



# **Start with the End with the Start**

**11<sup>th</sup> January 2018**

**Future Inn, Cardiff**



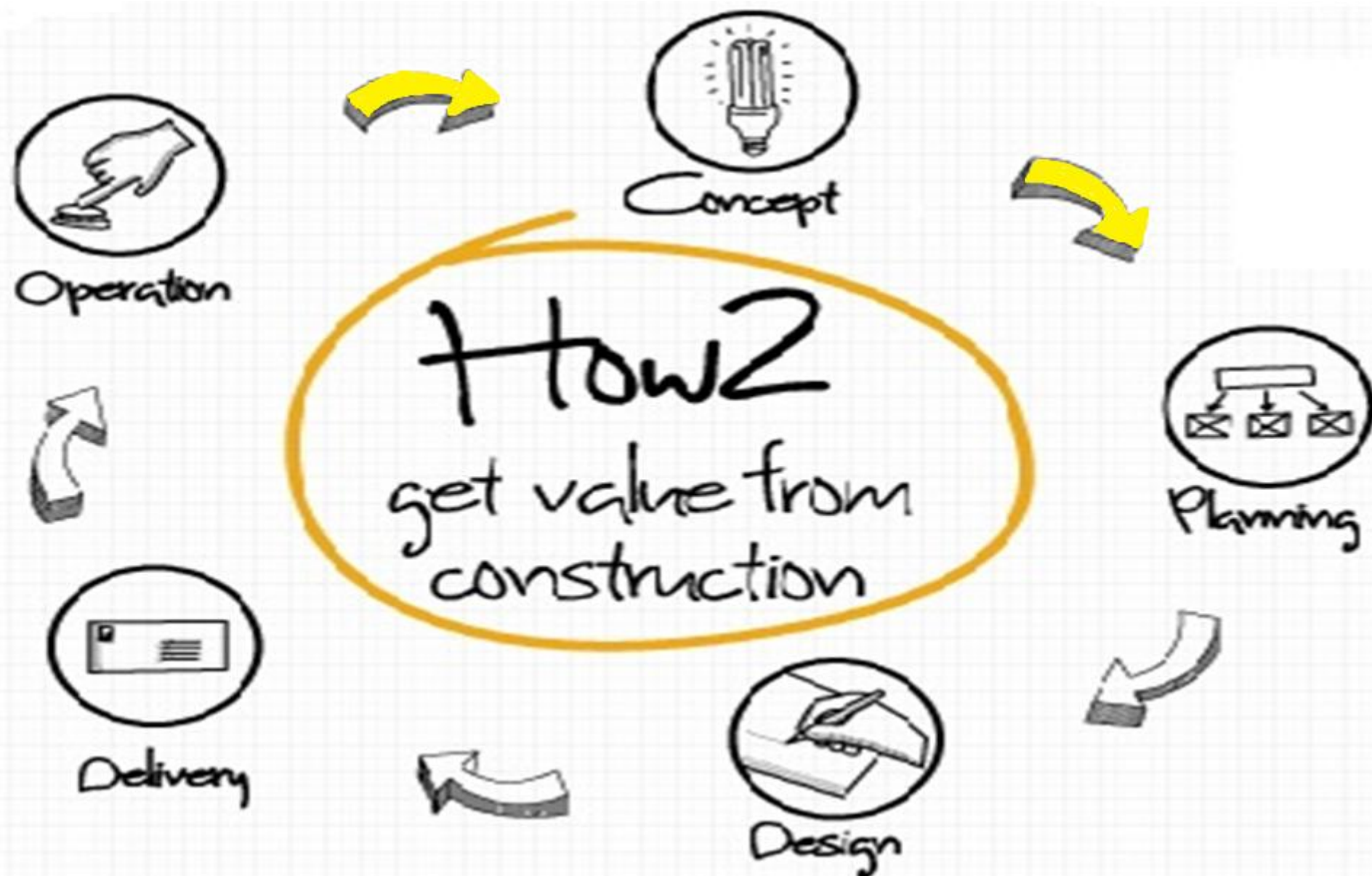


# Welcome & Setting the Scene

**Tony Norris**

**Chair**

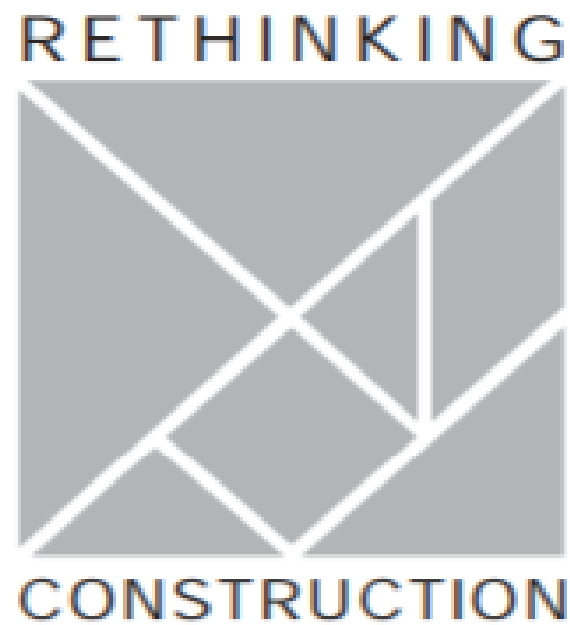




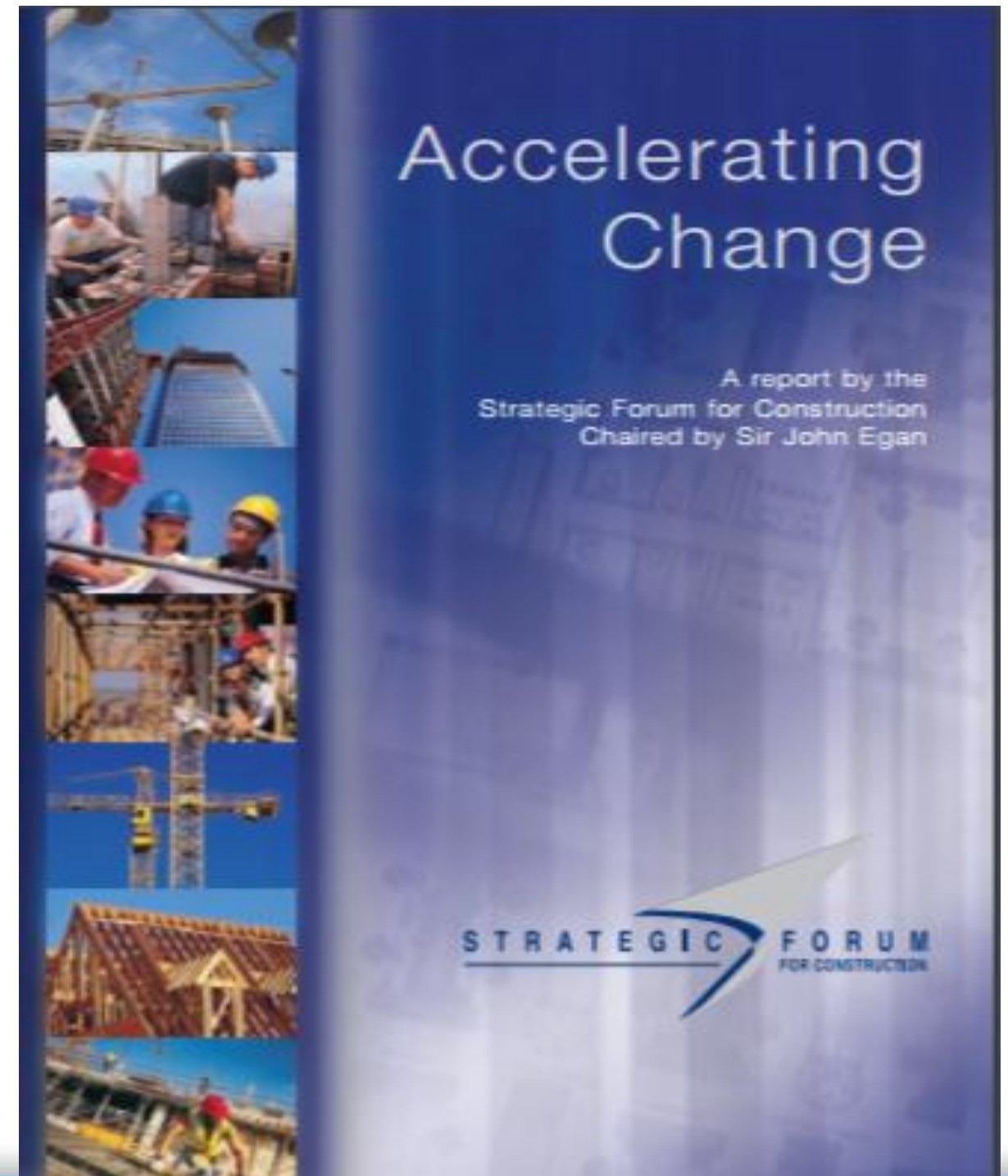


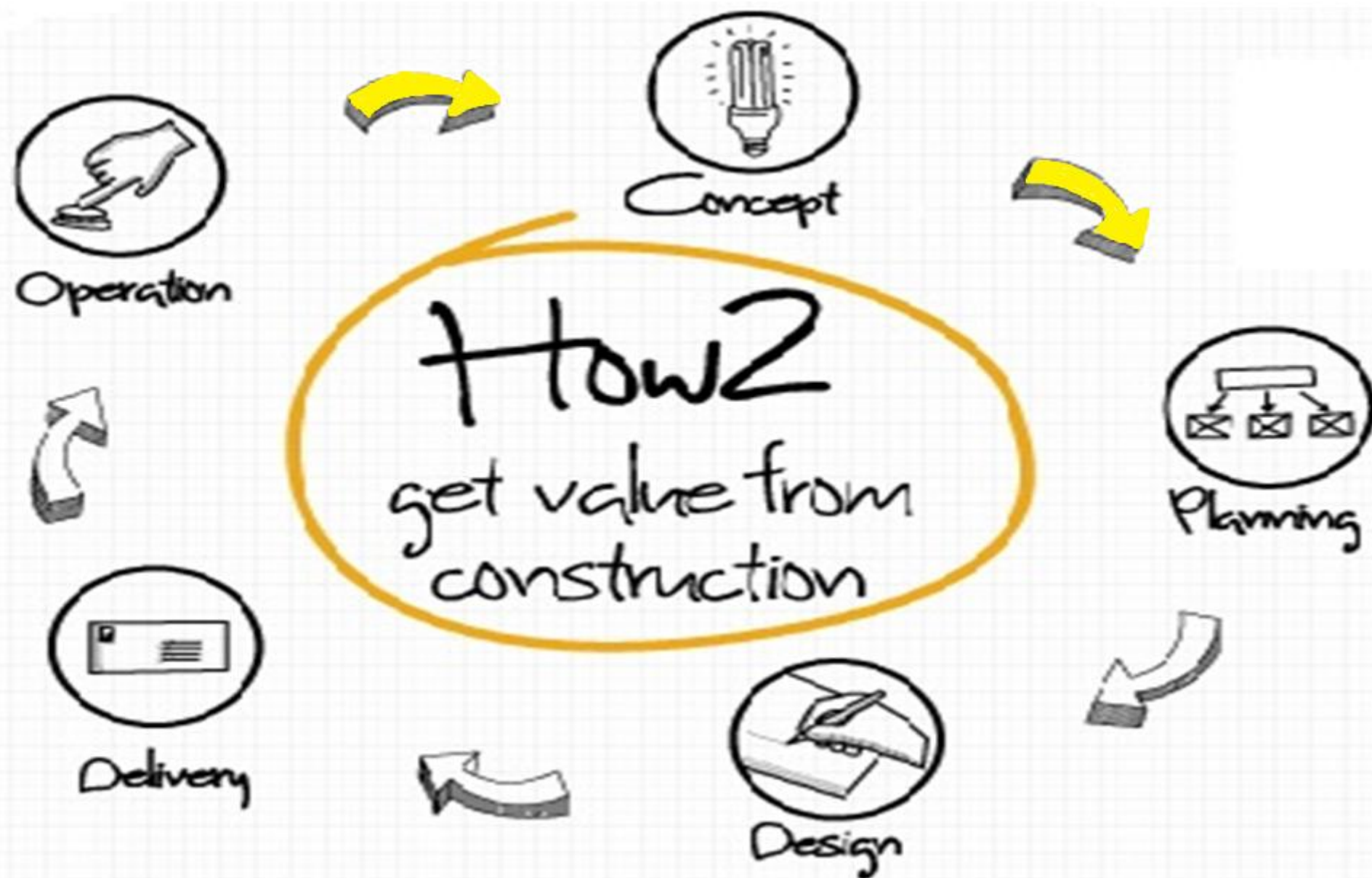
# *Rethinking Construction*

# Accelerating Change



THE REPORT OF THE CONSTRUCTION TASK FORCE

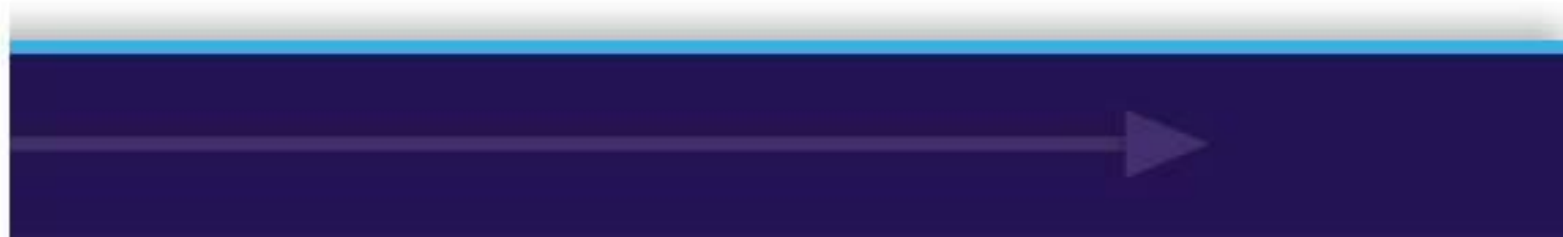






## Introduction & Group Discussion

**Diarmid de Burgh-Milne**  
**Facilitator**





# **How Lessons Learned Can Improve Project Outcomes.**

**Balfour Beatty Mott MacDonald**



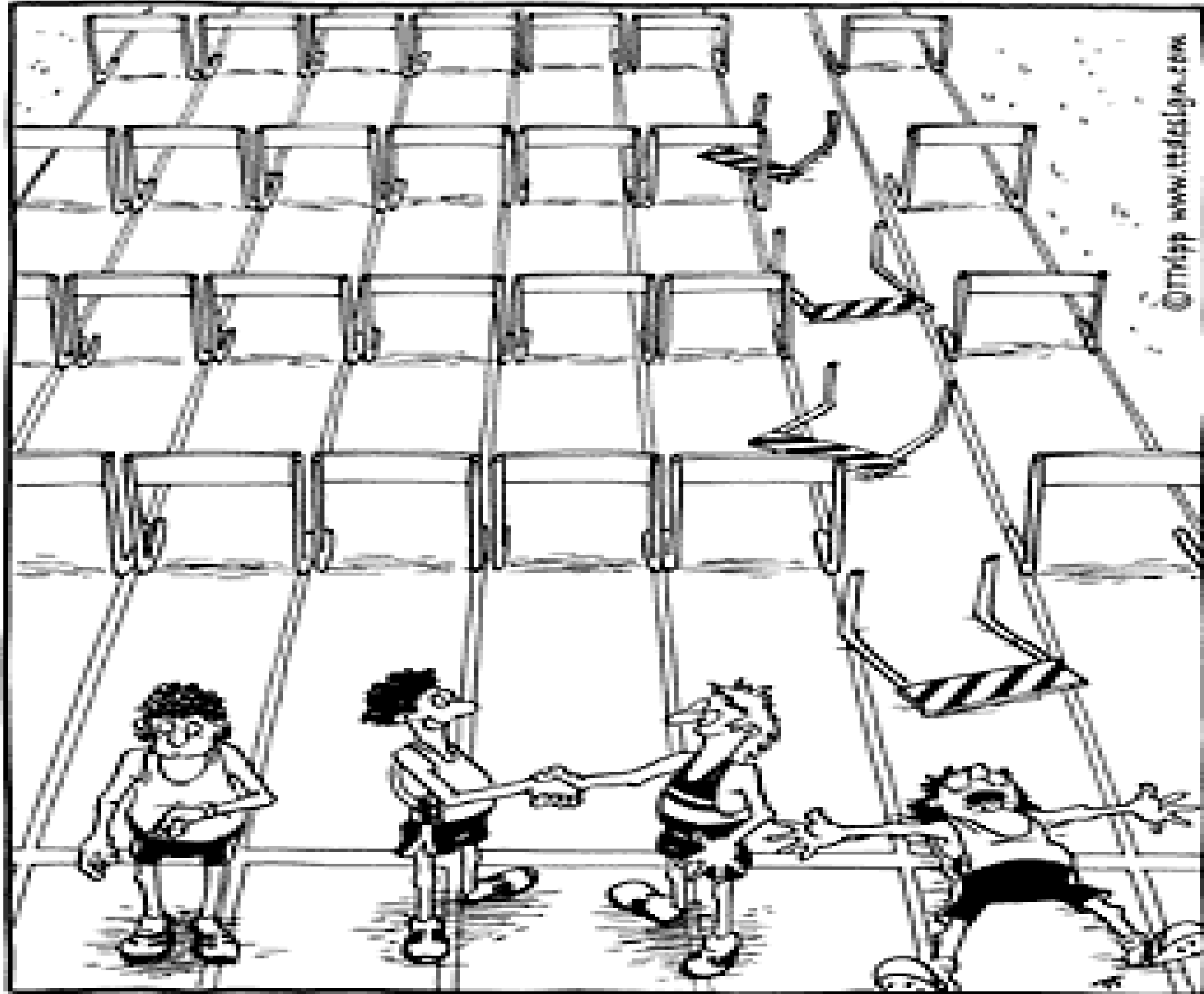
**Its not just about right or wrong its about  
right and wrong!**



**Balfour Beatty Mott MacDonald**



**There may be trouble ahead.**



**Balfour Beatty Mott MacDonald**

Don't forget the letter 'E'.



Balfour Beatty Mott MacDonald

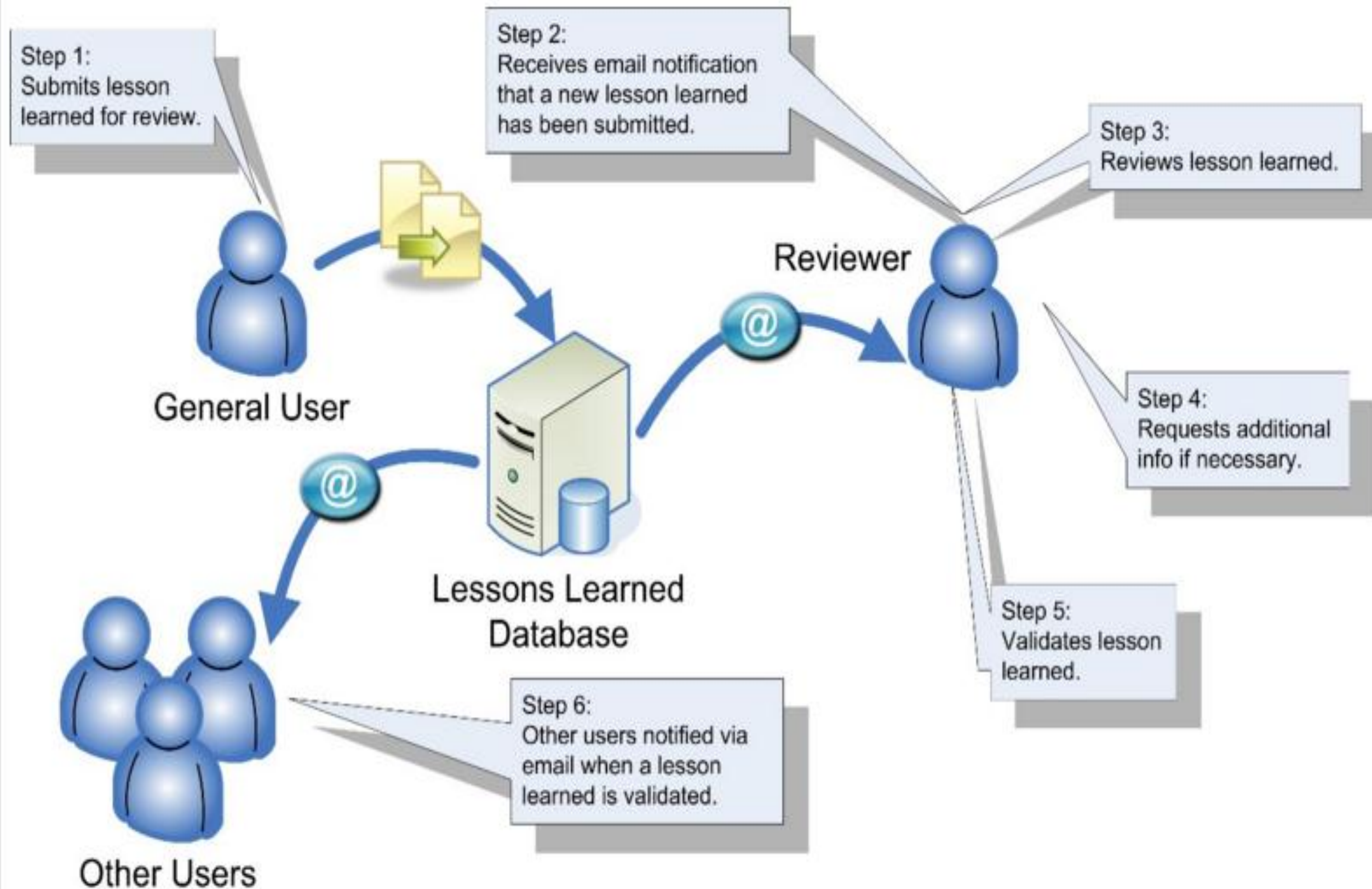
# The 8 rules to ensuring lessons are captured, learned and passed on!

1. By both the Good and the Bad using a "lessons learned" database, information can be in the moment
  2. Gather the 'Right' Data
  3. Collected, reviewed and used to improve your project processes
  4. Input your data
  5. Prevent repeat occurrence of similar mistakes or
  6. Publish & Communicate
  7. Can be shared to promote methods of good working practices.
  8. Encourage
7. Regular Reviews
8. This will ultimately lead to more successful projects and the associated financial advantage for relatively little effort.





# Creating A Useful Lessons Learned Database.



**Balfour Beatty Mott MacDonald**



**Any Questions?**

**Balfour Beatty Mott MacDonald**

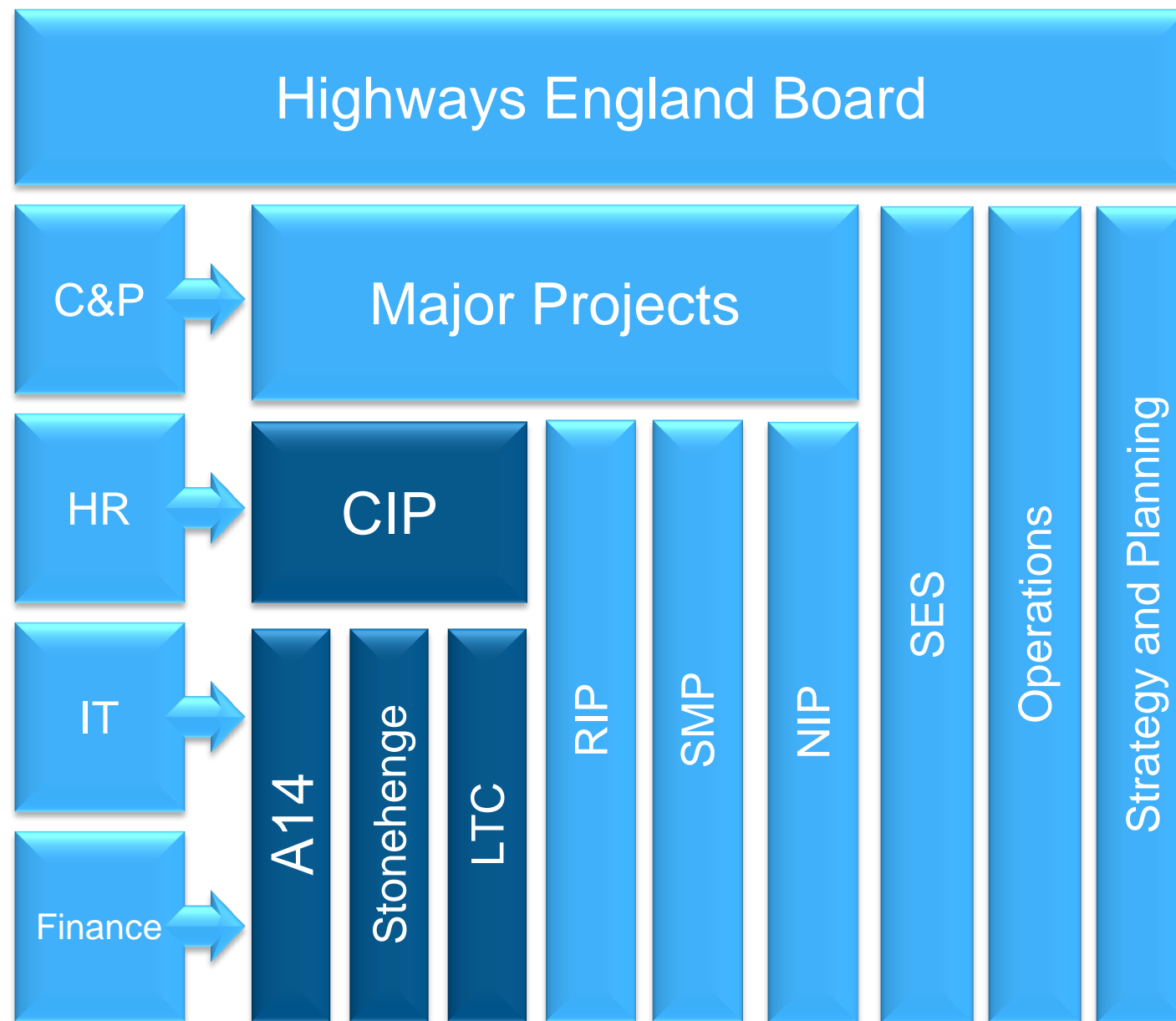
# *Complex Infrastructure Programme*

## *Improving our knowledge management capability*





## Our Organisation



*Major Projects 'Relied upon as the leaders in all aspects of delivering major road schemes'.*

*The establishment of CIP brings mega projects delivery expertise together in one place.*

## Our Values



# A14 Cambridge to Huntingdon Improvement Scheme



- £1.5bn with £100m of local partner funding
- 34km (21 miles) of improvement, open late 2020
- relieves major congestion hotspot
- key east-west freight route
- regional benefits – enabling growth and employment
- largest greenfield project in HE portfolio
- 85,000 vehicles per day - 26% HGV
- 32 structures including 834m river Great Ouse & East Coast mainline crossing
- 117km Utility diversions required
- 10m<sup>3</sup> earthworks (6 borrow pits)
- 500 staff and 2000 operatives on site

*Fastest project through Development Consent Order (DCO); 2 years 3 months ahead of original schedule*

*From commission to start of works in 4 years - on site November 16*

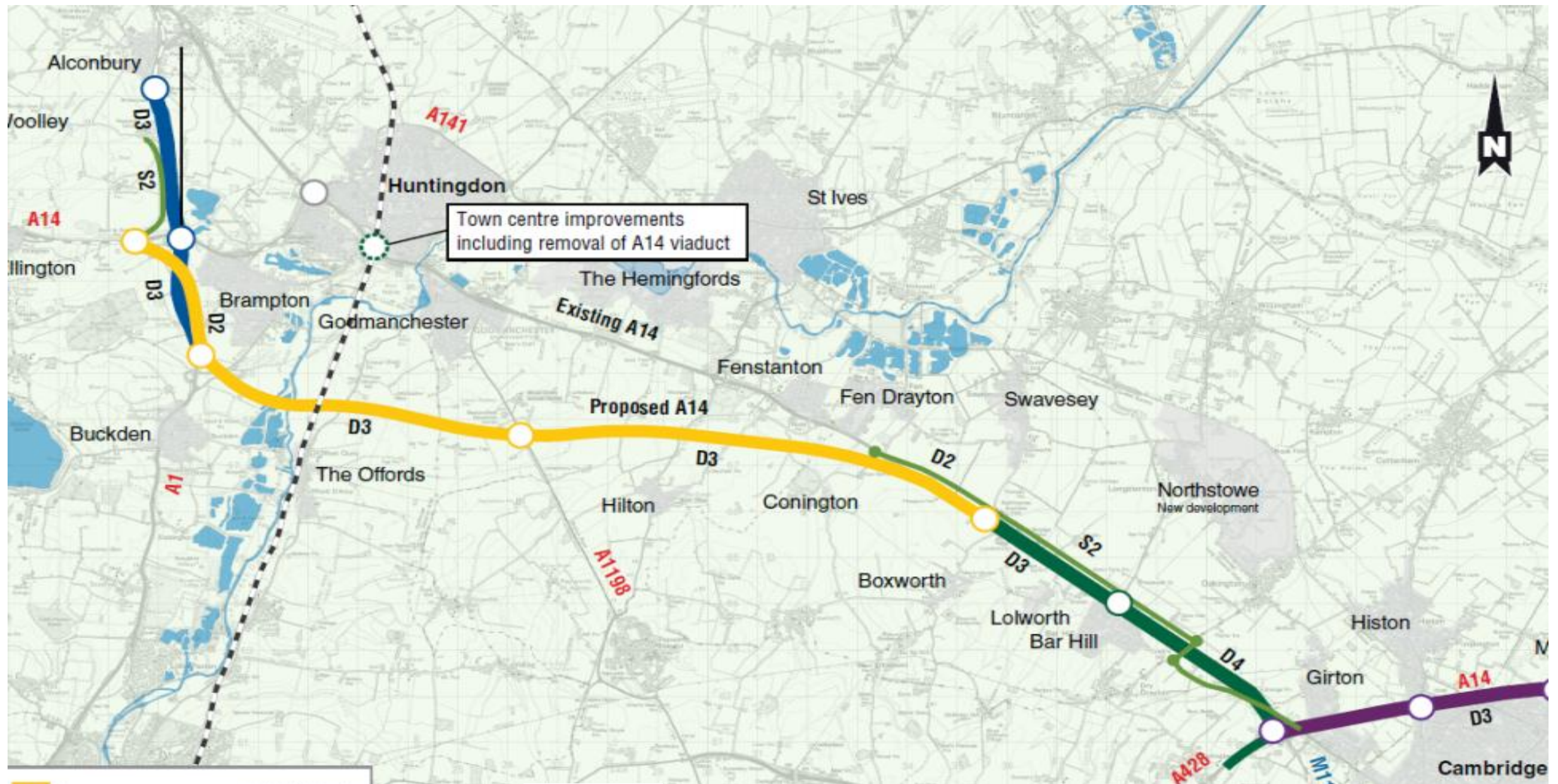
*Integrated and collaborative delivery model, investing £1m/day*

*3.5m man hours to date*

*2.5m<sup>3</sup> earth moved (roughly volume of the great pyramid)*



# A14 Cambridge To Huntingdon Improvement Scheme Route



SKANSKA



**A14 IDT  
Delivery  
Team**



**Balfour Beatty**





# A14 Cambridge to Huntingdon Improvement Scheme - One Year On Site Nov 17





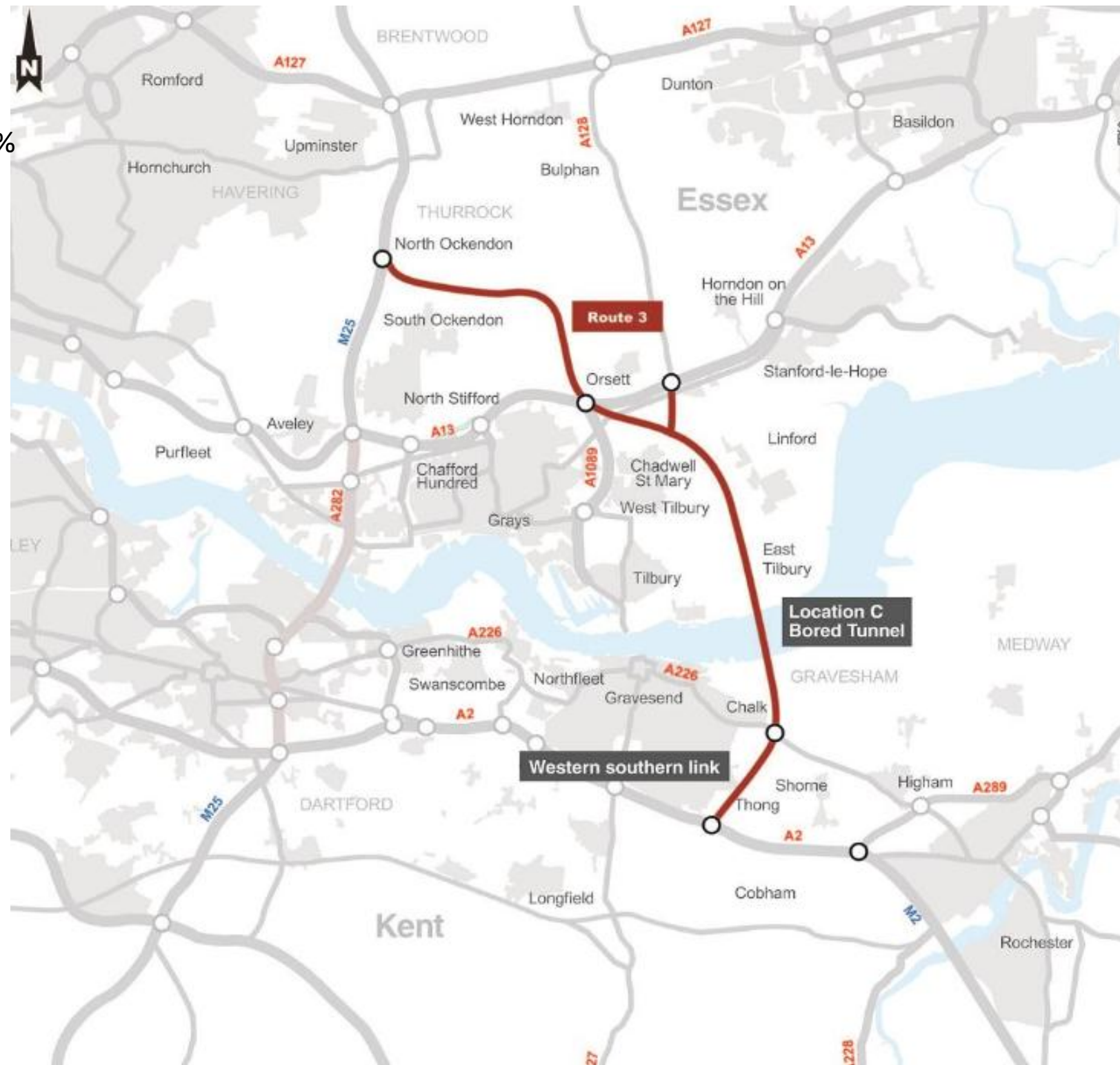
# Lower Thames Crossing

## Benefits

- 50% increase in crossing capacity
- Modern 70mph free flowing connection
- Peak times journey savings
  - 7 ½ min journey time saving for around 40% of all customers
  - 3 ½ min journey time saving at Dartford
- Creates an alternative route (22-45 minutes)
- Delivers 65% more benefit for 24% greater cost than a solution at Dartford
- Enables significant regional economic growth, estimated at £7bn to GDP and 4000 jobs

## Key facts

- Cost estimate £5.9bn
- 22.9km (14.2 miles) long
- 3.2km bored tunnel 15.8m bore diameter
- Biggest ever roads consultation response
  - 47,000 responses
  - 13000 people attended 24 events
  - 400+ businesses & organisations
- Statutory consultation mid 2018
- Development Consent Order (DCO) - 2019
- DCO granted late 2020/early 2021
- Open for traffic 2027



## LTC - project challenges

- Complex problem
- Biggest diameter road tunnels in the UK
- Effective tunnel operation and maintenance
- Complex junctions
- Improving performance on local roads and SRN
- Real concern locally – balancing impacts and benefits
- Scale of delivery
- Contentious and political

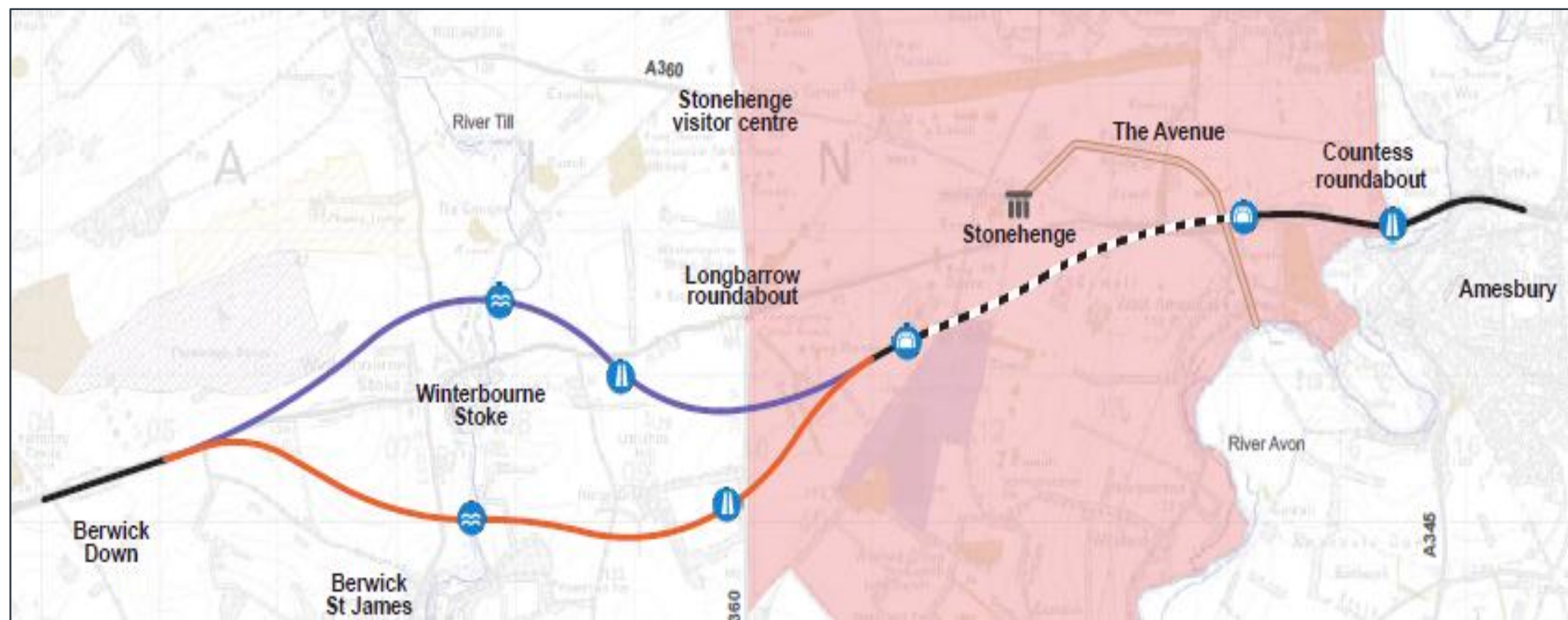


*Artist's impressions of tunnel portals used for the 2016 public consultation*



## A303 Stonehenge (Amesbury To Berwick Down)

- Reduce peak delays from >1hr to less than 10 mins
- Once in a lifetime opportunity to reunite world heritage site
- Proposed 2.8km twin bored tunnel, 12 km of new dual 2 lane carriageway
- Partnership working heritage groups
- Route options public consultation Jan - Mar 17 9k responses
- Statutory Consultation – Early 2018
- Development Consent Order - Autumn 2018
- Construction start early 2021 (subject to Development Consent Order)



## What it might look like?

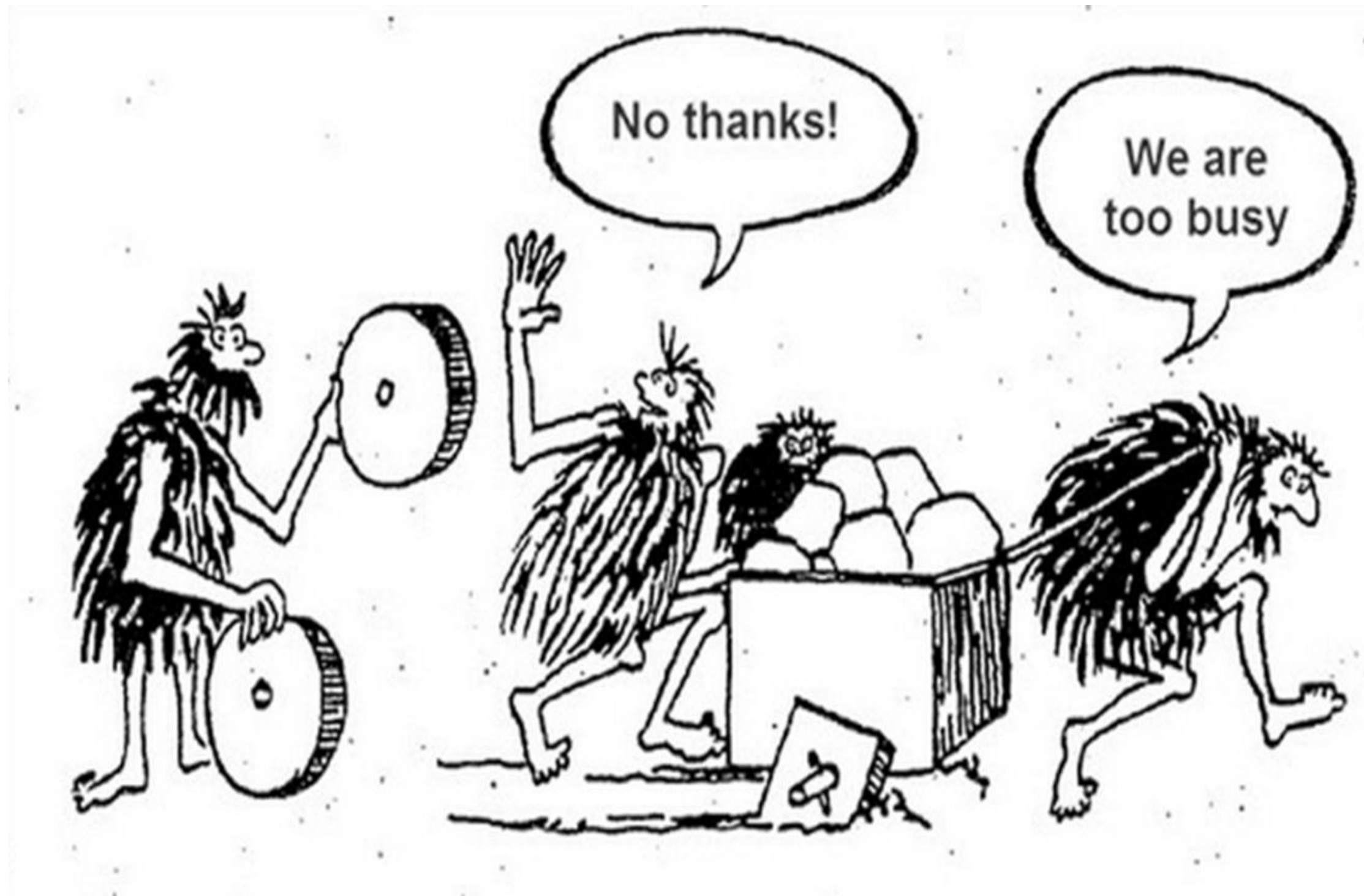
Artists impression of portal concept designs



A303 Stonehenge Public Consultation January 2017

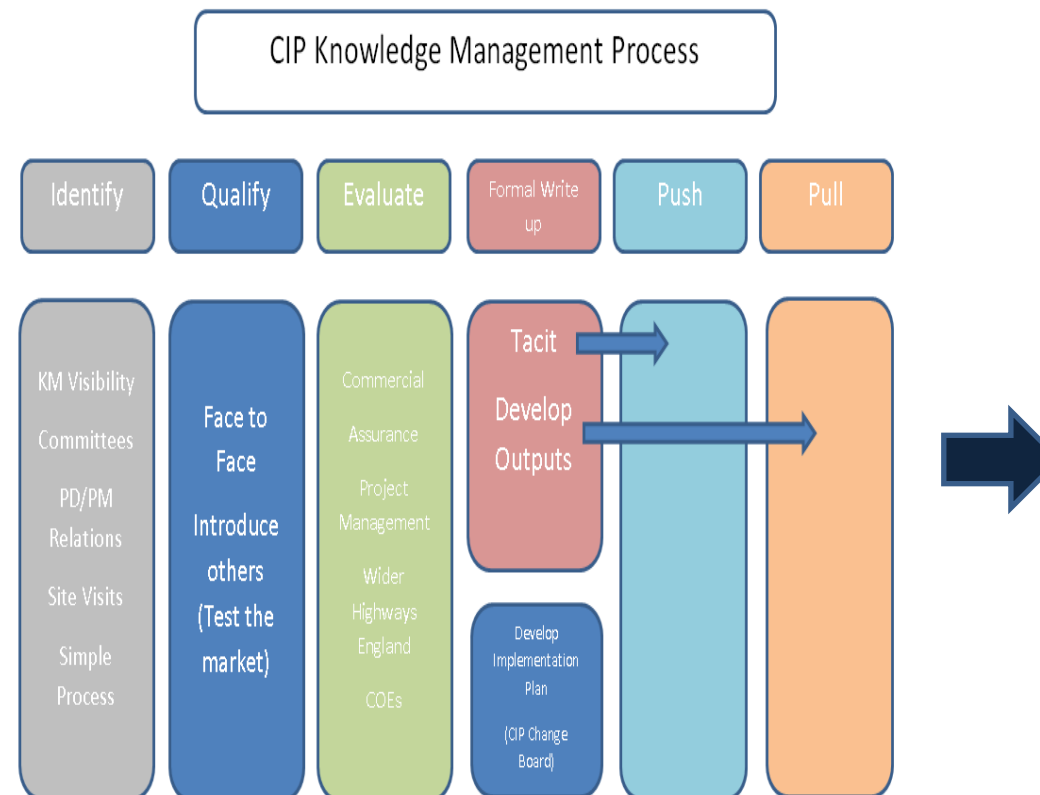
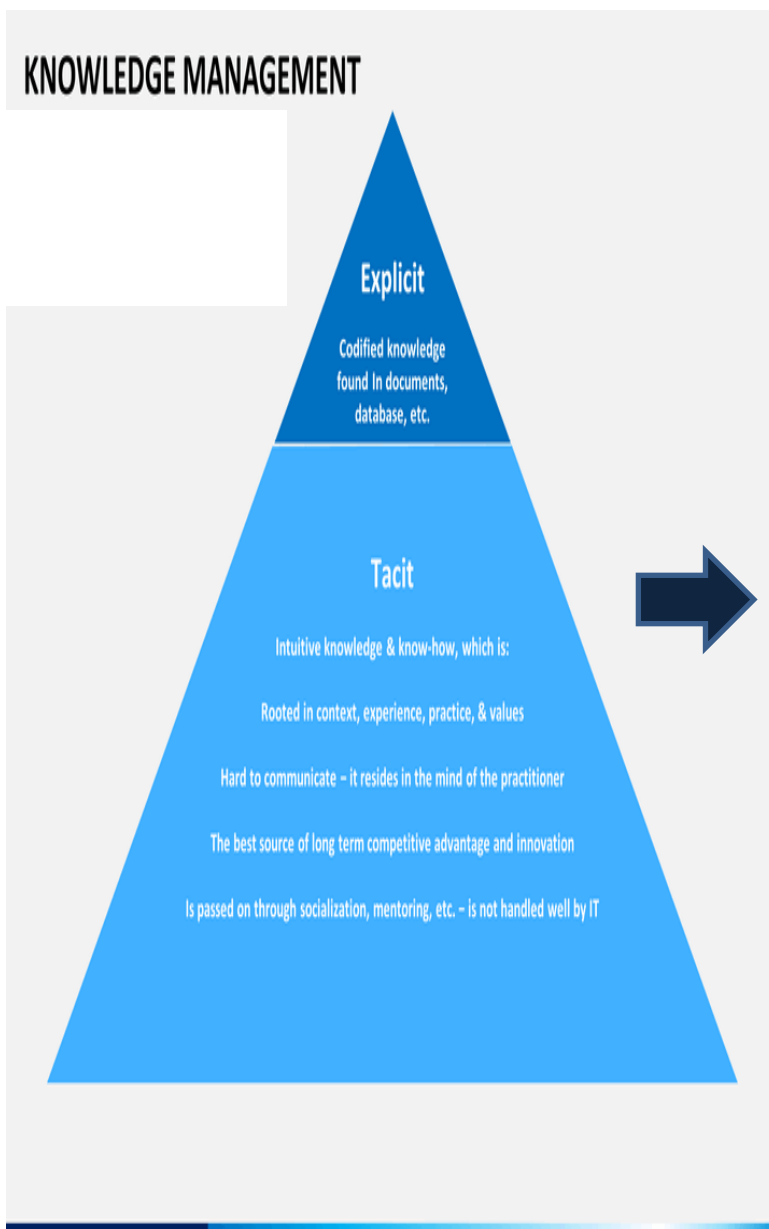


# Why knowledge management?





# Knowledge harvesting & transfer within CIP



- Documented learning, case studies, “how too” guides
- Individual 1 2 1 lessons learned sessions
- Facilitated knowledge transfer workshops
- Immediate post event reviews
- Individual storytelling and narratives
- Small group discussions
- Best practice case studies
- Programme & project team learning events/days
- Job shadowing & mentoring
- Formal question and answer sessions
- Formal knowledge transfer
- Project and programme meetings

# Challenges & barriers to successful knowledge collaboration & sharing in CIP

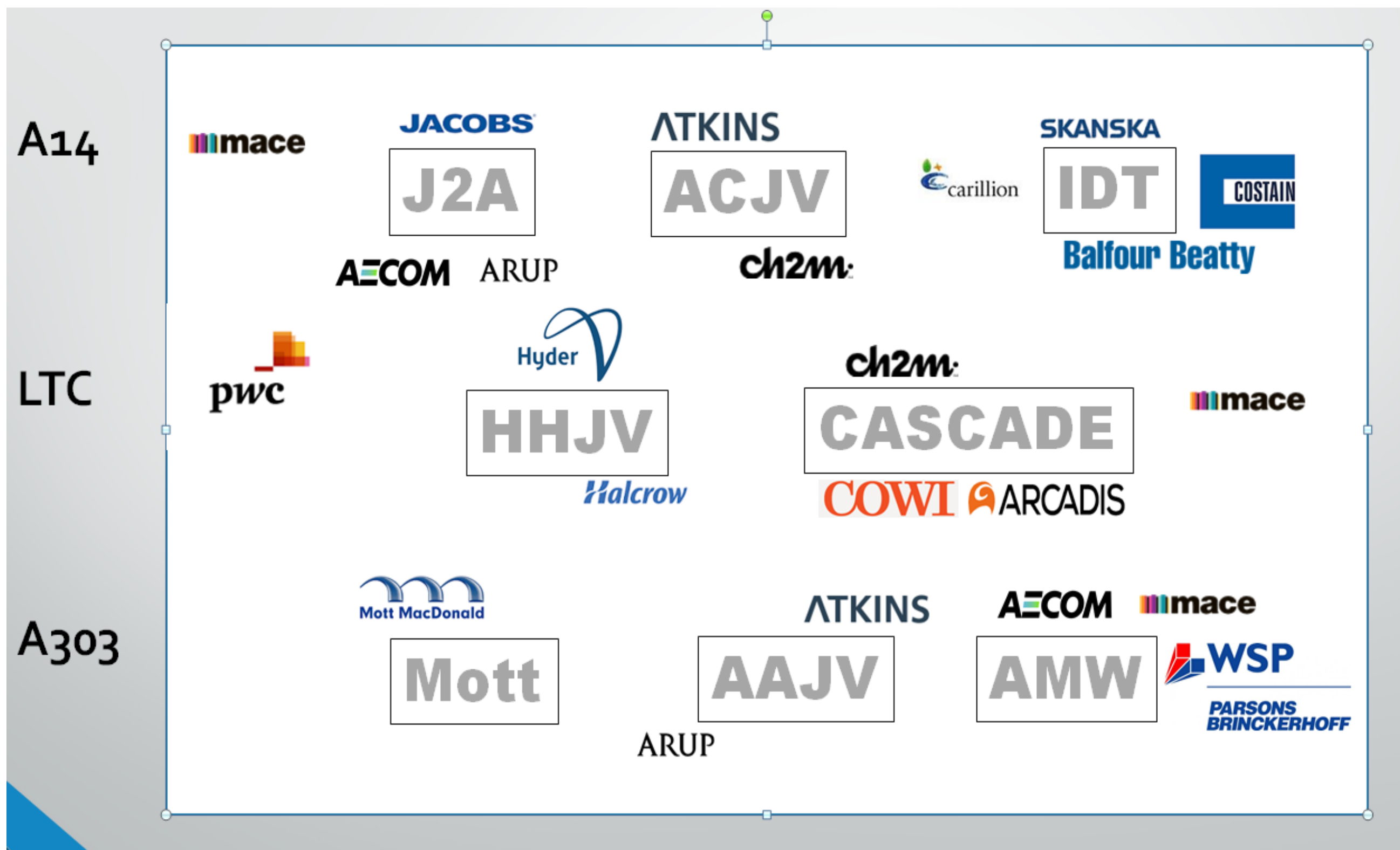
## People & Behaviours

- People don't have the time to submit information (pressure for delivery)
- Value of sharing knowledge and learning not fully valued or recognised (cultural and behavioural maturity)
- People reluctant to share what they know
- People comfortable operating in project silos. Not invented here syndrome
- Embryonic knowledge sharing culture
- Current contractual approach does not drive and reinforce appropriate behaviours

## Process & Systems

- Interim lessons learned process manual and cumbersome
- Production of knowledge & learning content time consuming
- Accessibility - tactical knowledge hub (Excel & Share based) not accessible by supply chain partners
- Limited classification and poor content search capability
- High level of admin & maintenance required to keep hub current
- No ability to rate content and user contribution

## Reality Of Scale & Engagement





# CIP knowledge management – the journey



## Current State/As Is

- Limited knowledge articulation ( is improving)
- Generally fragmented unstructured approach (silo approach)
- Lack of formal classification & structure
- Visibility/accessibility of key learning (buried in multiple repositories)
- Primarily governance driven (PCF process)
- Not fully embedded into HE and supply chain culture and behaviours
- Value add not fully appreciated
- Retrospective rather than proactive
- Limited dissemination and sharing of key learning



## Future State

- Structured learning and knowledge transfer
- Proactive lessons learned capture and dissemination
- Knowledge sharing culture and behaviour embedded into “way we work” (HE & supply chain)
- Central repository with easy to find information fully accessible to HE and supply chain
- Benefits of lessons learned flowing into CIP project outcomes and wider MP/HE organisation
- Alignment of efficiencies, lean and knowledge sharing

Estimated Value of CIP Lessons Learned £80m – £100m

## Best practice & lessons learned procedure & template



## Complex Infrastructure Programme

### Knowledge Management Best Practice and Lessons Learned Procedure



<http://share/Share/llisapi.dll?func=ll&objaction=overview&objid=49222157>

Complex Infrastructure Programme Lessons Learned Template		Please insert relevant information as requested or select appropriate label from drop down menu in this column	
<p>CIP lessons learned template can be found at <a href="http://www.highwaysengland.co.uk/lessons-learned">http://www.highwaysengland.co.uk/lessons-learned</a></p> <p>Lessons learned process documentation, guidance on capturing lessons learned and how to complete this template can be found at the following link: <a href="http://www.highwaysengland.co.uk/lessons-learned">http://www.highwaysengland.co.uk/lessons-learned</a></p> <p>CIP lessons learned mailbox address: <a href="mailto:CIPLessonslearned@highwaysengland.co.uk">CIPLessonslearned@highwaysengland.co.uk</a></p>			
Initiators name			
Initiator e mail address			
Learning type			
Lessons learned title			
Source			
Major project lifecycle stage			
Category			
Sub category			
<p><b>Description</b> (description of lesson learned to include context in which lesson learned, specific scenario where appropriate, learning categorisation (people, process or systems), potential impact on future project or programme time, cost or quality metrics, opportunities or benefit from implementing lessons learned)</p>			
<p><b>Recommendations</b> (specific recommendation or improvement action)</p>			
<p><b>Supporting documentation</b> (word, excel, powerpoint, pdf etc) (please insert additional supporting information/documentation using insert object and display as an icon)</p>			
<p><b>Thank you for completing the CIP lessons learned template. To forward your lessons learned for evaluation and inclusion in the CIP knowledge and lessons learned hub please use the submit button opposite</b></p>		<p>Submit lesson learned for further evaluation</p>	

<http://share/Share/llisapi.dll?func=ll&objaction=overview&objid=49987665>



# Tactical CIP knowledge hub (Excel and SHARE based)

## CIP Lessons Learned & Knowledge Hub

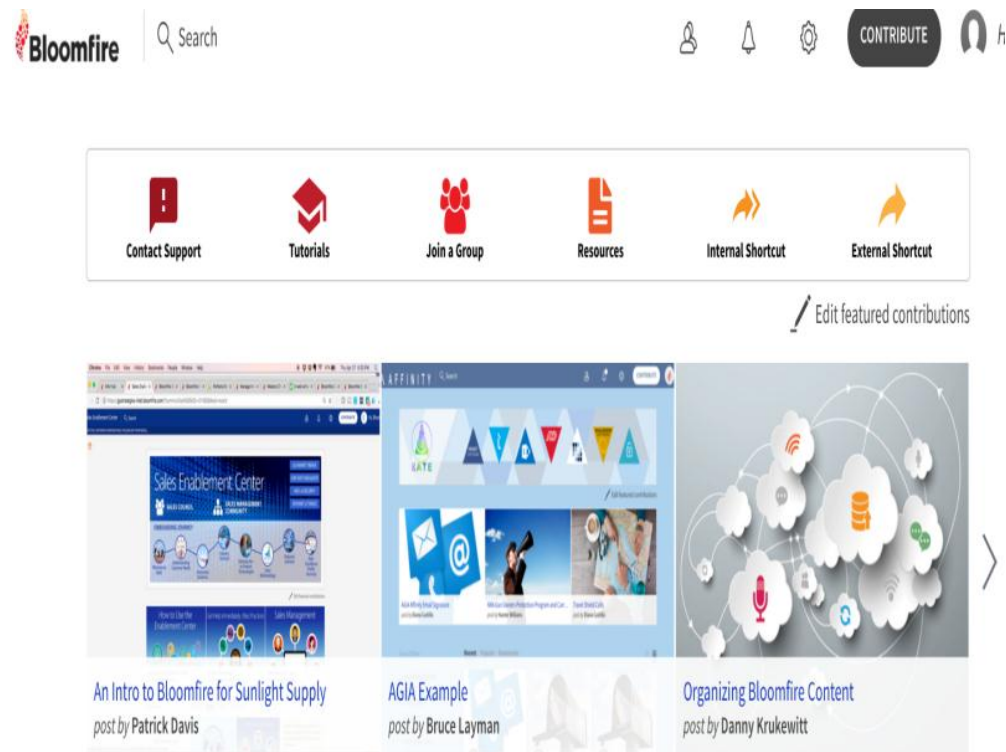


Home Page

To begin first click on a subject area  
Alternatively click CTRL F to begin search

# Leading knowledge collaboration platform vendors

## Bloomfire



## Secutor

**Capture Your Lesson**

Lesson Information | Comments | Attachments

**Lesson Title**: Lesson title is required.

**Primary Category**: Select Category (required)

**Additional Categories**: None selected (click to add)

**Current Status**: Draft

**Description**: Provide the description of the situation in which the lesson was learned...

**Recommended Actions**: Provide a description of actions that should be taken as the result of the lesson learned...

Create Your Lesson

## Novo Solutions



Track, Share and Report on Information in more Productive Ways

### Novo ShareNet Knowledge Base Screenshots

Knowledge Base Article Add/Edit Form  
(fields can be added/change on the form in minutes)

Articles → Another Best Practice article after closure

Lesson Learned

Save & Close Save Cancel View Send Email Delete

Title\*: Another Best Practice article after closure

Learning Type: Best Practice

Source: Source 1

Project Stage: Project Closure

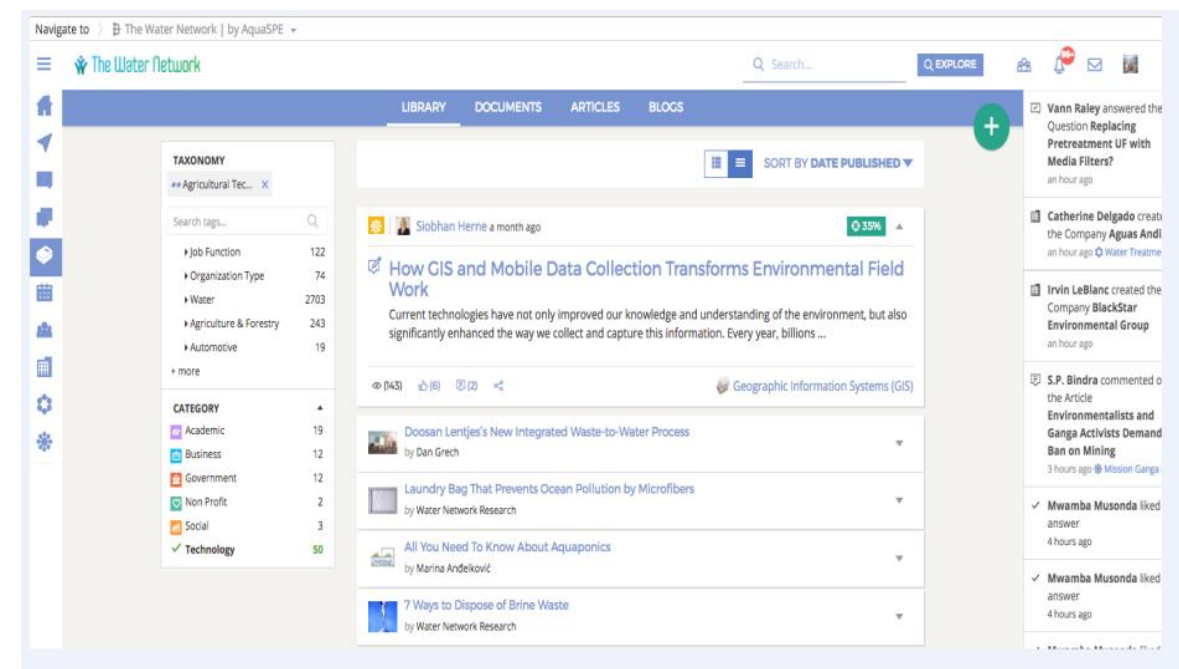
Summary: --Not Selected--

Content: Project Inception, Design, Implementation, Project Closure, Other

Clipboard Font Paragraph Styles Editing

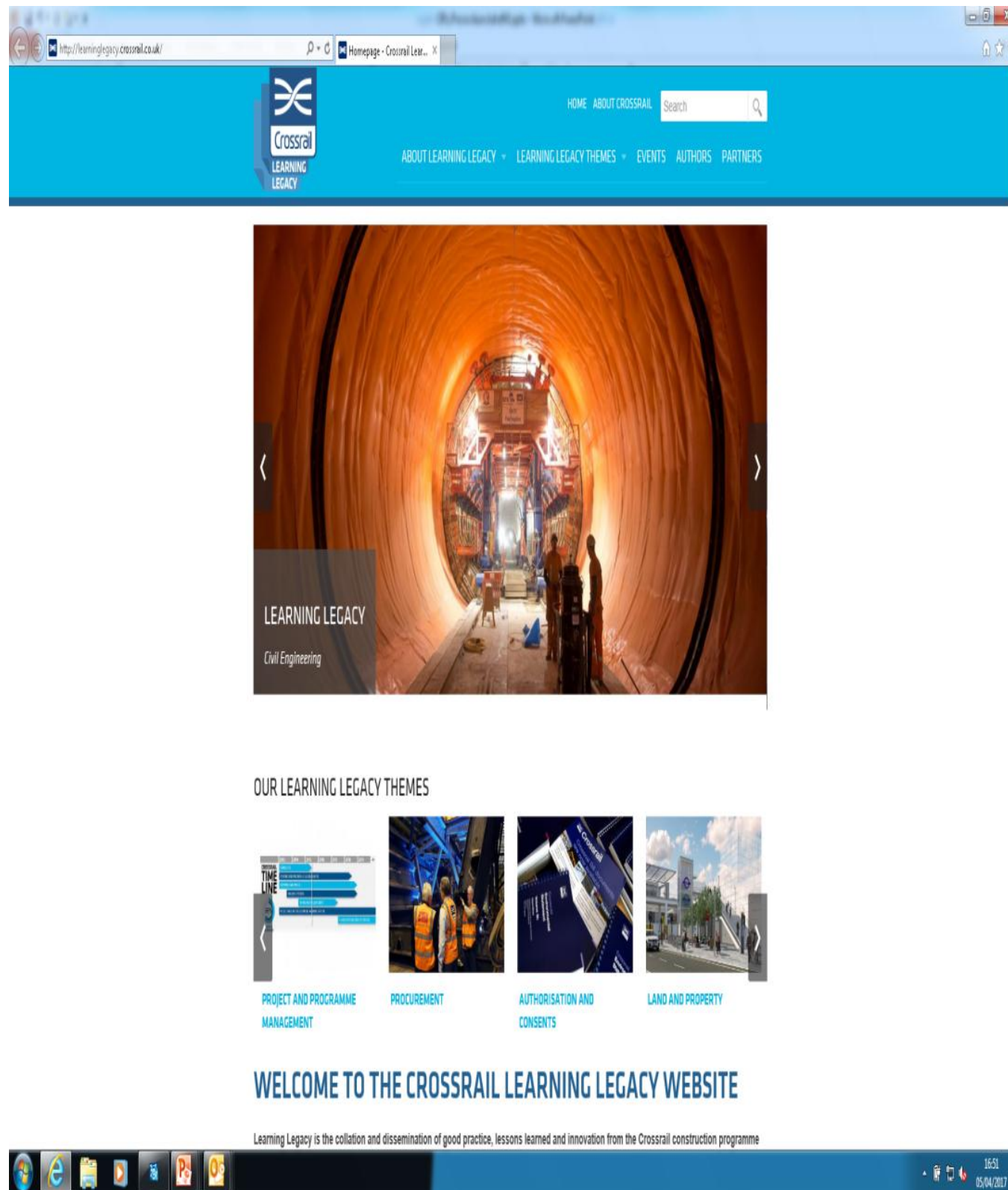
Knowledge Base Article Management List  
(columns can be added/changed in 1 minute)

## Tallium

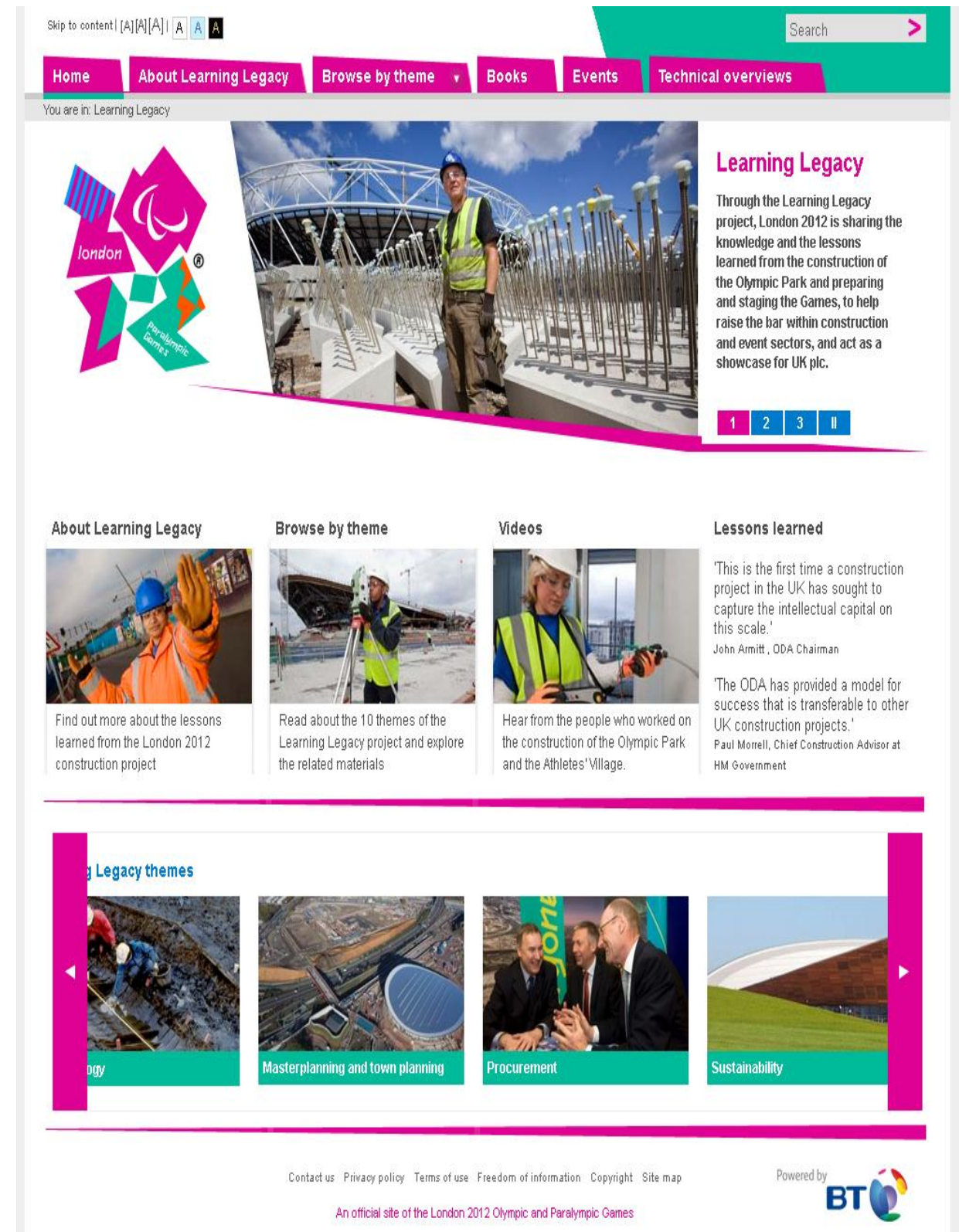




# The ultimate end game?



The screenshot shows the Crossrail Learning Legacy website. The header is blue with the Crossrail logo and navigation links: HOME, ABOUT CROSSRAIL, and a search bar. Below the header, there's a large image of a tunnel under construction with the text "LEARNING LEGACY Civil Engineering". A section titled "OUR LEARNING LEGACY THEMES" features four categories: PROJECT AND PROGRAMME MANAGEMENT, PROCUREMENT, AUTHORISATION AND CONSENTS, and LAND AND PROPERTY. At the bottom, it says "WELCOME TO THE CROSSRAIL LEARNING LEGACY WEBSITE" and "Learning Legacy is the collation and dissemination of good practice, lessons learned and innovation from the Crossrail construction programme".



The screenshot shows the Learning Legacy website. The header is green with navigation links: Home, About Learning Legacy, Browse by theme, Books, Events, and Technical overviews. A search bar is on the right. Below the header, there's a large image of a construction site with the text "Learning Legacy". A section titled "About Learning Legacy" includes a video thumbnail and text: "Find out more about the lessons learned from the London 2012 construction project". A "Browse by theme" section lists 10 themes: Project and programme management, Procurement, Authorisation and consents, Land and property, Masterplanning and town planning, Procurement, Sustainability, etc. A "Lessons learned" section features a quote from John Amitt, ODA Chairman: "This is the first time a construction project in the UK has sought to capture the intellectual capital on this scale."

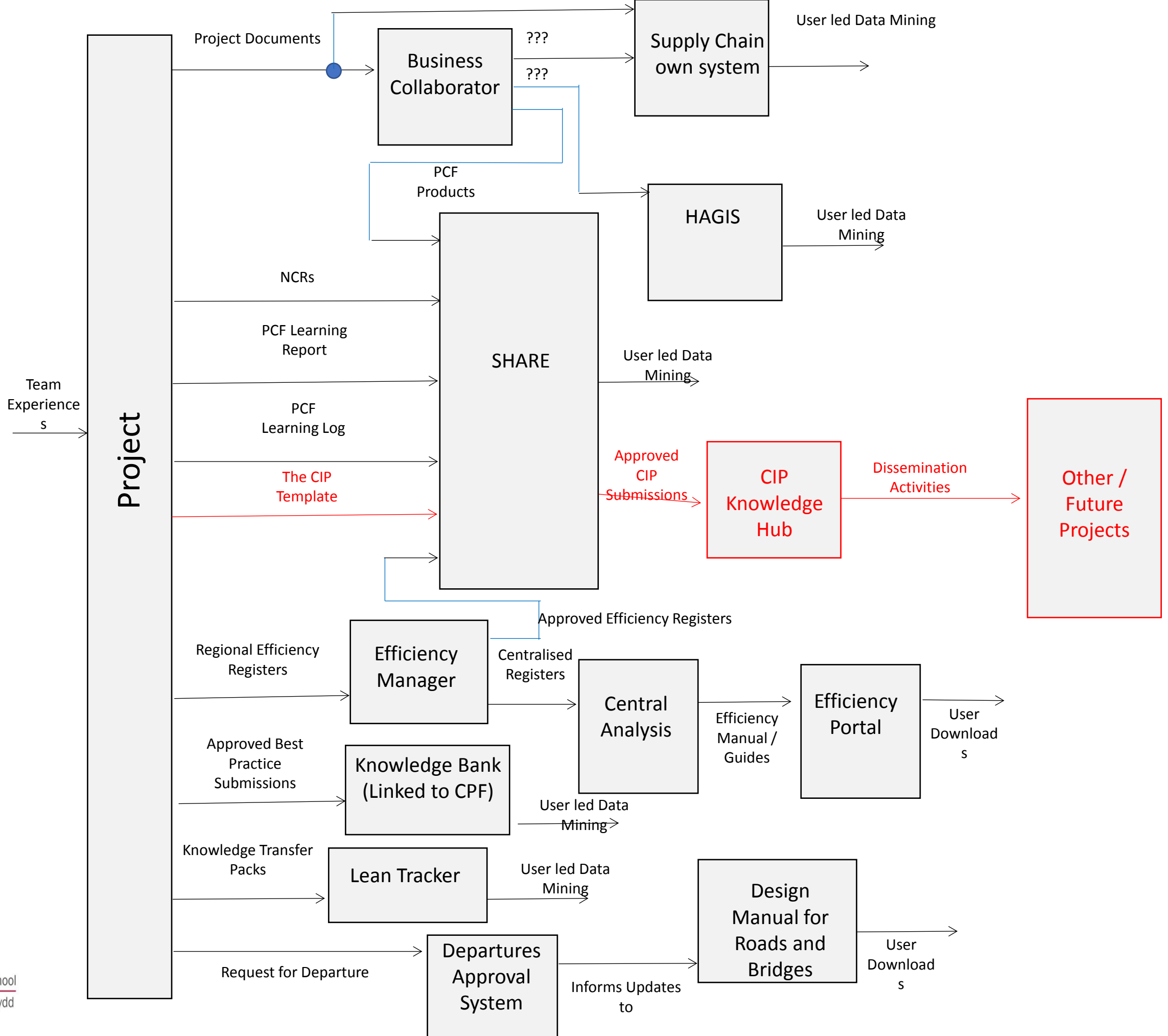
Any questions?

# Capturing and Mobilising Project Memories

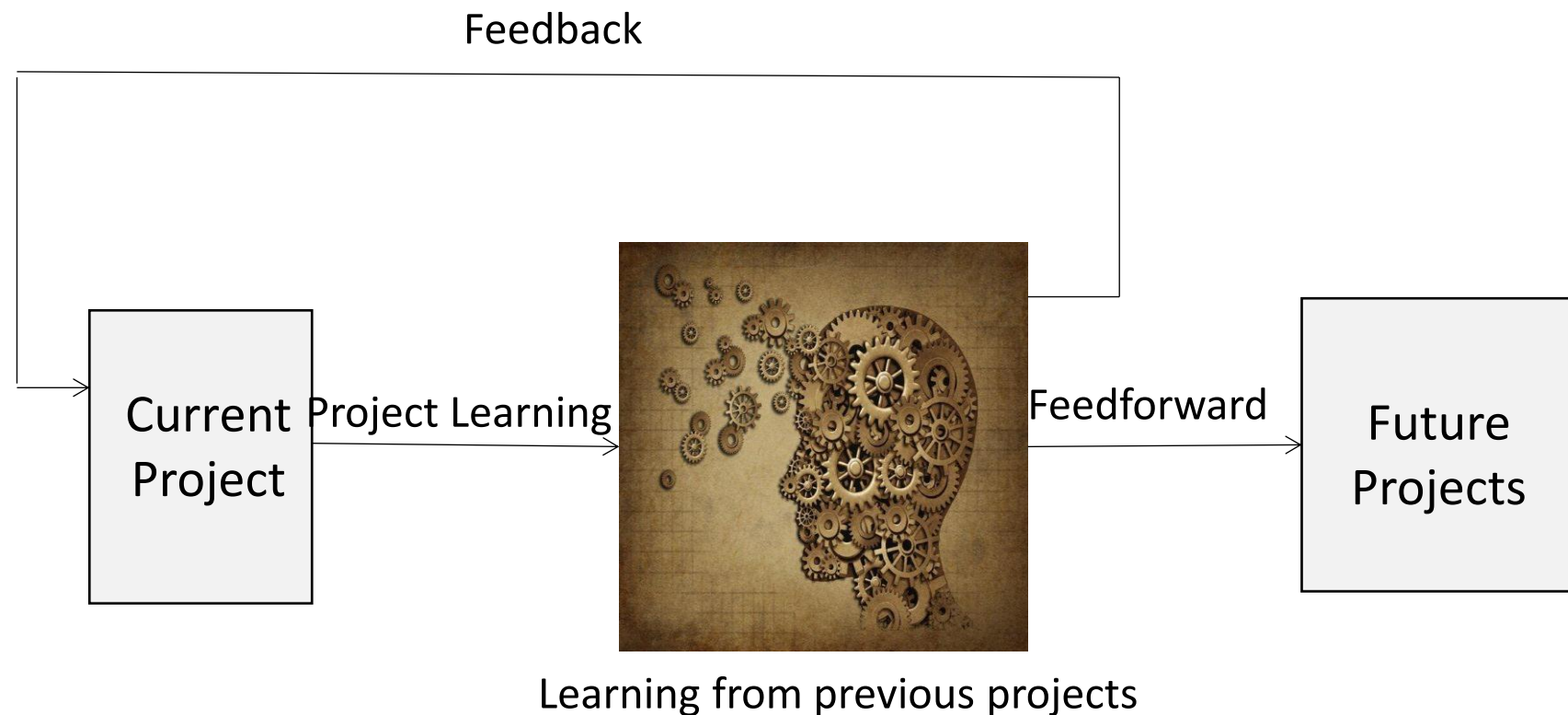
Knowledge Management Research in Infrastructure Supply  
Chains

Dr Jon Gosling, Reader in Supply Chain Management





# Learning in Projects – the need for feedback, feedforward and narratives



*Experience  
Accumulati  
on*

*Knowledge  
Articulation  
and  
Codification*

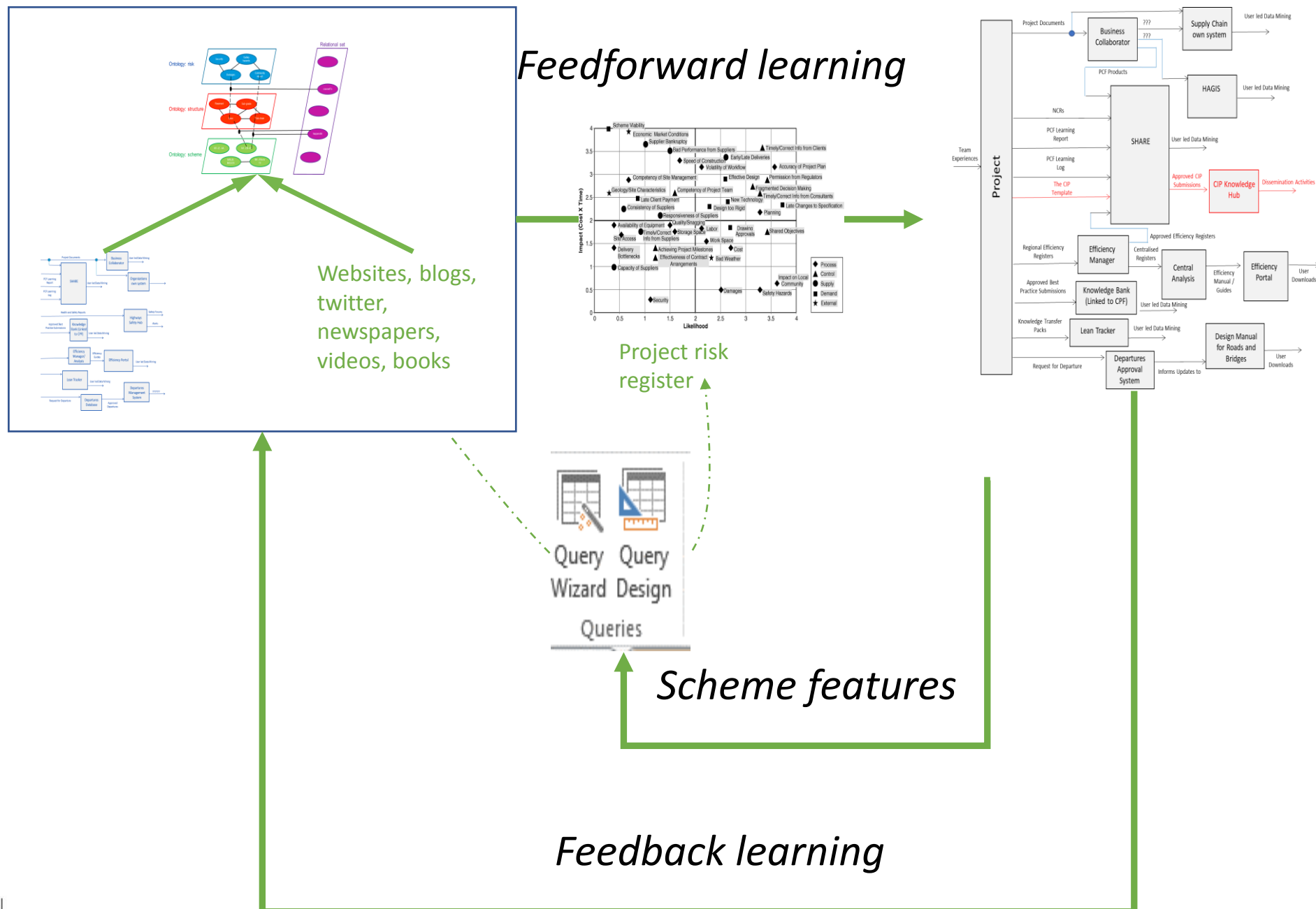
*Knowledge  
Mobilisatio  
n*

**NARRATIVE  
MATTERS**

# The Project Life Story Book Concept

*Project memories  
and 'stories'*

*Each project feeds into  
existing HE knowledge bases*





# Next Steps

- Trial some of our ideas in a live environment
- Gain further understanding of structures, and linkages of people, process and I.T. systems
- Further project to review strategy and best practice principles for effective knowledge management, supporting HE & supply chain journey.



Cardiff Business School  
Ysgol Busnes Caerdydd



# Many Thanks

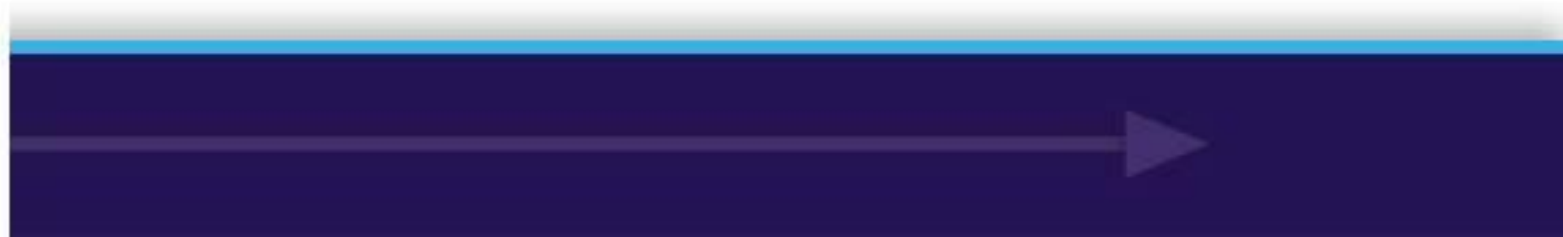
[goslingj@cardiff.ac.uk](mailto:goslingj@cardiff.ac.uk)

**ADEILADU  
ARBENIGRWYDD**  
Clwb De Ddwyrain Cymru



**CONSTRUCTING  
EXCELLENCE**  
South East Wales Club

## Facilitated Workshop Session





**ADEILADU  
ARBENIGRWYDD**  
Clwb De Ddwyrain Cymru



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## Feedback



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**Close & Lunch**

