.uk

Improving the productivity of infrastructure construction

At a macro level, the UK is committed to tens of billions of pounds of investment in civil infrastructure over the next five years. At a micro level, extreme weather conditions or even combinations of non-extreme combinations can seriously affect construction productivity in relation to delivery of this investment. The University of Reading and Costain’s Weather wise project is exploring the feasibility of using long-term multi-variable historical weather data in scheduling construction programmes both in terms of timing and, for larger schemes, in terms of location.

Debris effect on bridge resilience

The high cost of repairs (£175m), including to bridges, following the flooding in Cumbria is an example of the scale of this issue. This project will make use of recent research at Southampton University, which has improved understanding of the flow and accumulation of debris on bridges and how this exacerbates bridge scour. Project partners include Network Rail and the Environment Agency who, collectively own 10 000 bridges near to watercourses.

Synthesising extreme storm surges, in which the Environment Agency and EDF Energy Plc are partners, is helping with understanding of the effects of plausible extreme coastal surge and wave events on the function, resilience, design and standard of protection of key coastal infrastructure.

Debris effect on bridge resilience

The high cost of repairs (£175m), including to bridges, following the flooding in Cumbria is an example of the scale of this issue. This project will make use of recent research at Southampton University, which has improved understanding of the flow and accumulation of debris on bridges and how this exacerbates bridge scour. Project partners include Network Rail and the Environment Agency who, collectively own 10 000 bridges near to watercourses.

Synthesising extreme storm surges, in which the Environment Agency and EDF Energy Plc are partners, is helping with understanding of the effects of plausible extreme coastal surge and wave events on the function, resilience, design and standard of protection of key coastal infrastructure.
Suzanne Simmons, CIRIA Project Manager reflects on the 2017 BIG Biodiversity Challenge Awards and catches up with Victoria Pollard, Environmental Manager, Kier Infrastructure & Overseas, to discover what it takes to become a BIG Biodiversity Champion.

“Champions are made from something they have deep inside them - a desire, a dream, a vision. They have to have the skill, and the will. But the will must be stronger than the skill.”

Muhammad Ali

It has been fascinating to observe CIRIA’s BIG Biodiversity Challenge develop and grow since inception in 2013. At that time the Biodiversity Interest Group wanted to engage better with the construction industry. As much as the BIG Awards initiative was all about biodiversity, flora, fauna and habitat, it became clear that it was also intrinsically about people, a critical factor of the ‘do one thing’ ethos. In recognition of this, CIRIA introduced the BIG Biodiversity Champion category in 2017, which attracted a rich seam of construction sector talent.

Many nominees had a direct remit for biodiversity and sustainable good practice, however some did not. This award was all about individuals doing more than their job and doing it well through shared learning, bespoke projects and positive outcomes. The one thing all entrants had in common was their ability to communicate and deliver their enthusiasm for biodiversity within and beyond the boundaries of their work place.

In this, the inaugural year for the BIG Biodiversity Champion award, CIRIA observed online voting only being conclusive on the final day of the vote. The accolade eventually went to Victoria Pollard who, at the time, was working as Environmental Manager for the Mersey Gateway project.

Interview

Congratulations Victoria on being voted CIRIA’s BIG Biodiversity Champion for 2017! Can you explain how you become involved in the Mersey Gateway project?

Four years ago, my then regional director, John Edwards, asked me if I wanted to move from my regional manager role to work on the Mersey Gateway Project. I knew a little bit about it from the tender, but had only touched the surface. Had I realised then that I was going to be climbing 125-metre high pylons, wading through the saltmarsh, giving briefings on buried radioactive waste and tramping over some of the most contaminated ground in the UK, I would not have thought twice.

Can you describe what the project entailed from your perspective?

The £650 million project has been the most diverse and challenging that I’ve worked on to date. Over the nine kilometres of road, there was virtually every environmental aspect you can think of, including a one kilometre wide estuary to cross. Where do you start on a project of this scale?

Figure 2: Mersey Gateway Project (observed from south to north). Photo supplied courtesy of Van Rhijn Aerial Photography.
How did you start?
By talking! Before we had even put a spade in the ground, we invited all of the regulators in en-masse to meet the team and technical specialists that they would be working with for the duration. Specific working groups were established from these – contaminated land, hydrodynamics, statutory nuisance etc. These allowed us to focus our regular meetings and give the regulators confidence in the construction team. Our driven approach to stakeholder liaison was awarded the CIEEM Best Practice Stakeholder Engagement award.

Well done! That sounds like a very positive and constructive process. How did things develop from these early planning and discussion stages?
Consultation has not been straightforward, the design of the bridge abutment and piers into contaminated land and the reuse of some very heavily impacted contaminated soils posed some difficult questions for the Environment Agency. After a year of dialogue we managed to assuage the regulator’s concerns about founding piles into a sandstone aquifer through a dense non-aqueous phase liquid (DNAPL) contaminated area. We gained consent to treat and reuse hydrocarbon and arsenic impacted materials in embankment construction through completely novel treatment additives. So, it is fair to say that the project has been completely unprecedented for the regulators too.

In terms of biodiversity, were there any aspects of your involvement that were particularly challenging or satisfyingly resolved?
The project also crosses over saltmarsh habitat and a local nature reserve (LNR). In this area it was imperative to keep land take to a minimum and develop a restoration plan for the regeneration after construction. The plan for the saltmarsh includes the fluming of existing creeks, creation of new scrapes/ditches, constructing sluice gates and saltmarsh cattle grazing. Access to the grazing site was difficult due to the construction so the easiest solution was to drive the cattle through the construction site. Not a sight seen every day!

Tell us about a lasting memory of your time on this project?
One of my lasting memories from the project will be from this year when we ‘air lifted’ a bee swarm to safety from the bridge. The swarm had flown over during the day and settled on a pallet on the bridge deck. At around 8pm with the help of a local bee keeper, we collected the swarm into a box and lowered it via crane on to temporary trestle bridge below. The bees are now happy in their new home on the roof of a local museum and gardens. Apparently we should have some bridge honey from them this year.

Finally, how did it feel to be CIRIA’s first BIG Biodiversity Champion?
Winning the BIG Biodiversity Champion Award was completely overwhelming and our achievements on the project wouldn’t have happened without the support of an incredible team. We have laughed, cried and sworn! Fortunately, we’ve laughed more than we’ve cried, but this project has been a labour of love.
Overall award winner & Community Engagement award winner

The thrilling finale to this year’s competition was held on 14 September 2017 in London, with eight well deserved winning entries revealed, along with the overall winner of this year’s Challenge, as well as our first BIG Biodiversity Champion as voted for by the industry.

Project name: RG Group Redhill Quadrant Redevelopment
Location: Redhill, Surrey
Organisation: RG Group
Community Engagement award sponsor: Landsec
Overall award prize sponsor: Wildflower Turf Ltd

This building project comprised of the phased replacement of an existing Sainsbury’s Supermarket at Redhill in Surrey. Our judges appreciated the infectious enthusiasm of this team. If ever a team went over and beyond the standard remit for new development – this team did, with their minds fixed firmly on making the biodiversity of the site so much better than when they began. This was especially pertinent when none of this was required of the RG Group by their client or the local planning authority.

BIG Biodiversity Champion award winner
Winner: Victoria Pollard
Organisation: Merseylink Civil Contractors JVCC
Award sponsor: Sir Robert McAlpine

Victoria was nominated by colleagues from the Mersey Gateway Project as she had sought to engage and promote biodiversity widely to site staff and members of the public using innovative ways and clearly demonstrating biodiversity in action.
Large scale permanent award winner
Project name: Hampstead Heath Ponds
Project
Location: London
Organisation: Atkins, City of London and BAM Nuttall
The Flood and Water Quality Management works at Hampstead Heath is a high-profile and complex project. Its purpose is to virtually eliminate the risk of dam failure within the two main chains of ponds on Hampstead Heath by making them more resilient to extreme rainfall events. Our judges noted how this project had biodiversity enhancements added throughout and at every level. The team’s strong ethos of going over and beyond the original driver of flood mitigation to enhance biodiversity was very clear. Judges recognised the effective and massive amount of community engagement.

Small scale permanent award winner
Project name: Help for Hedgehogs
Project
Location: Glenwood Park Development, Nr Devon
Organisation: Redrow Homes
The Hedgehog Highway concept was developed by People’s Trust for Endangered Species and the British Hedgehog Preservation Society as a simple way of making gardens hedgehog-friendly. Our judges noted how the winning project had taken a simple idea with potential to roll out to over 5000 homes / year. The team’s strong communications strategy made a very convincing case for the judges in engaging residents to bring biodiversity into newly created domestic gardens.

Medium scale permanent award winner
Project name: Fitzroy Gate
Project
Location: Isleworth, London
Organisation: St James (Berkeley Group)
Award sponsor: British Land
Fitzroy Gate is a St James development of family homes and extra care apartments for the over 50’s. The project team sought to enhance the parkland to create biodiversity net gain and area of high amenity value for residents to enjoy. Our judges were impressed by how this project went over and beyond to achieve high quality biodiversity outcomes, which was not a requirement from the planning authorities. Wider health and wellbeing benefits were acknowledged, with strong physical links to adjacent public spaces, which has resulted in a scheme that brings a wide range of benefits.

Maintenance and Management award winner
Project name: Highways England
Project
Location: Area 1 Blackhall Farm Management, Nr A30, Devon
Organisation: Kier Highways & Sticklepath Okehampton Conservation (StOC)
Award sponsor: Esri UK
The area known as Blackhall Farm is part of the Highways England operational soft estate next to the A30 in Devon currently managed by Kier Highways. Our judges were impressed by how this project went over and beyond its basic remit. The team excelled in community engagement, with a focus on leaving a legacy by ensuring high quality management and maintenance processes were in place. This offers a great model through increased community skills and excellent use of volunteers.

Pollinator award winner
Project name: Aspen Way – Good Beehaviour
Project
Location: Aspen Way Highways Depot, Torbay
Organisation: Kier Group: Local Highways Division.
Award sponsor: The Berkeley Group
Staff at Aspen Way Highways Depot created a wild garden area within the depot to provide a refuge for nature. The team liaised with a local beekeeper which enabled them to incorporate beehives in the wild garden, to improve the pollination of wild flowers. The judging panel all agreed that this project embodies the ethos of the BIG challenge through employee engagement, animal husbandry and in keeping a dying art alive. The team were commended for how they used their local depot team, with a non-elitist and hands on approach.

Temporary award winner
Project name: Spinney Fields
Project
Location: Long Itchington, Warwickshire
Organisation: David Wilson Homes, Nicholsons and RSPB
David Wilson Homes Mercia are building 150 new homes in Long Itchington. As part of the partnership between Barratt David Wilson and the RSPB, a wildlife-friendly garden was created for one of the showhomes, designed to attract wildlife by providing nectar-rich plants, a pond, bird and bat boxes, a bug hotel and various other features. Our judges said the winning project had great potential to be a nationally significant model that could be used on other developments by other organisations. They noted the team’s impressive engagement with the RSPB, community and potential buyers.
The BIG Biodiversity Challenge continues to be recognised as the number one industry initiative for delivering biodiversity within construction and the built environment. Since its launch in 2013 the Challenge has grown considerably and attracts organisations from a wide range of stakeholder groups. Award category sponsorship gives exclusive partnership of one of the nine categories of the BIG Biodiversity Challenge. This opportunity offers your organisation unique brand exposure, helping address specific challenges of implementing biodiversity fully within construction and the built environment.

The 2017 Awards could not have been made possible without the support of our sponsors: The Berkeley Group, British Land, Esri UK, Kier, Landsec, Sir Robert McAlpine and overall prize sponsor Wildflower Turf Ltd.

Benefits of sponsorship:

- **Raise your profile and brand exposure** across a wide range of stakeholders covering both the supply and demand sides of the industry, including clients, contractors, consultants, as well as public sector champions, regulators, academia and Government. Sponsors benefit from significant supported promotion and additional opportunities through relevant CIRIA events, webinars, briefings and online content.
- **Demonstrate leadership and commitment** to championing sustainability and the delivery of biodiversity within construction and the built environment.
- **Position your organisation at the forefront of good practice in sustainability** and be recognised as an industry leader in biodiversity.
- **Meet your CSR objectives** by supporting good practice and technical excellence across the construction industry to improve environmental and societal impacts of construction.
- **Help key personnel with professional development** through peer to peer learning, demonstrating thought leadership and speaking opportunities.
- **Raise your profile** and target a rapidly growing sector, including key decision makers and biodiversity leaders.

To find out more about sponsorship, contact Nipa Patel at: nipa.patel@ciria.org or tel: 020 7549 3300

**Comments from some of our 2017 Awards sponsors**

“British Land is delighted to sponsor the BIG Biodiversity Challenge Award for medium scale permanent biodiversity enhancements. Pocket parks, wildflower meadows, tree-lined courtyards and other green spaces can deliver lasting positive impacts on biodiversity and provide delightful opportunities for people to enjoy nature. We hope to see ever more cities and organisations developing and growing acres of valuable ecological habitats for people and the planet.”

**Sarah Cary, PhD – Head of Sustainable Places, British Land**
It gave us great pleasure to be the sponsor of the Community Engagement Award for the third year running. The calibre and creativity of projects entering this category year on year goes from strength to strength – a recognition of the importance biodiversity is having amongst today’s society.”

Sarah Beattie, Senior Environment & Energy Manager, Landsec

“We have had the pleasure of sponsoring the overall winner’s prize since the BIG Biodiversity Challenge started in 2013. Each year the enthusiasm for and interest in biodiversity grows and this is reflected in the standard of entries. After another difficult decision for the judges, we look forward to working with this year’s overall winner, the RG Group”.

James Hewetson-Brown, Wildflower Turf Ltd

“Sir Robert McAlpine is an active supporter of the Big Biodiversity Challenge and was proud to sponsor the new Biodiversity Champion category this year. We recognise the opportunity the awards bring to showcase the excellent work that takes place in our industry as well as recognise those individuals who work so hard to raise the biodiversity profile”.

Anna Baker, Head of Sustainability, Sir Robert McAlpine Ltd

READY TO TAKE THE BIG BIODIVERSITY CHALLENGE IN 2018?

The 2018 Challenge will be launched on 28 February at City Hall, London. Join us to learn more from some of our 2017 award winners’ as they discuss their winning projects and demonstrate the impact and outcomes that can be achieved by the construction industry when they Do One Thing for biodiversity enhancement.

Keep an eye out for full details of the launch event via www.bigchallenge.info and be sure to save the date!
PUTTING THE MANAGEMENT OF HEALTH RISKS AT THE HEART OF THE DESIGN PROCESS

Kieran Tully, CIRIA Associate Director, reveals a new CIRIA proposal on how to manage health risks via the design process.

Clients, designers and contractors can do more to put health at the start when making design decisions. There has been a step-change in the way health and safety is managed in the construction industry over the last 10 years, with behavioural safety programmes making a significant contribution to improved performance. However, the long-term health effects on the construction workforce is still a concern.

The challenge to industry and, in particular, clients and designers is that they may be unaware of the health risks related to certain construction activities, and do not have access to good practice guidance for alternative solutions. There is no single source for these good practice examples and a collaborative approach is required. CIRIA will be hosting a workshop at a future date to discuss the scope in detail, identify sources of funding and establish the industry networks from which to obtain good practice examples.

The new CIRIA guidance will be complementary to existing publications produced by CIRIA and other organisations. Its main objectives will be to identify the relevant construction work activities with health risks, the risk considerations at design stage, and to set out the financial and economic impact of designing for health. The guide will include examples of risk mitigation or methods of solution and case studies.

For further details or to get involved contact Kieran Tully: kieran.tully@ciria.org or tel: 020 7549 3300

Reducing error and defects associated with cast in situ concrete

Kieran Tully, CIRIA Associate Director, outlines a new proposal on reducing defect risks associated with cast in situ concrete.

Defects are a constant irritation to the industry, are very costly to fix, lead to delays on projects and undermine industry initiatives to improve performance and productivity as set out in Construction 2025 (HM Government, 2013). The Get it Right Initiative shows that cast in situ concrete has the greatest frequency of error and greatest financial impact.

CIRIA’s good practice guidance for cast in situ concrete will include challenges commonly encountered, the mechanisms that lead to poor outcomes and how zero defects might be achieved through collaborative approaches and implementing other measures. It is intended that this guidance will help to improve current practices and facilitate change.

The project’s key objectives will be to identify common project risks associated with key project stages, demonstrate how alternative collaborative approaches to procurement, design and construction might control the risk in a more acceptable way and give organisations the information to establish the right ‘zero defect’ culture and methods for continuous improvement.

The project will show how to reduce defect risks associated with cast in situ concrete throughout the procurement, design and construction stages through collaborative working. It will include case studies to show good practices implemented successfully.

For further details or to get involved contact Kieran Tully: kieran.tully@ciria.org or tel: 020 7549 3300

Websites
Sustainable cities: Is there a future? Is it green?

William Gates, CIRIA Network Programme Manager, summarises CIRIA’s 2017 annual debate

Urbanisation in the UK has become increasingly complex. Engineers and built environment professionals are operating in a challenging context and constantly working to adapt urban environments to changing demographics, changing situations and aging assets, while at the same time finding solutions to design and manage cities that mitigate environmental damage, resource depletion and social inequality.

Cities are in constant transition, and it is in this context that CIRIA’s summer debate examined how best to plan for and manage a resilient urban future, and how it can be done in a sustainable and equitable way. Professor Peter Head CBE, founder of the Ecological Sequestration Trust, chaired an esteemed and talented panel consisting of Dr Sally Uren, Chief Executive, Forum for the Future, Sarah Toy, Resilience Officer, Bristol City Council, Professor Steffen Lehmann, Co-Director, Cluster for Sustainable Cities at the University of Portsmouth, and Malcolm Smith, Arup Fellow.

Is there a future for sustainable cities? In short – yes there is! The United Nations’ Sustainable Development Goal 11 has seen to that! In a panel situation it is perhaps not ideal when there is widespread agreement across the board, but the second statement – is the future green? – created much more discussion, because ultimately it is up to all of us to make change happen.

Professor Head suggested that ambition for sustainable green cities is lost during procurement – where lowest first cost investments squeeze out environmental and social outcomes. If we had a planning system that enables the metrics associated with environment, social and human well-being benefits to be fully explored in the design process then they could be procured for a given price for the maximum social, economic and environmental outcomes.

Professor Lehmann suggested the challenges of rapid urbanisation and sprawl requires regeneration and re-compacting cities in a new forward-thinking way. The compact, mixed-use and walkable city model has (again) emerged as the most promising urban model in the shift towards low-carbon cities. But providing the evidence for long-term decision making and urban governance needs to improve. This will require new partnerships for sharing experiences and better evidence to ensure efficient decision making, and to overcome the frequent lack of reliable urban data on cities and neighbourhoods.

Both Malcom and Sarah stressed the need for local institutional capacity to facilitate change. ‘System disruptions’ will inevitably occur in every city and the unexpected shocks and long-term stresses can only be counteracted if business as usual is changed at a local level. For the modern city to be resilient, they must adapt to the implications of disruptive occurrences.

Dr Uren eloquently argued that thriving cities meet the needs of their citizens – people-centred orientation in design

Peter Head, CEO, Ecological Sequestration Trust, speaking at CIRIA Annual Debate 2017 is critical to this. Cities will also need to do more with less, but that does not necessarily mean doing things better, but doing better things.

The role of technology in enhancing urban resilience is receiving more attention. Sally concluded by emphasising how technology can be used to simulate and understand how different future megatrends may interact and heighten the complexity of urban living. Although such technology exists, it is fundamental that people still take precedence in the design of sustainable cities and that the impacts of adaptations are continuously monitored and evaluated to enable positive evolutionary outcomes.

Perhaps the most poignant factor discussed on the night is time. Time is of the essence in counter-acting fossil-fuel induced climate change and we are very late in acting. What is required is accelerated action to radically reduce greenhouse gas emissions.

To summarise the debate, perhaps the words of Professor Lehmann seem the most apt: “While we have entered the ‘Age of Cities’, we clearly have not yet entered the ‘Age of Sustainable Cities’.”

CIRIA members can access the podcasts of the speaker statements on the post-event pages of the CIRIA website. The speeches challenged the audience to think about the bigger picture and how they can use their own influence in their day-to-day work. Look out for more information on the 2018 CIRIA debate in the New Year.

References
UNITED NATIONS Sustainable development goals: www.un.org/sustainabledevelopment/cities
Kieran Tully, CIRIA Associate Director, provides insight into the newly launched CIRIA guidance.

It is no surprise that the construction phase is an important stage in any construction project and the moment when all the preparation, planning, design and procurement come to fruition on site. However, there is limited up-to-date guidance on how to set up on site. While this practice has been done for many years, things can go wrong. This new CIRIA guide *Starting on site* (C739) sets out why key issues on site should be considered early on to ensure that the start on site is positive.

Every construction site is unique and while organisations aim to standardise processes it is important that they understand the underlying principles, risks and issues of starting on site to adapt to each new challenge.

The information provided in CIRIA C739 should be used in a proportionate manner, but it can assist in identifying the important issues for each project. It demonstrates a range of issues that should, or need to be addressed, signposting where to go for further information. It does not consider individual issues in depth, the people needed on site or the materials and equipment required, but it can be used as a checklist.

The guide provides information for readers involved in small projects, but some aspects may not be relevant to their work. Similarly for large projects companies may have in-house systems that already address many of the issues raised here, in which case the guidance may be used to inform or supplement such systems.

Many individuals are involved in the process of defining a scheme through to the establishment of a site and ensuing construction activities. With all construction projects, the greatest opportunity to influence the project outcome is at the early planning stage. However, fundamental decisions will be made at many stages in the process. The guide covers all the elements in the planning and set up of a construction site with the objective of helping people to:

- ensure that main site factors are identified and taken into account as early as possible
- promote collaborative working and good practice solutions drawing on industry experience
- encourage innovative thinking.

The topics addressed include:

- tasks arising from the practicalities of creating a working site from nothing and delivering a successful project
- preparing the site for work, site facilities and logistics and eventual demobilisation
- planning for the early-stage activities, eg getting tasks underway to ensure easier, safer work later on
- contractual framework and supply-chain strategy
- risk management processes, communication and teamwork
- safety, environmental and quality management
- legislative requirements.

It is no surprise that the construction phase is an important stage in any construction project and the moment when all the preparation, planning, design and procurement come to fruition on site. However, there is limited up-to-date guidance on how to set up on site. While this practice has been done for many years, things can go wrong. This new CIRIA guide *Starting on site* (C739) sets out why key issues on site should be considered early on to ensure that the start on site is positive.

Every construction site is unique and while organisations aim to standardise processes it is important that they understand the underlying principles, risks and issues of starting on site to adapt to each new challenge.

The information provided in CIRIA C739 should be used in a proportionate manner, but it can assist in identifying the important issues for each project. It demonstrates a range of issues that should, or need to be addressed, signposting where to go for further information. It does not consider individual issues in depth, the people needed on site or the materials and equipment required, but it can be used as a checklist.

The guide provides information for readers involved in small projects, but some aspects may not be relevant to their work. Similarly for large projects companies may have in-house systems that already address many of the issues raised here, in which case the guidance may be used to inform or supplement such systems.

Many individuals are involved in the process of defining a scheme through to the establishment of a site and ensuing construction activities. With all construction projects, the greatest opportunity to influence the project outcome is at the early planning stage. However, fundamental decisions will be made at many stages in the process. The guide covers all the elements in the planning and set up of a construction site with the objective of helping people to:

- ensure that main site factors are identified and taken into account as early as possible
- promote collaborative working and good practice solutions drawing on industry experience
- encourage innovative thinking.

The topics addressed include:

- tasks arising from the practicalities of creating a working site from nothing and delivering a successful project
- preparing the site for work, site facilities and logistics and eventual demobilisation
- planning for the early-stage activities, eg getting tasks underway to ensure easier, safer work later on
- contractual framework and supply-chain strategy
- risk management processes, communication and teamwork
- safety, environmental and quality management
- legislative requirements.

It is no surprise that the construction phase is an important stage in any construction project and the moment when all the preparation, planning, design and procurement come to fruition on site. However, there is limited up-to-date guidance on how to set up on site. While this practice has been done for many years, things can go wrong. This new CIRIA guide *Starting on site* (C739) sets out why key issues on site should be considered early on to ensure that the start on site is positive.

Every construction site is unique and while organisations aim to standardise processes it is important that they understand the underlying principles, risks and issues of starting on site to adapt to each new challenge.

The information provided in CIRIA C739 should be used in a proportionate manner, but it can assist in identifying the important issues for each project. It demonstrates a range of issues that should, or need to be addressed, signposting where to go for further information. It does not consider individual issues in depth, the people needed on site or the materials and equipment required, but it can be used as a checklist.

The guide provides information for readers involved in small projects, but some aspects may not be relevant to their work. Similarly for large projects companies may have in-house systems that already address many of the issues raised here, in which case the guidance may be used to inform or supplement such systems.

Many individuals are involved in the process of defining a scheme through to the establishment of a site and ensuing construction activities. With all construction projects, the greatest opportunity to influence the project outcome is at the early planning stage. However, fundamental decisions will be made at many stages in the process. The guide covers all the elements in the planning and set up of a construction site with the objective of helping people to:

- ensure that main site factors are identified and taken into account as early as possible
- promote collaborative working and good practice solutions drawing on industry experience
- encourage innovative thinking.

The topics addressed include:

- tasks arising from the practicalities of creating a working site from nothing and delivering a successful project
- preparing the site for work, site facilities and logistics and eventual demobilisation
- planning for the early-stage activities, eg getting tasks underway to ensure easier, safer work later on
- contractual framework and supply-chain strategy
- risk management processes, communication and teamwork
- safety, environmental and quality management
- legislative requirements.

It is no surprise that the construction phase is an important stage in any construction project and the moment when all the preparation, planning, design and procurement come to fruition on site. However, there is limited up-to-date guidance on how to set up on site. While this practice has been done for many years, things can go wrong. This new CIRIA guide *Starting on site* (C739) sets out why key issues on site should be considered early on to ensure that the start on site is positive.

Every construction site is unique and while organisations aim to standardise processes it is important that they understand the underlying principles, risks and issues of starting on site to adapt to each new challenge.

The information provided in CIRIA C739 should be used in a proportionate manner, but it can assist in identifying the important issues for each project. It demonstrates a range of issues that should, or need to be addressed, signposting where to go for further information. It does not consider individual issues in depth, the people needed on site or the materials and equipment required, but it can be used as a checklist.

The guide provides information for readers involved in small projects, but some aspects may not be relevant to their work. Similarly for large projects companies may have in-house systems that already address many of the issues raised here, in which case the guidance may be used to inform or supplement such systems.

Many individuals are involved in the process of defining a scheme through to the establishment of a site and ensuing construction activities. With all construction projects, the greatest opportunity to influence the project outcome is at the early planning stage. However, fundamental decisions will be made at many stages in the process. The guide covers all the elements in the planning and set up of a construction site with the objective of helping people to:

- ensure that main site factors are identified and taken into account as early as possible
- promote collaborative working and good practice solutions drawing on industry experience
- encourage innovative thinking.

The topics addressed include:

- tasks arising from the practicalities of creating a working site from nothing and delivering a successful project
- preparing the site for work, site facilities and logistics and eventual demobilisation
- planning for the early-stage activities, eg getting tasks underway to ensure easier, safer work later on
- contractual framework and supply-chain strategy
- risk management processes, communication and teamwork
- safety, environmental and quality management
- legislative requirements.

It is no surprise that the construction phase is an important stage in any construction project and the moment when all the preparation, planning, design and procurement come to fruition on site. However, there is limited up-to-date guidance on how to set up on site. While this practice has been done for many years, things can go wrong. This new CIRIA guide *Starting on site* (C739) sets out why key issues on site should be considered early on to ensure that the start on site is positive.

Every construction site is unique and while organisations aim to standardise processes it is important that they understand the underlying principles, risks and issues of starting on site to adapt to each new challenge.

The information provided in CIRIA C739 should be used in a proportionate manner, but it can assist in identifying the important issues for each project. It demonstrates a range of issues that should, or need to be addressed, signposting where to go for further information. It does not consider individual issues in depth, the people needed on site or the materials and equipment required, but it can be used as a checklist.

The guide provides information for readers involved in small projects, but some aspects may not be relevant to their work. Similarly for large projects companies may have in-house systems that already address many of the issues raised here, in which case the guidance may be used to inform or supplement such systems.

Many individuals are involved in the process of defining a scheme through to the establishment of a site and ensuing construction activities. With all construction projects, the greatest opportunity to influence the project outcome is at the early planning stage. However, fundamental decisions will be made at many stages in the process. The guide covers all the elements in the planning and set up of a construction site with the objective of helping people to:

- ensure that main site factors are identified and taken into account as early as possible
- promote collaborative working and good practice solutions drawing on industry experience
- encourage innovative thinking.

The topics addressed include:

- tasks arising from the practicalities of creating a working site from nothing and delivering a successful project
- preparing the site for work, site facilities and logistics and eventual demobilisation
- planning for the early-stage activities, eg getting tasks underway to ensure easier, safer work later on
- contractual framework and supply-chain strategy
- risk management processes, communication and teamwork
- safety, environmental and quality management
- legislative requirements.

It is no surprise that the construction phase is an important stage in any construction project and the moment when all the preparation, planning, design and procurement come to fruition on site. However, there is limited up-to-date guidance on how to set up on site. While this practice has been done for many years, things can go wrong. This new CIRIA guide *Starting on site* (C739) sets out why key issues on site should be considered early on to ensure that the start on site is positive.

Every construction site is unique and while organisations aim to standardise processes it is important that they understand the underlying principles, risks and issues of starting on site to adapt to each new challenge.

The information provided in CIRIA C739 should be used in a proportionate manner, but it can assist in identifying the important issues for each project. It demonstrates a range of issues that should, or need to be addressed, signposting where to go for further information. It does not consider individual issues in depth, the people needed on site or the materials and equipment required, but it can be used as a checklist.

The guide provides information for readers involved in small projects, but some aspects may not be relevant to their work. Similarly for large projects companies may have in-house systems that already address many of the issues raised here, in which case the guidance may be used to inform or supplement such systems.
OPPORTUNITIES TO GET INVOLVED

CIRIA has a number of opportunities for organisations wishing to get involved in the development of good practice guidance. For a full list of proposals, visit www.ciria.org/proposals

Quantifying the benefits of off-site construction (P3094)
This project will quantify the benefits of off-site construction.

Modelling for resilience – decision support tools for infrastructure (P3128)
This scoping study will review current information, plus a series of modules/information sheets each describing a particular class of model applications and their assumptions.

Accreditation and/or assessment of SuDS – scoping (P2802)
This project will explore the potential and methodology for an accreditation and/or assessment scheme to assess SuDS designs and designers supporting both the approval process and the delivery of high quality multi-beneficial SuDS.

Guidance on cost effective SuDS delivery (P3085)
This project will create guidance expanding on the SuDS Manual, collating case studies and disparate research on costs to provide advice on practical approaches to improve the cost effectiveness of SuDS.

The use of unmanned aerial vehicles for infrastructure asset management (P3069)
This project will enable clients and infrastructure asset managers and those providing these services to better understand how this technology can be used within their organisation to improve asset management capability.

Guidance on natural flood management (P2970)
This project will produce guidance which builds on existing case studies, high-level guidance and research (e.g. SEPA’s handbook, Environment Agency and NERC research) to present case studies, develop a design philosophy, design objectives and criteria.

Effective innovative remediation approaches for contaminated land – case studies and good practice (P3077)
This project will update C549 explain how to design and implement innovative land remediation technologies using a series of case studies.

Invasive species – supporting effective management on construction projects (P3059)
This project will update CIRIA’s previous guidance and will be complemented by a series of briefings describing individual invasive species and detailing the relevant techniques to manage them.

Infrastructure assets – whole life design and management (P2980)
This project will produce an “intelligent index” to CIRIA’s suite of Infrastructure Asset Management guides followed by a suite of documents/modules that cover the principal activities and topics.

Guidance on the inspection and maintenance of SuDS (P2866)
This project will assess the need for repackaging and representing guidance.

Grouted (Ground) Anchors – condition appraisal and remedial treatment (P2618)
The publication of BS EN 1537:2013 (Execution of special geotechnical works grouted anchors) and revision of BS8081 and EC7, has presented a timely opportunity to produce good practice guidance for the industry.

Infrastructure data – signposting of good practice in capture, management and analysis (P2952)
This new initiative will signpost emerging good practice in the capture, management and analysis of construction and other related data.

Designing for health in construction (P3086)
While regulations require health and safety hazards and risks to be prevented and strictly controlled, there are no specific legal requirements for workers’ physical and mental health.

Effective innovative remediation approaches for contaminated land (P3077)
This project will update C549 explain how to design and implement innovative land remediation technologies using a series of case studies.

Guidance on the delivery of blue roofs (P3084)
This project seeks to produce examples of good practice and planners, highlighting a range of outputs for clients to research outputs and recommendations.

Perfluorinated alkylated substances (PFAS) in brownfield sites (P3131)
This project will produce guidance to improve awareness and understanding of PFAS and legislations, helping practitioners to understand their responsibilities and liabilities as well as support them in managing risk.

Delivering green infrastructure along linear assets (P3032)
This project seeks to produce a range of outputs for clients and planners, highlighting examples of good practice on implementing green infrastructure along the linear infrastructure network and in doing so help share good practice between different asset managers, sectors and drive improvement across the industry.

Key benefits of funding CIRIA proposals

- Exclusive, early access to research outputs and recommendations.
- Thought leadership and positioning on whole-life infrastructure asset management and SHM promoted through CIRIA’s marketing campaign.
- Learn directly from leading industry professionals and those working in other sectors.
- Company branding on all published outputs.
- Complimentary hard copies of outputs and opportunity to purchase copies/PDFs at discounted rates.
- Partner with CIRIA for launch events and dissemination activities.
CIRIA’S CPD TRAINING
HELPING YOU DEVELOP NEW SKILLS

CIRIA delivers a range of informative and engaging training courses based on tried and tested good practice guidance. Courses offered include sustainable urban drainage systems (SuDS), SuDS planning facilitation for local authorities, environmental good practice on site (IEMA approved), culvert design and operation, as well as other specialist topic areas.

Our training is delivered by industry experts either as open courses or in-house at client offices where courses they can be customised to suit specific needs. Course content includes up-to-date experience with practical examples and group work to deliver first class learning outcomes.

Why attend CIRIA training
- Course content is developed from CIRIA’s good practice guidance, and reviewed and updated regularly.
- Delivered by industry experts.
- CIRIA is a not-for-profit, independent and authoritative organisation.
- True to its mission, CIRIA training aims to help improve performance in the modern built environment.
- Gain valuable CPD towards your professional development.

Courses available
- Environmental good practice on site (IEMA approved and recognised as an equivalent to the Site Environmental Awareness Training Scheme (SEATS) under the UKCG Standard)
- SuDS foundation
- Designing SuDS
- Developing SuDS: securing SuDS through planning for local authorities
- Culvert design and operation
- Sustainable procurement for construction
- BIM strategy for clients and consultants
- Lean in construction

In-house training
All CIRIA training courses can be delivered in-house at your offices. Courses are based on tried and tested approaches or can be adapted to suit your training needs. Training courses are engaging, interactive and informative, and using practical examples to create the ideal learning environment.

Contaminated land online training
Following an update of the course in 2014, this training fully reflects changes in technology and policy reiterating why contaminated land is still important and relevant. The course is aimed at those who want a foundation level understanding of brownfield and contaminated land legislation, liabilities and technical details. The online format provides a flexible approach to learning, allowing delegates to learn at their own pace and in their own time. In addition, the course allows for 35 hours of CPD.
What delegates say about CIRIA training

SuDS training
“Trainer was clearly very knowledgeable. Discussion between attendees was encouraged and this enriched the experience.”

“Great course for those looking to gain a stronger understanding of the importance of utilising SuDS applications in construction.”

“Both trainers worked really well together to produce a complete, well-rounded view on how to design resilient SuDS schemes.”

SuDS planning facilitation for LAs
“Very interesting topic. Crucial that more people are aware of SuDS interventions.”

“Drainage is not everyone’s idea of an interesting subject, but Bob’s clear enthusiasm for and detailed knowledge of the subject made the training much more animated and interesting.”

Environmental good practice on site
“I found the whole course very informative and feel I really went away learning something.”

“Great course, highly recommended, very enthusiastic and knowledgeable trainer, lots of practical exercises.”

“Really impressed with the trainer’s knowledge on the subject matter. Good course, trainer knowledgeable and engaging.”

“Very informative course, interactive and well structured.”

Culvert design and operation
“I found this course very useful indeed and the trainers did very well to cover a huge range of topics within the couple of days.”

“This was a great course and a lot of detail was provided.”

CIRIA TRAINING CALENDAR

Forthcoming courses in 2018

Environmental good practice on site
22 January, London
13 March, Manchester

SuDS Foundation
24 January, London
6 March, Manchester
1 May, Edinburgh

Designing SuDS
5-6 February, London
26-27 April, Manchester
31 May-1 June, Edinburgh

Culvert design and operation
20-21 March, London

In-house training
CIRIA courses can be booked for in-house delivery at your own offices. To enquire please contact Nipa Patel at nipa.patel@ciria.org or tel: 020 7549 3300.

How to book:
Visit: www.ciria.org
Tel: +44 (0) 20 7549 3300
Email: enquiries@ciria.org

How to book: