

Buildoffsite members' meeting

2 February 2022

Welcome and introduction



Dirk Vennix

Acting Business Manager

Buildoffsite

Agenda

- 10:05 Buildoffsite update
- 10:15 Update on the Transforming Construction programme
- 10:30 Update on the government's MMC projects
- 10:45 Overbuild projects
- 11:00 Q&A
- 11:15 Update from the offsite community
- 11:30 Buildoffsite members' updates
- 12:15 Looking ahead
- 12:30 Closing remarks

anglianwater

SUPPLY CHAIN SUSTAINABILITY
SCHOL

ARCADIS

alineca

Premier
MODULAR EXCELLENCE

VISTA

mtx

Barbour
PRODUCT SEARCH

FAITHFUL+GOULD

action **sustainability**

L Lloyd's
Register

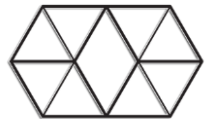
ICYNENE
The Evolution of Insulation

KIER

SFS

MAR
innovate | build | achieve
MEMBER OF THE M&P GROUP

DHL
EXCELLENCE. SIMPLY DELIVERED.



CONSTRUCTION BLOCKCHAIN CONSORTIUM

ideal lifts

ARUP

ciria

IFPI
INTERNATIONAL
FACILITIES & PROPERTY
INFORMATION LTD

**Sir Robert
McALPINE**

SCN | SMART
CONSTRUCTION
NETWORK

TRANSFORMING
CONSTRUCTION
NETWORK PLUS

VISION
MODULAR SYSTEMS UK LTD

BLP
INSURANCE



Homes
England



Ministry of Housing,
Communities &
Local Government



Department for
Business, Energy
& Industrial Strategy



Infrastructure
and Projects
Authority



Ministry
of Defence



Ministry of
JUSTICE



UNIVERSITY OF
CAMBRIDGE

Edinburgh Napier
UNIVERSITY



Scottish
Water
Trusted to serve Scotland

NWG
living water

Dŵr Cymru
Welsh Water

YorkshireWater

**United
Utilities**
helping life flow smoothly

**STRIDE
TREGLOWN**

**UKBIM
ALLIANCE**
Enabling Digital Transformation

C-PROBE

ASDA
SAVING
YOU MONEY EVERY DAY

CS

Construction Specialties™

NetworkRail

RIBA



RICS

the mark of
property
professionalism
worldwide

OXFORD
BROOKES
UNIVERSITY

hs2
engine for growth

THE
HOUSING
FORUM

Heathrow



Transport
for London

bsi.



gsk



TEMPOHOUSING UK & Ireland



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SIMPPLICIA LA CONSTRUCCION

Danfoss

ENGINEERING
TOMORROW



**BUILDING
UNDERSTANDING**



CONSTRUCTION
INNOVATION HUB

Innovate UK

ela8

HERTFORDSHIRE
BUILDING CONTROL

LEAN THINKING LTD

**Stelling
Properties**

pbc today

Upcoming events

9 February

R&D in the offsite sector: financial reward for innovation

February

Client group meeting

23 March

MMC conference

April

C-Probe breakfast briefing

3 – 5 May

The Offsite Show

May

Achieving sustainable resilience in pre-cast structures guidance

Publication launch

May

Buildoffsite members' meeting

June

Overbuild guide

Publication launch

Buildoffsite Team



Keith Blanshard

Industry Advisor

Nigel Fraser

Industry Advisor



Fiona Haygreen

Business Development Manager



Sara Kotsani

Communications Coordinator



Fareita Udoh

Project Manager



Doug Waters

Client Group Chair

Buildoffsite members' meeting

2 February 2022

Buildoffsite update

Nigel Fraser

Industry Advisor
Buildoffsite



Fareita Udoh

Project Manager
Buildoffsite

Buildoffsite update



Roger Marlow

Principal Consultant and WIMES Coordinator
The Pump Centre, Arcadis

What is WIMES?

- WIMES stands for **W**ater **I**ndustry **M**echanical & **E**lectrical **S**pecifications
- The WIMES have been managed by the Pump Centre since 1996
- The Pump Centre is part of Arcadis, a global design & consultancy business for natural and built assets, based in Warrington, Cheshire
- Membership of the Pump Centre is open to all companies with an interest in mechanical and electrical equipment used in the water industry

Objectives and benefits of WIMES?

- To provide water companies with specifications that will enable them to obtain M & E equipment which is fit for purpose and provides the lowest Life Cycle Costs (LCC) at a competitive purchase price
- In achieving the above, the intention is therefore that the specifications determine not only the initial CAPEX but also the subsequent OPEX (mainly the energy and maintenance costs)
- The intention is also that the specifications should be unambiguous and allow individual suppliers to compete on an equal footing

Objectives and benefits of WIMES?

- They avoid duplication of effort amongst water companies
- They avoid restrictive and potentially expensive personal preferences, which could arise where specifications are written 'in isolation'
- Familiarity with the specifications facilitates supplier response to tenders and reduces the likelihood of potentially costly mistakes occurring during procurement
- The WIMES project provides an excellent water industry forum/network for the exchange of ideas and operational experiences

What equipment is covered by WIMES?

- WIMES cover a wide range of M & E equipment
- There are currently over 90 WIMES and associated resources available, from simple machinery items, such as pumps and motors, to complicated pieces of package plant such as chemical dosing equipment
- A full list of the WIMES can be found on the Pump Centre website at:
<https://www.pumpcentre.com/SitePages/WIMES%20Docs.aspx>

WIMES collaboration with Buildoffsite

- The Buildoffsite Water Hub provides a focal point to promote the increased use of offsite construction solutions by water companies
- Several water companies (and the Pump Centre) have been involved with the Water Hub over recent years and a 'standard products' workshop on chemical dosing equipment was planned for March 2020, however, this had to be cancelled due to the pandemic!

WIMES collaboration with Buildoffsite

- Being aware of this, in Summer 2020, The Pump Centre invited the Water Hub to work with WIMES during the forthcoming review of WIMES 8.02 (Chemical Dosing Equipment)
- It was agreed that WIMES would manage the technical side of the review and the Water Hub would facilitate the webinars and encourage supply chain involvement

WIMES collaboration with Buildoffsite

- WIMES 8.02 comprises a general specification and 7 'satellite specifications' (A to I) for the commonly used dosing chemicals
- The current WIMES 8.02 (Issue 3, 2011) is mainly focussed on dosing equipment incorporating storage tanks in concrete bunds and has limited content on equipment built off site using MMC

WIMES collaboration with Buildoffsite

- In AMP 7 (2020 to 2025), the focus for chemical dosing for the water companies in England and Wales (up to 1000 schemes!) is phosphorus removal and alkalinity control for waste water treatment
- The equipment associated with these schemes does not typically need a civil engineering based on site-built solution, hence there was a need to update Issue 3 of WIMES 8.02 to cover equipment built off site using MMC such as:

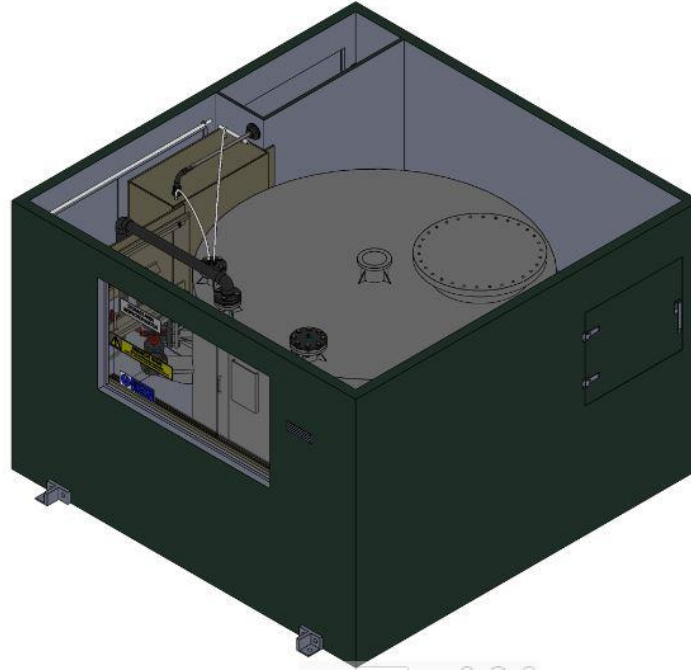
Collaboration with Buildoffsite

- Integrally banded tanks



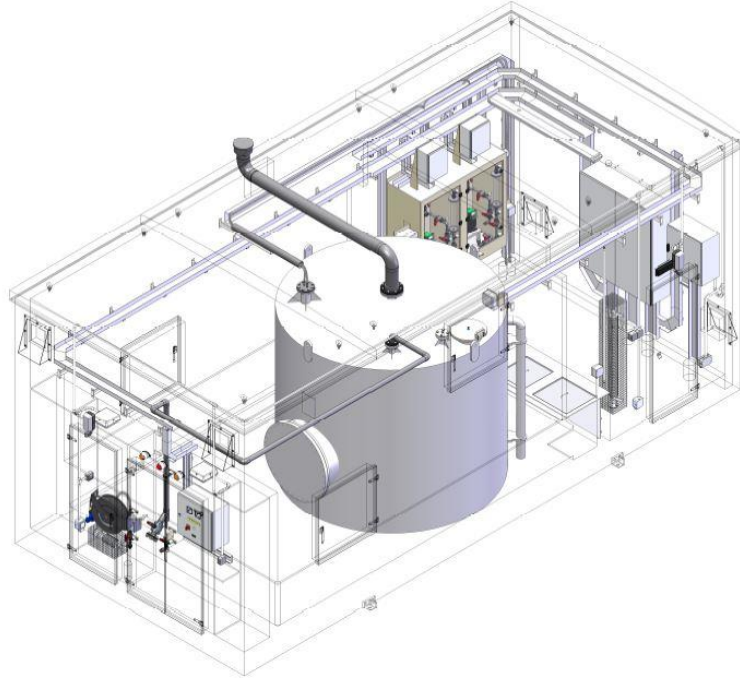
Collaboration with Buildoffsite

- Non-walk-in kiosks



Collaboration with Buildoffsite

- Walk-in kiosks



Collaboration with Buildoffsite

- The collaboration was very successful. 10 webinars were held between November 2020 and September 2021 with excellent attendance
- The Pump Centre is currently finalising the review and expects to publish Issue 4 of WIMES 8.02 before Easter 2022
- The Pump Centre has contacted colleagues in Arcadis regarding Water Hub membership and this may lead to future WIMES/Water Hub collaborations for equipment with a significant BOS content
- The Pump Centre is aware that the Water Hub is also hoping to collaborate with the WRc on the revision of CESWI 7

Buildoffsite members' meeting

2 February 2022

Transforming Construction programme update



Sam Stacey

ISCF Challenge Director for Construction
UK Research and Innovation

Leading transformation, at scale

The Transforming Construction Challenge and its Legacy

Sam Stacey
Challenge Director



Together, we are transforming construction

As a result of the **£150m** already match-funded, platform outputs deployed across public and private sector projects worth **over £13bn** are on track to deliver:

Lower costs

33%

reduction in the initial costs of construction and the whole life cost of built asset

Lower emissions

50%

reduction in greenhouse gas emissions in the built environment

Faster delivery

50%

reduction in the overall time from inception to completion, for newbuild and refurbished assets

Exports

50%

reduction in the trade gap between total exports and total imports for construction products and materials

Productivity

15%

Eliminate the gap between construction and the rest of the economy

You can accelerate change

Do you simply keep up with
changing customer needs...



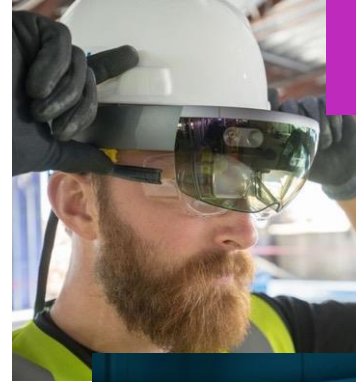
...or step-change the value
of your business?



This is why we're asking you to lead

Make a public commitment to the platform model and continue to:

- Scale a manufacturing approach
- Deploy digital and data-driven processes
- Embed whole-life value



The foundations are laid for you

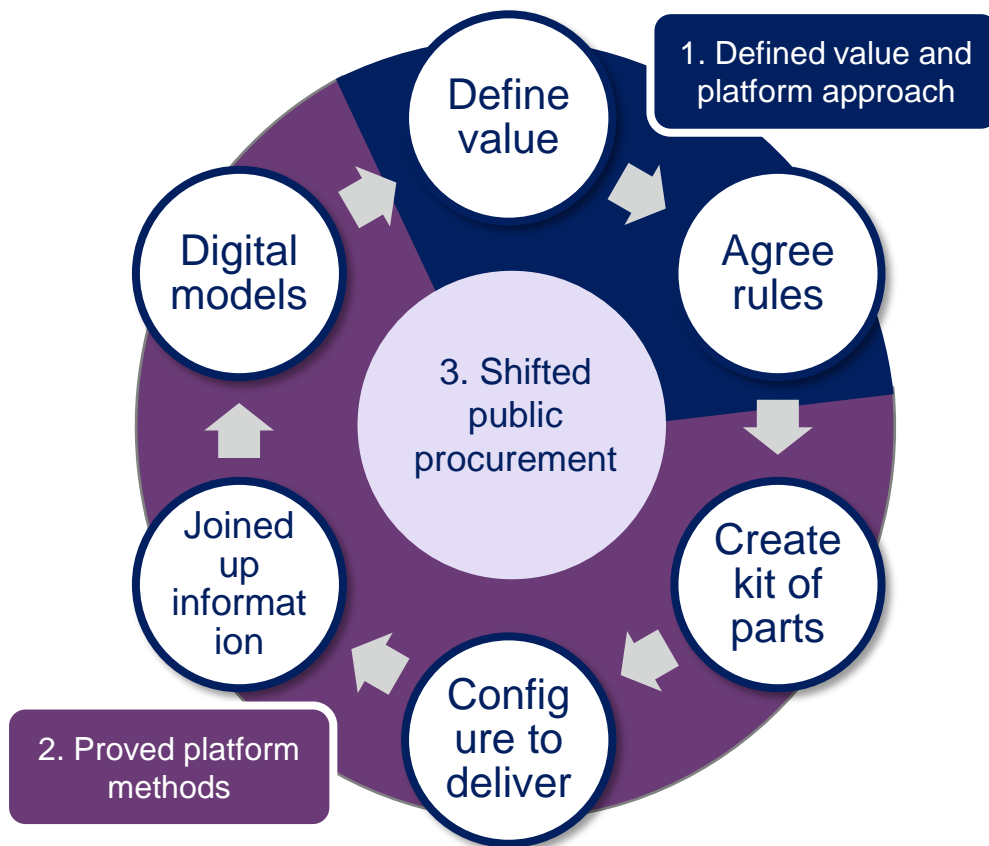
Over the last three years, the Transforming Construction Challenge has:

1 Defined value and platform approach

2 Proven platform methods

3 Shifted public procurement

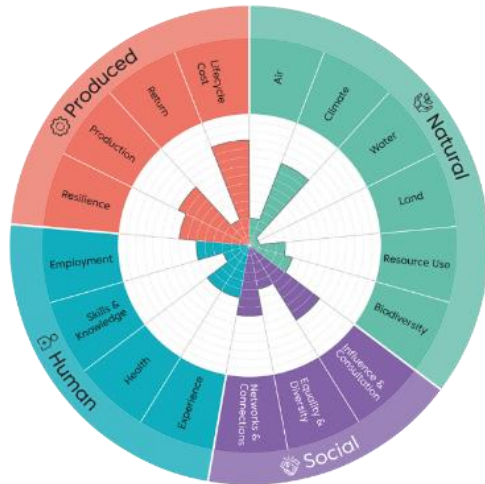
Enabling leadership in the sector



1. Defined value and platform approach

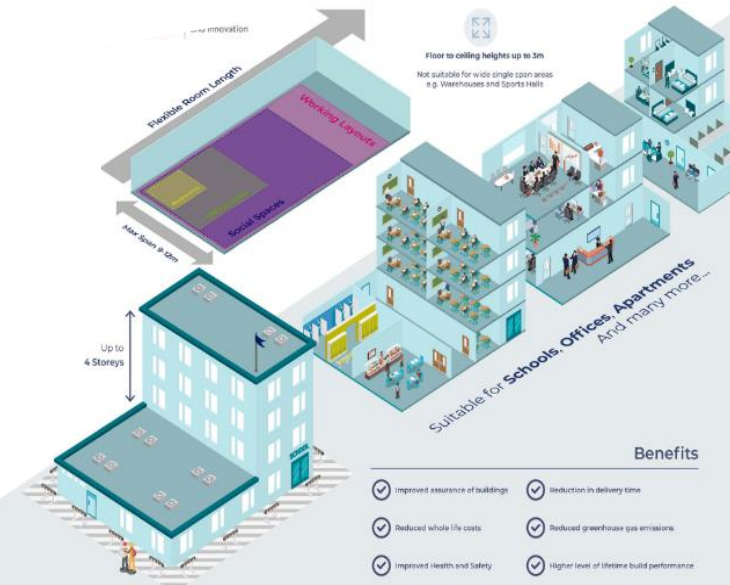
The Value Toolkit

A series of integrated activities – supported by tools, resources, and guidance – to drive better outcomes from each investment.



The Platform Rulebook

A set of open-source processes, tools and guidance which apply to platform construction.

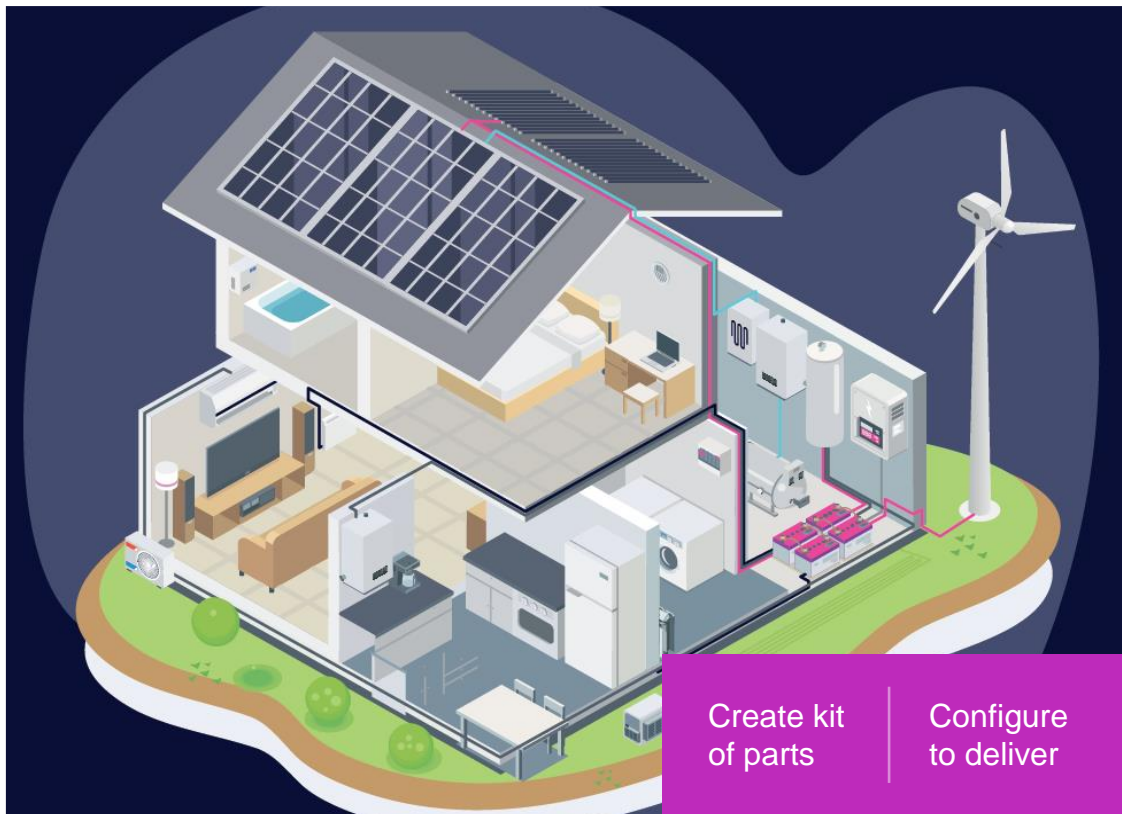


2. Proven platform methods



Active Building Technology

- Testing, validation and configuration of clean energy technology
- Better energy capture, e.g. 67% heat pump performance improvement
- Cost effective energy storage: chemical, phase change, batteries, steam
- Labs and demonstrator projects
- Flintshire homes: 97% Part L improvement at no extra cost
- Building as power stations that trade energy



Create kit
of parts

Configure
to deliver

Automated Construction



- 10% capital cost reduction
- 30% less material cost and waste
- 15% shorter programme
- 50% fewer workers needed on site, so safer conditions
- 20% reduction in supply chain emissions
- 73% saving on energy in use
- 13.5% increase in productivity



Create kit
of parts

Configure
to deliver

Advanced Methods for Homes

- Biggest housebuilder in the UK and the second biggest social association
- Working with supply chain to test Modern Methods of Construction at scale
- More efficient scheduling & better use of workforce – 30% more can be built
- 120 companies engaged in supply chain collaboration & sharing data across the sector
- 52% faster build than industry average (14 vs 29 weeks)



Agree
rules

Create kit
of parts

Configure
to deliver

HIPER Pile



- Foundations that integrate with building components to help generate, manage and store energy
- Fewer piles and less material needed
- Use of Cemfree, a light-weight, cement-free concrete
- Potential to reduce materials and emissions by 80%



Create kit
of parts

Configure
to deliver

Live Automated Materials Plan (LAMP)

- Technology to optimise how construction materials are tracked, delivered and used onsite.
- 18% saving on logistics costs (equivalent to £10bn p.a. across UK construction)
- 11% embodied carbon savings modelled along with fewer vehicles to/from site
- Up to 10% faster projects as a result



Joined up
information

Digital
models

3. Shifted public procurement

Mandated for central government departments and ALBs, a spend of over £30bn pa:

- Adopt the principle of value-based procurement and set targets for the level of use of MMC
- Procure construction projects based on product platforms with standardised designs, components and interfaces
- Use quality planning processes and UK BIM Framework




Department
for Education


Department
for Transport

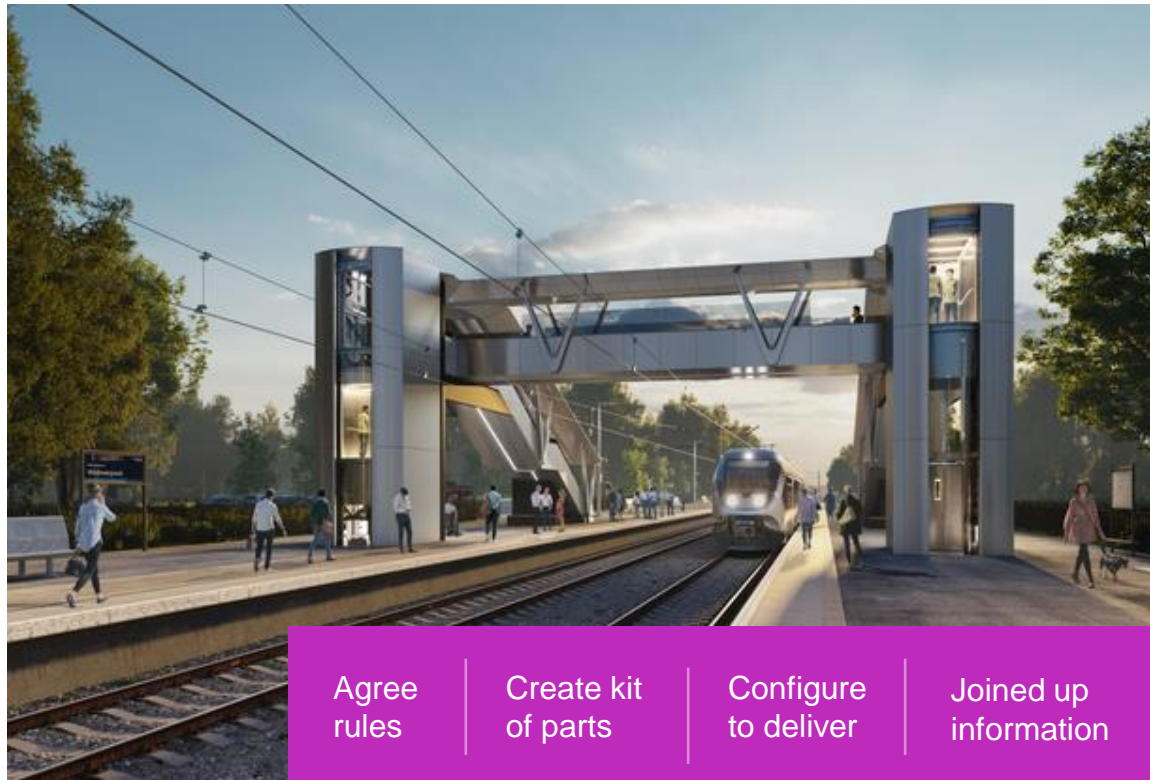

Department
of Health &
Social Care


Ministry
of Justice


Ministry
of Defence

TIES Living Lab

- Series of real-world pilots to test innovation
- 25 partners working to make transport infrastructure smarter, greener and better value for money
- New footbridge project will reduce embodied carbon content by up to 50%, and operational energy emissions by up to 60%.
- Underground cooling being trialled in near Tower Hill and in operation at Knightsbridge station



Agree
rules

Create kit
of parts

Configure
to deliver

Joined up
information

Challenging Space Frontiers in Hospitals

- Looking to space industry to improve whole-life value for clinicians and patients.
- Offsite manufactured operating theatres can be delivered in five months
- Decarbonisation by improving local bulk gas capture, extraction and purification.
- Potential 15% increase in productivity
- £21bn worth of major projects planned



Define
value

Configure
to deliver

GenZero



Active
Building
Centre



Department
for Education

- Department of Education (DfE) builds up to 200 new schools each year
- This design concept will help create healthier spaces to learn
- The buildings have reduced energy consumption, and can generate and store their own energy
- The concept is being applied to the next DfE procurement framework worth ~£2.5bn in FY21/22
- Its digital format is being shared and used by other Government departments



Agree
rules

Create kit
of parts

Will you take up the opportunity to lead?



Potential for platform approach to deliver
£35bn
of government procured buildings.



Government infrastructure that is fit for people and our planet totals
£650bn
pipeline over next decade.



From 20% of our GHG emissions to
net zero
at lowest lifetime cost.

Commercialisation and funding

Active Building Centre Legacy Company

- Decarbonisation of new and existing buildings
- Sales and licensing of products, services and software
- Exploitation of lab facilities

Construction Innovation Hub

- Transfer of assets to external organisations for commercial exploitation
- Legacy company covering marketplace, configuration and assurance of product platforms: CPM?
- Spring budget opportunity

Portfolio Companies

- Commercialisation being discussed with selected organisations

Evaluation results 24 February

01

Engagement

Firms, public bodies and academics are engaging in projects related to TCC's concepts

02

Procurement

Construction sector 'clients' enable TCC concepts to be used in the procurement processes

03

Investment

Construction industry and its associated value chain increase investment in R&D related to TCC concepts

04

Adoption

Construction sector and its supply chain adopt TCC concepts

Performance

Increased performance of construction sector firms and their suppliers

05

Delivery

Improved delivery of built assets (time, quality and whole-life costs)

06

Environment

Improved environmental performance of built assets

07



Innovate
UK

[Eventbrite link
for 24 February](#)

Leading transformation, at scale.

Sam Stacey
Transforming Construction
Challenge Director



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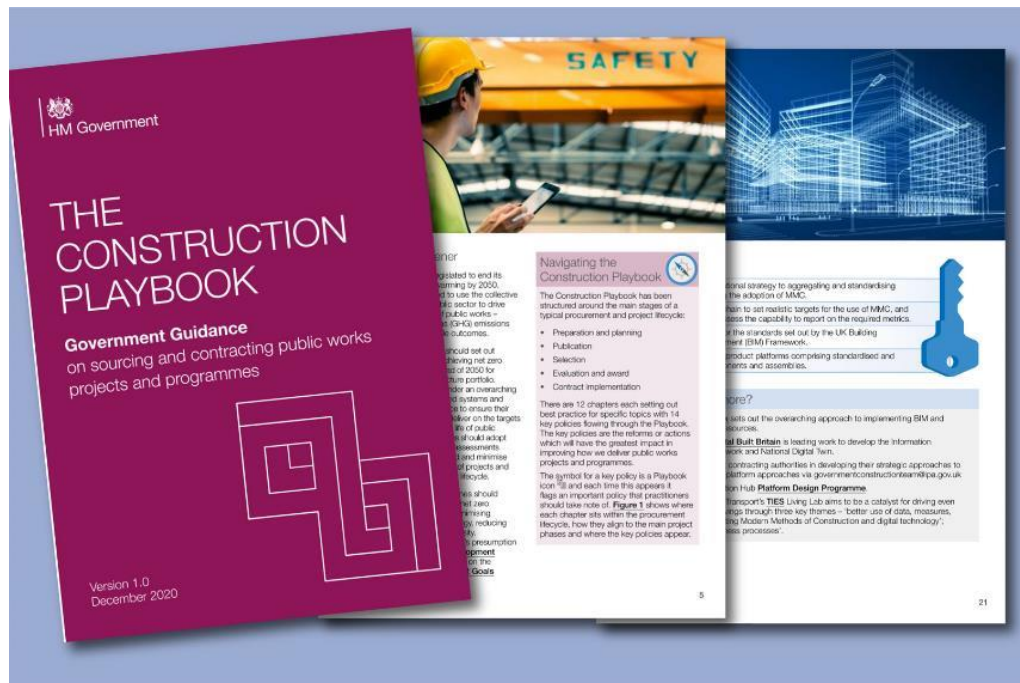
The future of construction: Government priorities



Dr David Hancock

Chair, CIRIA Executive Board and
Construction Director, Infrastructure and Projects Authority
Reporting to HM Treasury and Cabinet Office

Construction Playbook



Construction Playbook



Proposed 14 Key Policies



Eight policies have been adapted from the existing Outsourcing Playbook

1	Publication of commercial pipelines
2	Portfolios and longer term contracting
3	Harmonise, digitalise and rationalise demand
4	Market health & capability assessments
5	Early supply chain involvement
6	Outcome-based approach
7	Further embed digital technologies
8	Should Cost Models and benchmarking
9	Delivery Model Assessments
10	Risk allocation
11	Pricing & payment mechanisms
12	Effective contracts
13	Assessing the economic and financial standing of suppliers
14	Resolution planning



There are six policies new to the Construction Playbook

Construction Playbook

14 key policy reforms will create the right environment to enable improvements across construction:

1	Publication of commercial pipelines
2	Market health & capability assessments
3	Portfolios and longer term contracting
4	Harmonise, digitise and rationalise demand
5	Further embed digital technologies
6	Early supply chain involvement
7	Outcome-based approach
8	Benchmarking and Should Cost Modelling
9	Delivery Model Assessments
10	Effective contracting
11	Risk allocation
12	Pricing & payment mechanisms
13	Assessing the economic and financial standing of suppliers
14	Resolution planning

Long term contracting will enable suppliers to invest in innovation and their workforce to provide continuous improvement in building and workplace safety

Greater use of MMC and offsite manufacturing will provide better certainty of outcome and better management of Health and safety risks under more controlled conditions

Improving the consistency and quality of data will be transformational in how we can deliver projects and programmes by improving safety, enabling innovation, reducing costs, and supporting more sustainable outcomes.

Early engagement will allow the supply chain to be part of developing the solution to the right quality levels and increase productivity collaboratively.

We will focus on strategic priorities including quality, social value and safety rather than just lowest costs.

Frameworks

24 recommendations set out by the review, include extensive support and accountability in relation to helping the public estate achieve net zero status, generating social value, stimulating innovation through modern methods of construction, minimising or eradicating waste, connecting supply chains and ensuring that the supply chain are treated fairly.



Transforming Infrastructure Performance

1. Data & Insight

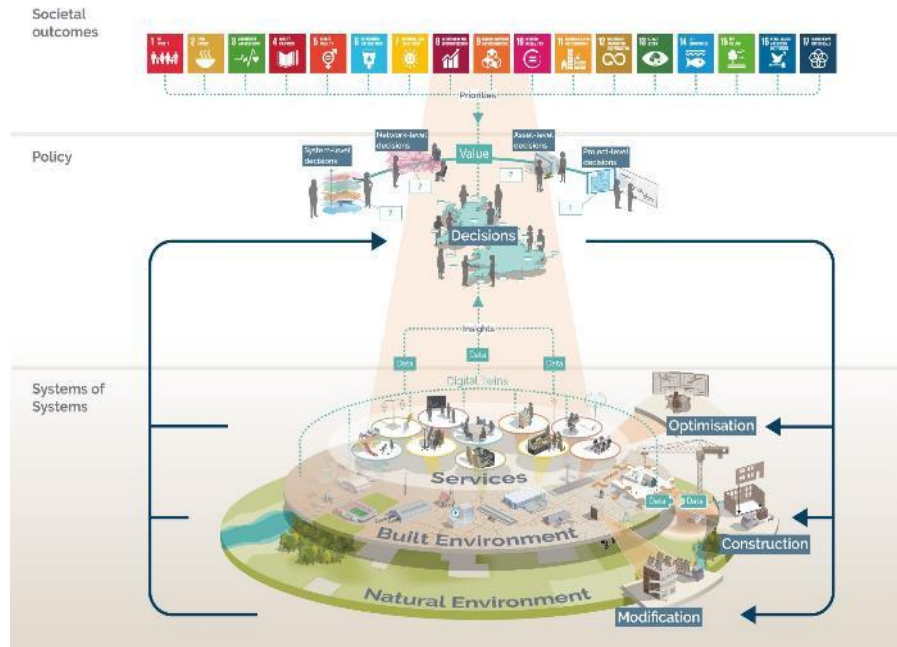
Collect, collate, analyse and share data appropriately on infrastructure performance to provide the insight needed to improve productivity and deliver better societal outcomes.

2. Business & Delivery Models

Set up projects and programmes with governance and contracting arrangements that support cross department collaboration, industry innovation, the use of technology and delivery of balanced whole life outcomes.

3. Market Capacity & Productivity

Deliver continuous improvement in the efficiency of infrastructure performance; matching the supply chain, capability and capacity to the pipeline of projects and programmes required and developing new ways of working.



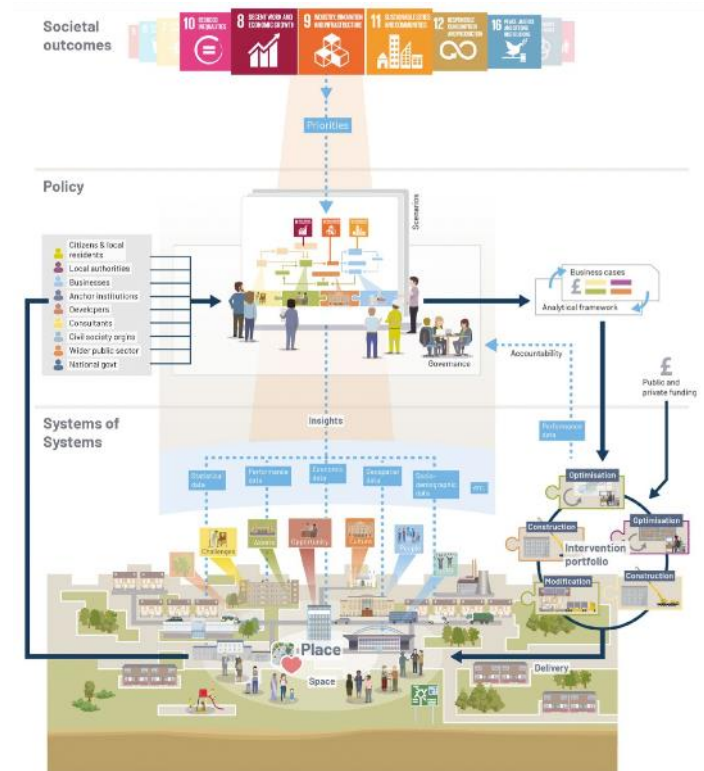
Transforming Infrastructure Performance

4. Environment & Sustainability

Embed outcomes for net zero, sustainability and environmental enhancement across the whole life of assets and systems.

5. Building expertise & capability

Develop and deploy people with the skills, expertise and capability to act as clients and supply chain providers to deliver high quality, balanced outcomes in a complex and multi-stakeholder environment.



Standardise, Harmonise & Digitise

What is the Platform Design Hypothesis?

We are developing a platform construction system, consisting of a standardised kit of parts, sub-assemblies, that we believe will be able to deliver a large proportion of social infrastructure buildings procured by government departments. It will offer significant benefits in quality, cost, delivery time and whole life value.

As part of the Construction Innovation Hub Platform project, we're working in partnership with government departments, industry and end-users to determine the needs for these buildings and feeding these into the Platform specification and design development. As part of this requirements capture phase of the project, we'd love to hear your opinions on this hypothesis, or where you think any gaps exist.

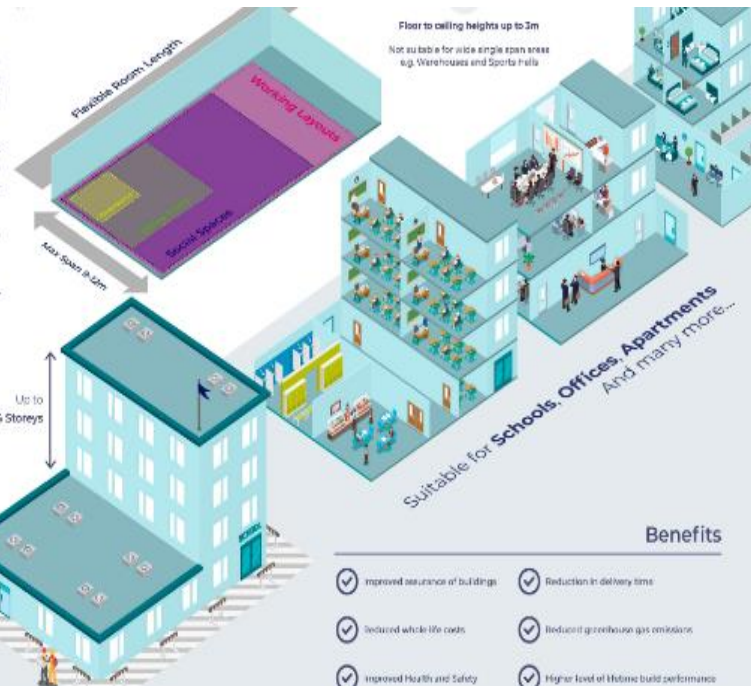
Please feel free to comment on the assumptions listed or email your feedback and comments to construction@the-mtc.org so we can consider them in our analysis.

Platform system sub-assemblies may include:

- | | |
|--|---|
|  Active Roof |  Ground Floors |
|  Building Control System |  Incoming Services |
|  Ceiling Cassette |  Internal Walls |
|  Cores Incl. Vertical Circulation |  Plant Room |
|  External Walls |  Risers |
|  Foundation System |  Structural Frame |
| |  Volumetric Pods |

Greenfield /
Brownfield
Compatibility
Not Site Only

Up to
4 Storeys



Benefits

- | | |
|---|--|
|  Improved assurance of buildings |  Reduction in delivery time |
|  Reduced whole life costs |  Reduced greenhouse gas emissions |
|  Improved Health and Safety |  Higher level of lifetime build performance |

Prisons



Universities

'Progressive' university building wins architecture prize

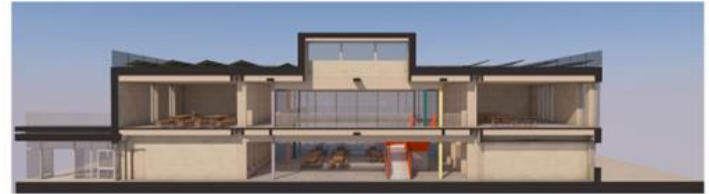
Kingston University London – Town House is the 25th winner of the award.



Schools (GenZero)



 **INDUSTRIAL
STRATEGY**  **UK Research
and Innovation**
Transforming Construction
Story Catalogue

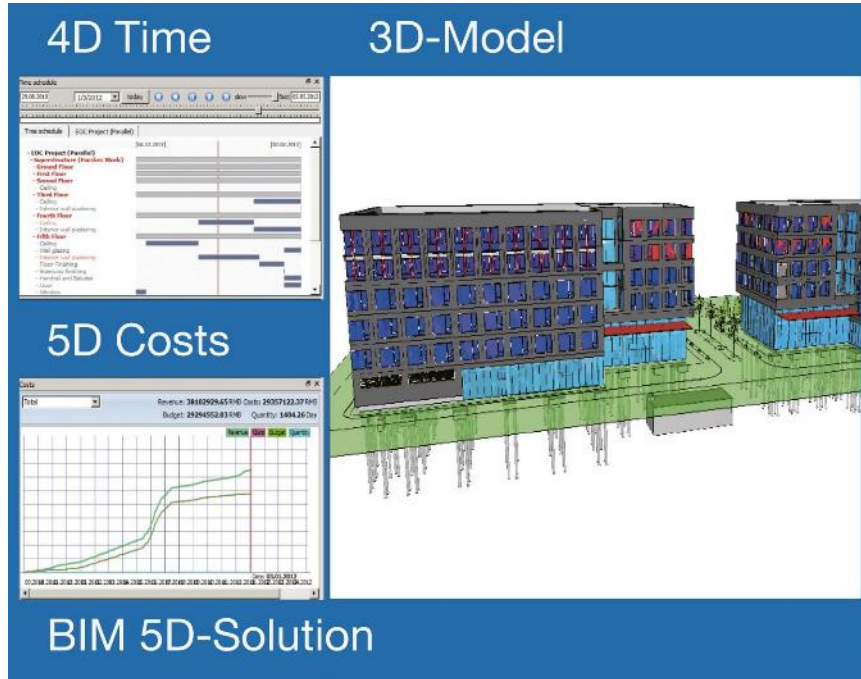


Active Building Technology

- Testing, validation and configuration of clean energy technology
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5D BIM



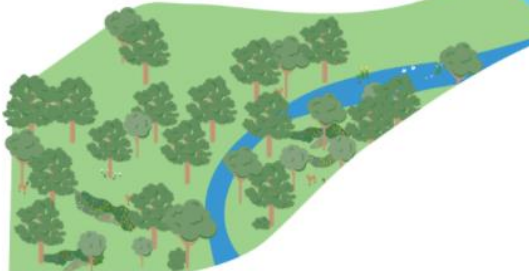
- **3D model:** A classic 3D geometric model is enriched with extra data (quantities, furnishings, materials, devices, personnel deployment).
- **4D:** The time factor. The 4D model integrates work stages and their duration so that a model-based schedule and process plan can be created.
- **5D:** Cost integration. Cost assignment in the 5D model thus created allows integral, model-based cost planning, tendering and execution.

Digital Twin



The Future

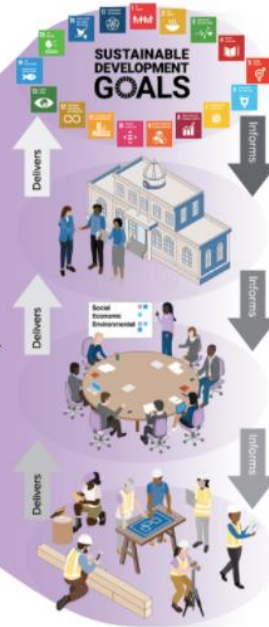
Built systems



Natural systems

Services

Outcomes
for people
and nature



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2 February 2022

Q&A



Dirk Vennix

Acting Business Manager

Buildoffsite

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Updates from the offsite community



Terry Mundy

BOPAS Consultant

Lloyd's Register Quality Assurance

Updates from the offsite community

Nigel Fraser

Buildoffsite

Industry Advisor

Updates from the offsite community



Nathan Garnett

Director

UK Construction Week



Paul Shelley

Sales Director

The Offsite Show



THE OFFSITE SHOW

Save the date: Exhibitor Day, 18th February 2021

Paul Shelley

Tel: +44 (0) 203 006 2359

paul@industry-expo.co.uk

Eddie Milton

Tel: +44 (0) 1327 876250

eddie@industry-expo.co.uk

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Acting Business Manager
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anglianwater

SUPPLY CHAIN SUSTAINABILITY
SCHOL

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MODULAR EXCELLENCE

VISTA

mtx

Barbour
PRODUCT SEARCH

FAITHFUL+GOULD

action sustainability



L Lloyd's Register

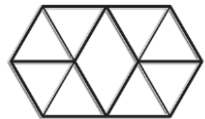
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ideal lifts

ARUP

ciria

IFPI
INTERNATIONAL FACILITIES & PROPERTY INFORMATION LTD

Sir Robert McALPINE

SCN SMART CONSTRUCTION NETWORK

TRANSFORMING CONSTRUCTION NETWORK PLUS

VISION
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BLP
INSURANCE



Homes England



Ministry of Housing, Communities & Local Government



Department for Business, Energy & Industrial Strategy



Infrastructure and Projects Authority



Ministry of Defence



Ministry of JUSTICE



UNIVERSITY OF CAMBRIDGE

Edinburgh Napier UNIVERSITY



Scottish Water
Trusted to serve Scotland

NWG
living water

Dŵr Cymru
Welsh Water

YorkshireWater

United Utilities
helping life flow smoothly

STRIDE TREGLOWN

UKBIM ALLIANCE
Enabling Digital Transformation

C-PROBE

ASDA
SAVING YOU MONEY EVERY DAY

CS

Construction Specialties™

NetworkRail

RIBA



RICS

the mark of property professionalism worldwide

OXFORD BROOKES UNIVERSITY

hs2 engine for growth

THE HOUSING FORUM

Heathrow



Transport for London

bsi.



gsk



TEMPOHOUSING UK & Ireland



NG Bailey

UNIBLOCK
SIMPPLICIA LA CONSTRUCCION

Danfoss

ENGINEERING TOMORROW



BUILDING UNDERSTANDING



CONSTRUCTION INNOVATION HUB

Innovate UK

ela8

HERTFORDSHIRE
BUILDING CONTROL

LEAN THINKING LTD

Stelling Properties

pbc today

Buildoffsite members' update



Nigel Rake

Foundation Systems Technical Manager

Roger Bullivant

Welcome

Nigel Rake
Foundation Systems Technical Manager

www.roger-bullivant.co.uk

✉ Info@roger-bullivant.co.uk

☎ 0845 838 1801

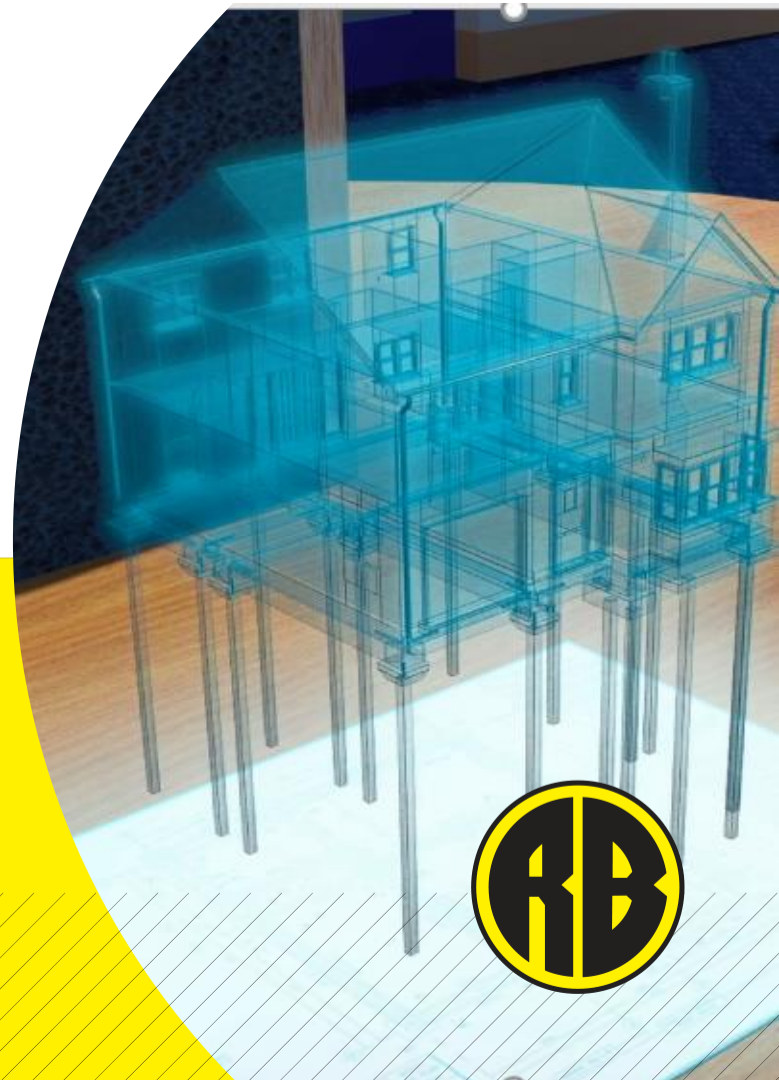
in @rogerbullivantlimited

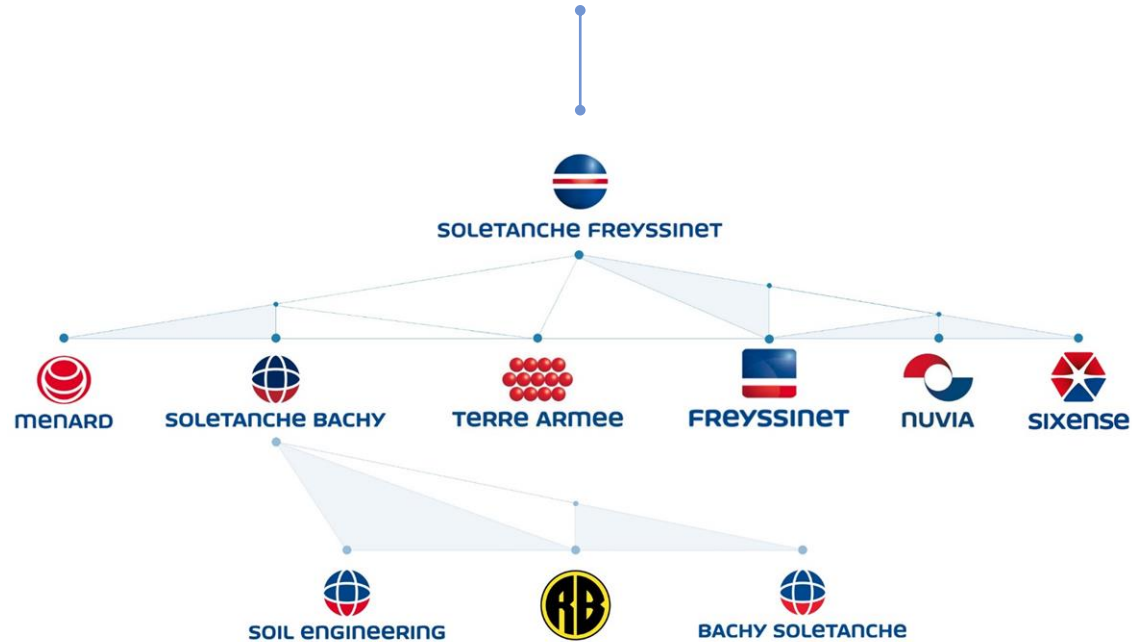


Foundation Engineering

Roger Bullivant Limited (RB) is a foundation engineering company specialising in the design and construction of foundations for all types of buildings and structures in all kinds of ground conditions.

“Foundation Engineering”

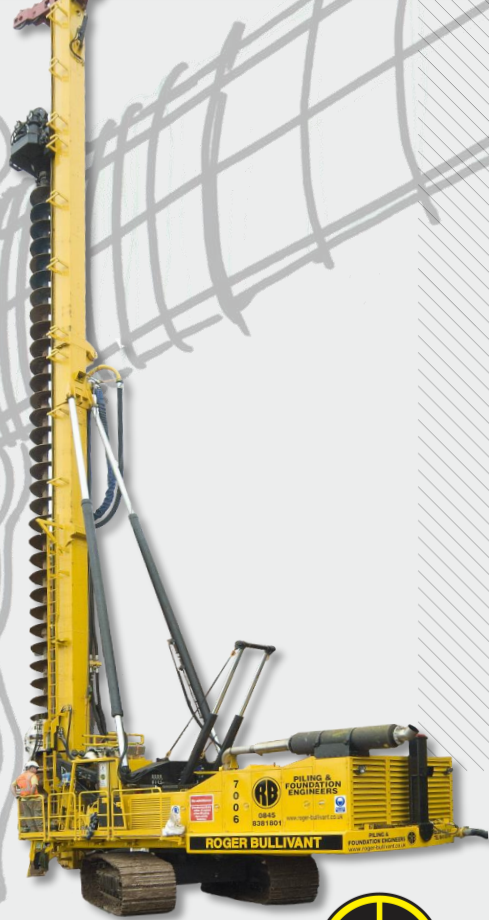




Local knowledge



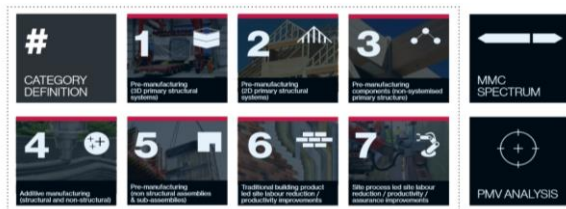
Plant & Equipment





Category DEFINITIONS

The term 'pre-manufacturing' encompasses processes executed away from final workplace, including in remote factories, near site or on site 'drop off' facilities. The point here is the application of a manufactured and consolidated process in controlled conditions prior to final assembly / install. On-site 'workface factories' are included in Category 5.



1
2
3
4
5
6
7
MMC
SPECTRUM
PMV
ANALYSIS

Category 3

Pre-manufacturing components
(non-systemised primary structure)

Use of pre-manufactured structural members made of framed or mass engineered timber, cold rolled or hot rolled steel or pre-cast concrete. Members to include load bearing beams, columns, walls, core structures and slabs that are not substantially in-situ workface constructed and are not part of a systemised design.

This category, although focused on superstructure elements, would also include sub-structure elements such as pre-fabricated ring beams, pile caps, driven piles and screw piles.

1
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PMV
ANALYSIS

Category 3

Pre-manufacturing components
(non-systemised primary structure)

- a. Driven / screw piling
- b. Pre-fabricated pile caps / ring beams
- c. Columns / shear walls / beams
- d. Floor slabs
- e. Integrated columns, beams and floor slabs
- f. Staircases
- g. Pre-assembled roof structure – trusses / spandrels



Products & Services

Cast Insitu Piling

Restricted Access

Driven Piling

Ground Improvement

Precast Beams

Foundation Packages



Products & Services

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Driven Piling

Ground Improvement

Precast Beams

Foundation Packages



Foundations from a Factory



Products & Services

Cast Insitu Piling

Restricted Access

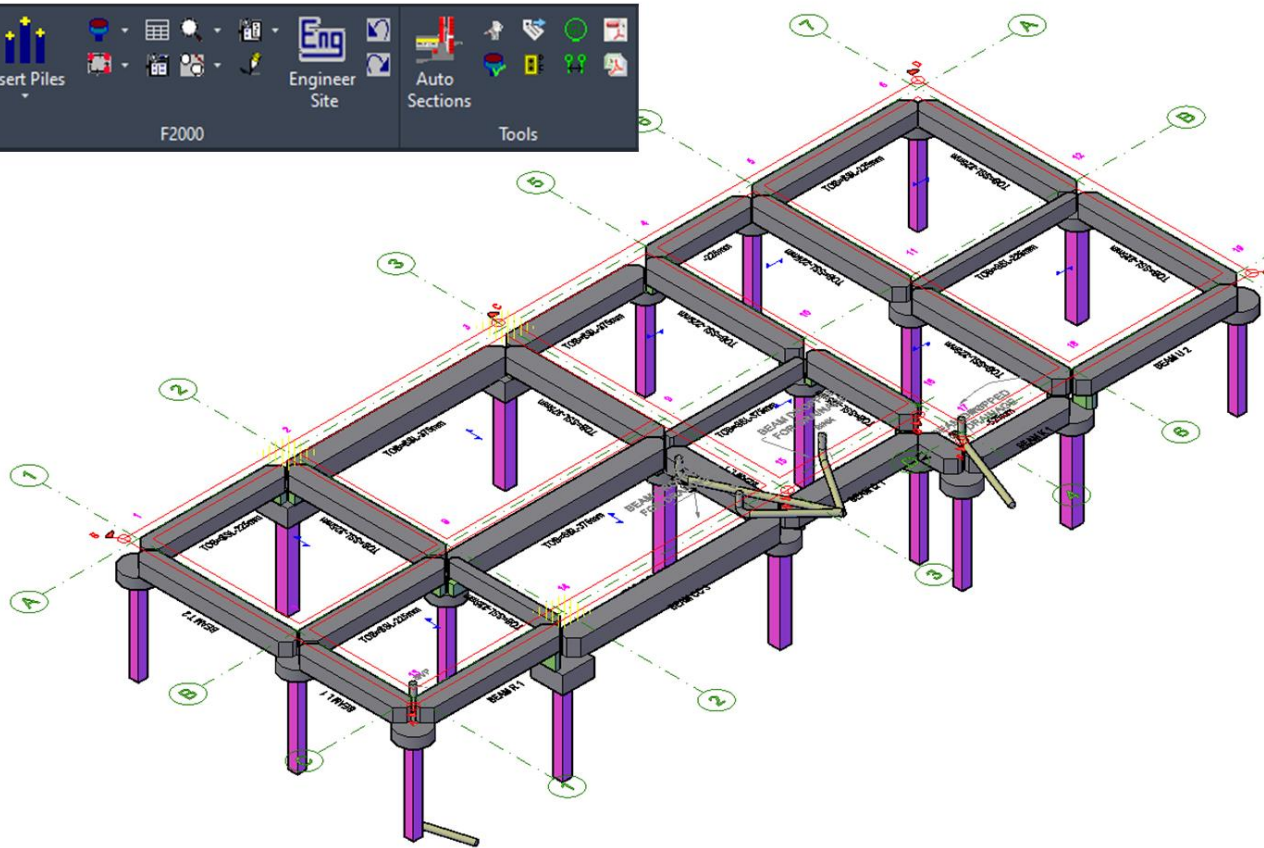
Driven Piling

Ground Improvement

Precast Beam

Foundation Packages





Beam Designer

Beam Details

Beam System: **RBEAM 400** ☒ Void Former ☐ Drainage

Top of Beam Level (mm): **-225**

Span to Concrete Length Reduction (mm): **99**

Beam Offset - From First Point (mm): ☐ 0

Beam Offset - From Second Point (mm): ☐ 0

Linear Beam Offset (mm): **0**

Calculation Details

Load Case Number: **3**

Unfactored Load on Beam (kN/m): **60.00**

Factored Load on Beam (kN/m): **85.60**

Update Line Load

Beam Variables & Calculations

STOCK BEAM?	YES
SPAN	3610 mm
CONCRETE LENGTH	3450 mm
MAXIMUM BENDING MOMENT	110.25 kNm
MAXIMUM SHEAR	137.39 kN
DESIGN SHEAR	116.67 kN
REACTION TO PILE	108.30 kN
BEAM TYPE REQUIRED	RBEAM 400 TYPE 2

Re-Calculate Beam **Force Beam Type**

End Bar Position

☒ (High) End Bar Position ☐ (Low) End Bar Position

Apply **Exit**

Design





Production





Installation



Thank you for listening



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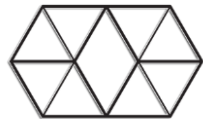
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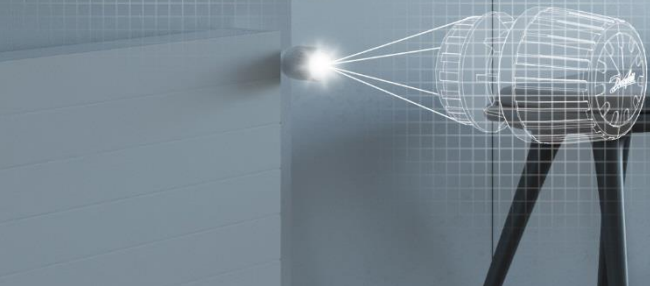
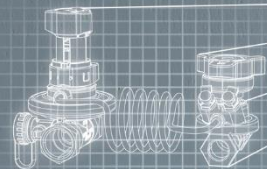
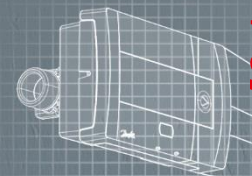
Stuart Kerr

Key Account Manager – OEM Underfloor & Trace Heating
Danfoss

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Introduction to Danfoss Solutions for Modular Buildings



Introduction to Danfoss

Key facts

37,000

Employees

**USA, CHINA
AND GERMANY**

Top three markets

WORLDWIDE SALES

in more than **100** countries

PRIVATELY HELD

Ownership

72 FACTORIES

in more than **20** countries

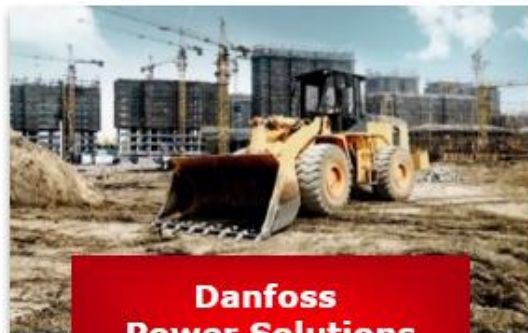
23 R & D Sites

worldwide

**NORDBORG,
DENMARK**

Headquarters

Our Segments



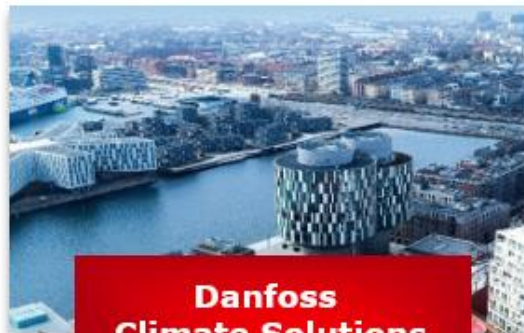
Danfoss Power Solutions

#2 Market position

- 17,200 employees
- 53 factories in 19 countries
- 3.4bn EUR annual sales



50%
of Group sales



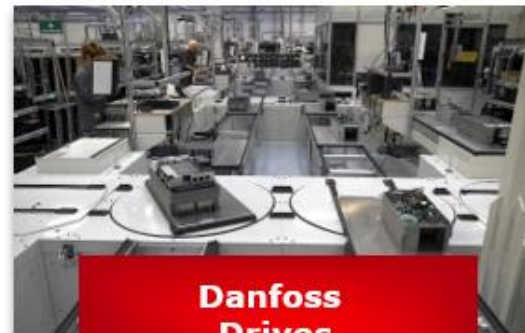
Danfoss Climate Solutions

#2 Market position

- 10,500 employees
- 35 factories in 14 countries
- 2.5bn EUR annual sales



30%
of Group sales



Danfoss Drives

#2 Market position

- 4,400 employees
- 9 factories in 7 countries
- 1.4bn EUR annual sales



20%
of Group sales

Danfoss Heating

Our Verticals



MULTI-FAMILY

- Radiator thermostats, floor heating, Trace Heating, heat pumps, and smart heating solutions, balancing valves (hydronic balancing of the heating system), flat stations, domestic hot water systems, energy meters etc.

RESIDENTIAL



SINGLE FAMILY

- Radiator thermostats, floor heating, heat pumps, Trace Heating and smart heating solutions, balancing valves (hydronic balancing of the heating system), flat stations, domestic hot water systems, energy meters etc.



NON-RESIDENTIAL

- HVAC digital and manual actuators, hydronic balancing valves, control valves, floor heating, hydronic- or electrical floor heating, Trace Heating, heat exchangers, HIU, radiator thermostats, heat pumps, pressure independent balancing and control valves, and electronic controllers.

NON-RESIDENTIAL



DISTRICT ENERGY

- Substations, light and heavy duty stations, controls, flat stations, heat exchangers, and domestic hot water systems.
- All components that belong to a substation: control and balancing valves, heat exchangers, electronic controllers and monitoring systems.

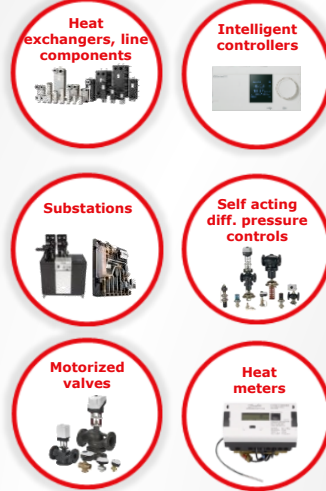
DISTRICT ENERGY



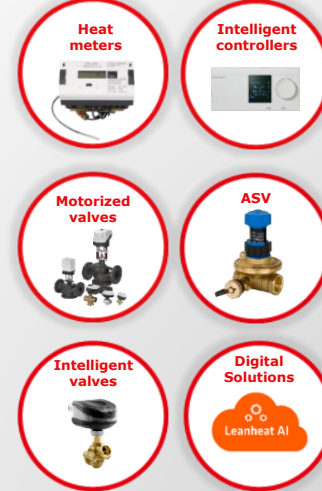
Residential



DEN



Buildings



Key Industry Challenges





Countdown to zero: how can the UK meet its 2050 carbon targets? | Features | Building
Reducing-UK-emissions-Progress-Report-to-Parliament-Committee-on-Cl...-002-1.pdf

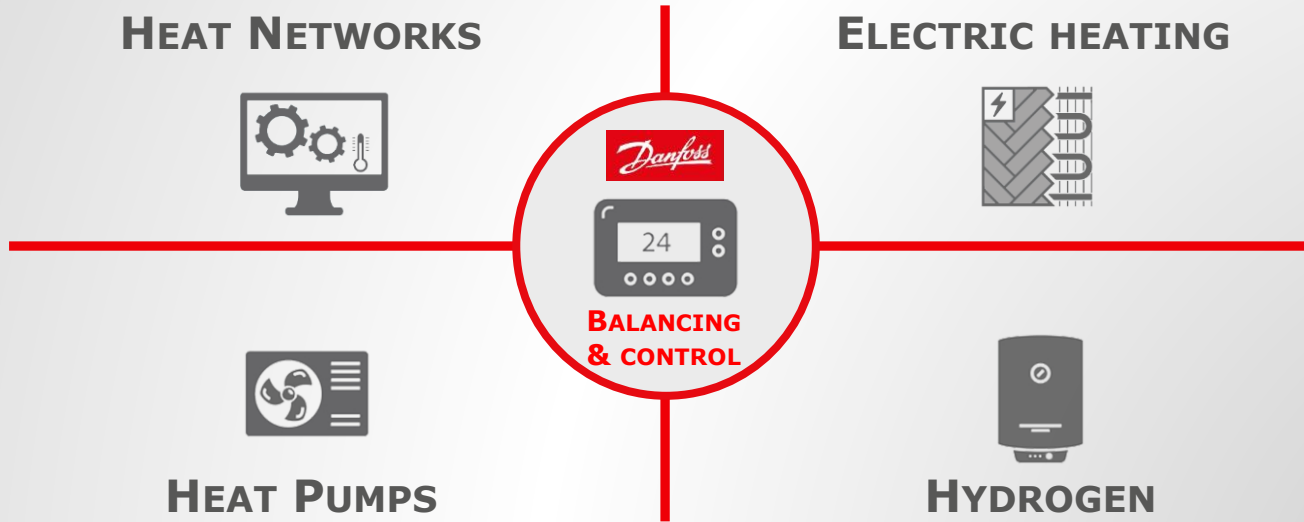
- 80% of the buildings that will be around in 2050 have already been built
- 80% of energy consumed in existing homes is used for space heating and hot water
- Greenhouse gas emissions from buildings increased by 4% in the latest published emissions data

The global climate and energy challenge



- The climate challenge is fuelled by growth in demographics and wealth increasing energy consumption
- By 2050, 70% of the world's estimated 10 billion inhabitants will be part of massive urban networks
- Energy consumption will grow by over a third up to 2035
- Cities are home to 80% of EU's population
- Cities are responsible for 70% of Greenhouse emissions
- Increasing need for energy efficiency and renewable energy sources to reduce CO₂ emissions
- Existing technology and solutions to reduce energy consumption are available!

The Future



Shaping our industry – Key macro drivers impacting Heating



Energy Efficiency

- Increasing global push for energy efficiency
- Eco-directive forcing energy system performance up
- Local regulations driving move for lower energy buildings
- New credit schemes enable more energy renovation



Connectivity

- Technology developments allow new opportunities for energy saving and comfort
- Smart room, building/house and city developments
- Increasing interconnection between heating and electricity (CHP, Renewable) also driving energy storage



Urbanization

- Increase urbanization rate (including growth in many European cities)
- Cities becoming a larger decision maker within energy efficiency activities and energy infrastructure



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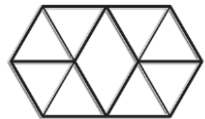
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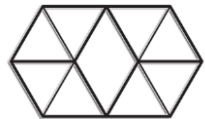
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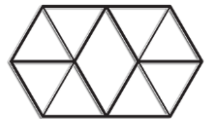
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Graeme Jones

Managing Director

C-Probe Systems

Buildoffsite members' meeting

2 February 2022

Looking ahead



Dirk Vennix

Acting Business Manager

Buildoffsite

Thanks for joining

Get in touch!



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Upcoming events

9 February

R&D in the offsite sector: financial reward for innovation

February

Client group meeting

23 March

MMC conference

April

C-Probe breakfast briefing

3 – 5 May

The Offsite Show

May

Achieving sustainable resilience in pre-cast structures guidance

Publication launch

May

Buildoffsite members' meeting

June

Overbuild guide

Publication launch

Buildoffsite members' meeting

2 February 2022

Closing remarks



Dirk Vennix

Acting Business Manager

Buildoffsite

Buildoffsite members' meeting

2 February 2022