

From Risks to Resilience: International Perspectives on Holistic Climate Adaptation at a Time of Financial Challenge

 In the kNOW Webinar Series

Oct. 1, 2020



Welcome & Introductions



*Today's presentation is hosted by
Jacobs in collaboration with NYC
Climate Week*

Why this issue is Important

- Laurens van der Tak, Jacobs, Vice President, Americas Director for Water Resilience

Building Resilience: Understanding the Risks

- Clare McAuliffe, Principal, Treatment & Resources, Integrated Planning, Melbourne Water
- Craig Clifton, Global Technology Leader, Resilience and Climate Change, Jacobs

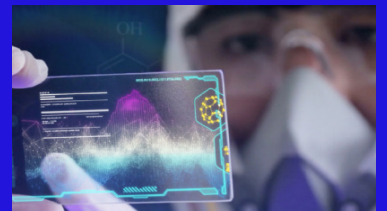
Adaptive Asset Management

- Abby Crisostomo, Thames Estuary 2100 Strategic Asset Management Lead, Environment Agency
- Richard Windsor, TEAM2100 Asset Management Lead, Jacobs

Questions & Answers

Defining Resilience...

Resilience is the ability to anticipate and resist the effects of a **disruptive event or trend**, **minimise adverse impacts**, respond effectively, maintain or recover functionality, and adapt in a way that allows for **learning and thriving**.



Water Utility Resilience

Disruptive events & trends

- Pandemic
- Climate change
- Cyber attack
- Aging Infrastructure

Minimise Impacts

- Adaptive actions
- Continuity of Operations Plans
- Response and Recovery
- Safety

Adapt, learn and thrive

- Recognise the opportunity
- 'Build back better'
- Share learning



Building resilience: understanding the risks

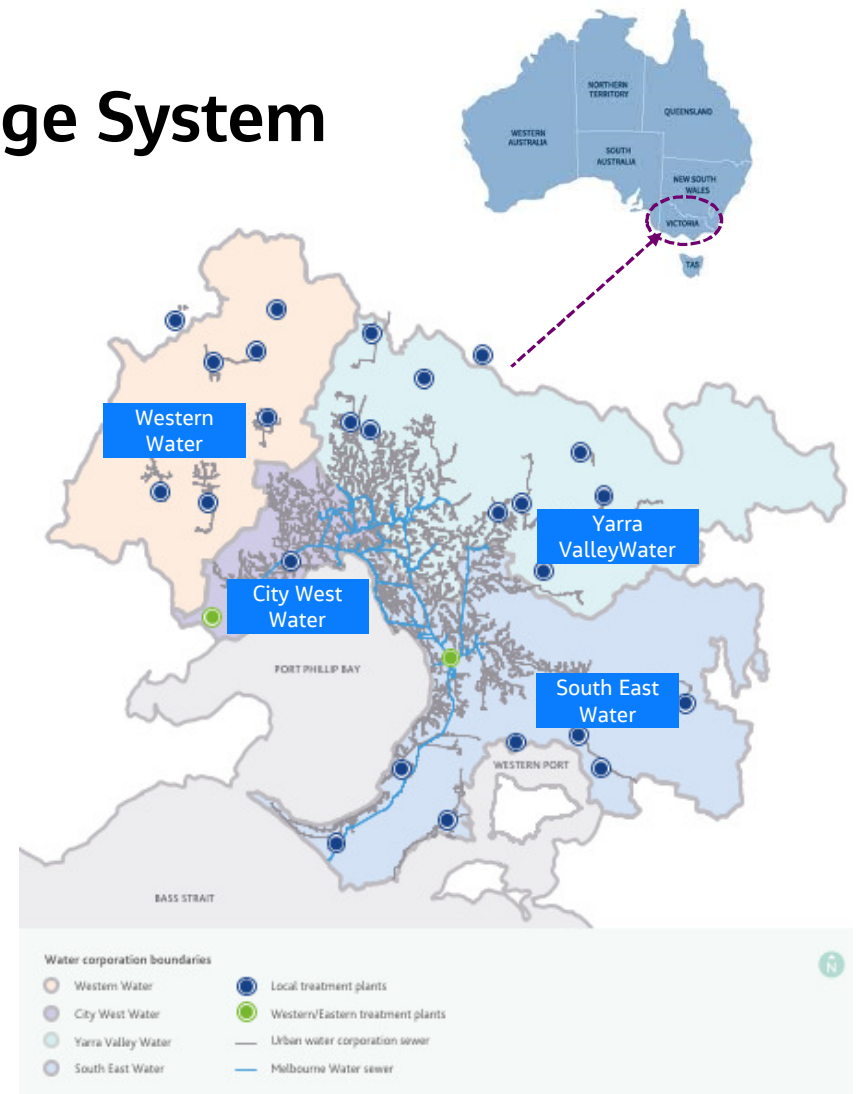
Clare McAuliffe, Principal, Treatment & Resources,
Integrated Planning, Melbourne Water

Craig Clifton, Global Technology Leader, Resilience and
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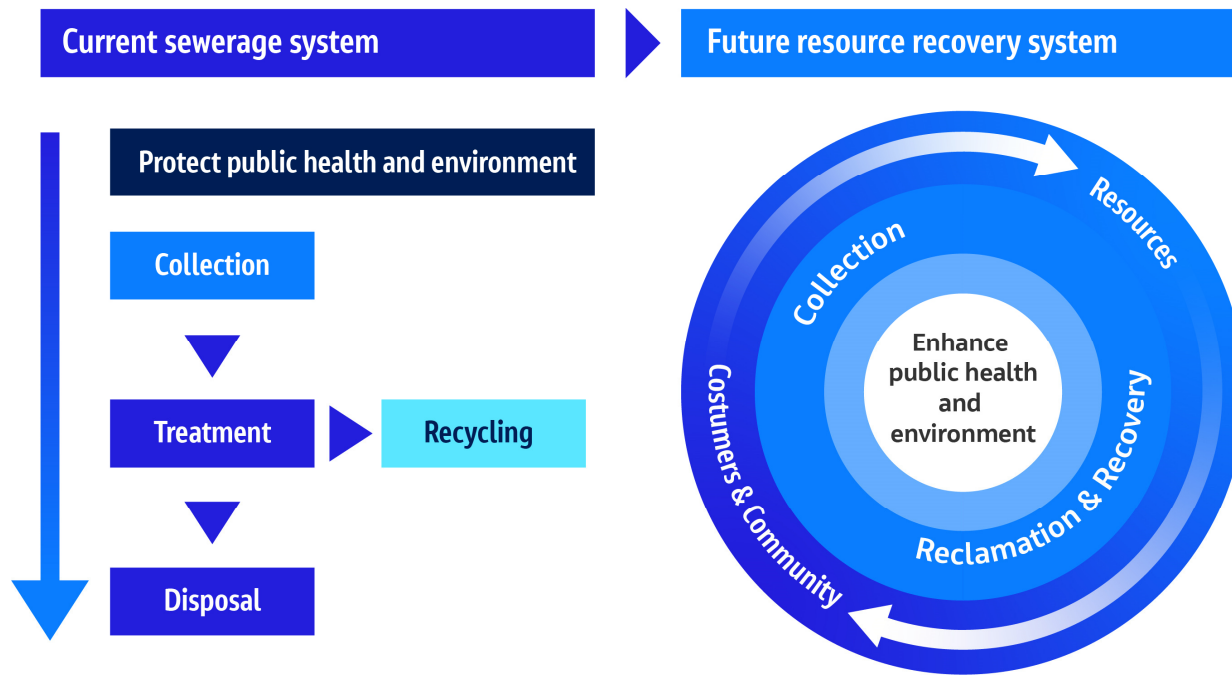


An Overview of Melbourne's Sewerage System

- System established in 1890s to protect public health and the environment for the people of Melbourne
- Melbourne Water:
 - Provides “bulk” wastewater services to retail water businesses
 - Operates two large wastewater treatment facilities - Western and Eastern Treatment Plants
 - Maintains trunk sewer network
- Sewerage system services
 - Population of ~5 million
 - Urban area of ~10,000 km² (~4,000 sq mi)



Melbourne Sewerage Strategy



A vision to transform the current sewerage system identity from a linear, waste disposal system to a fully-circular, resource recovery system where public health and the environment are enhanced for the benefit of Melbourne's community

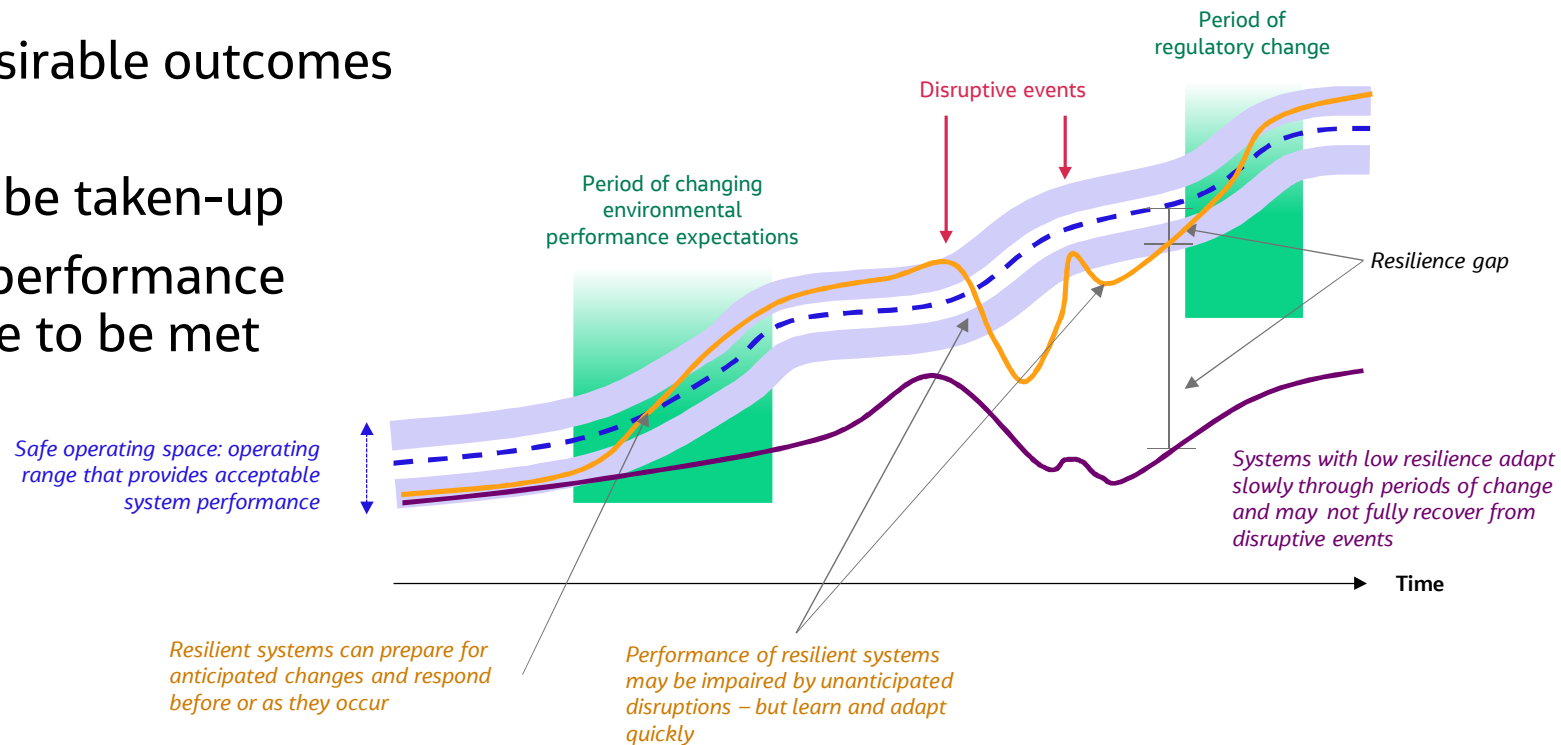
Imperatives

- Melbourne is changing rapidly:
 - Population changes, urbanisation, climate change
 - Increasing likelihood of disruptive events
 - Decisions are required to renew/build sewerage infrastructure
- Affordability of water and wastewater (and other utility) services is critical to government and pricing regulator
- Going beyond just 'least cost' solutions and *just enough, just in time* decisions:
 - Removes the 'shock absorbing' capacity of the system
 - Reduces future options
 - Increases long-term cost
- Continuing with BAU will erode system resilience and create risks that are *not fully understood, explicitly disclosed or adequately considered*
- Incremental change will not meet the scale of future challenges or capture opportunities associated with the vision for the sewerage system



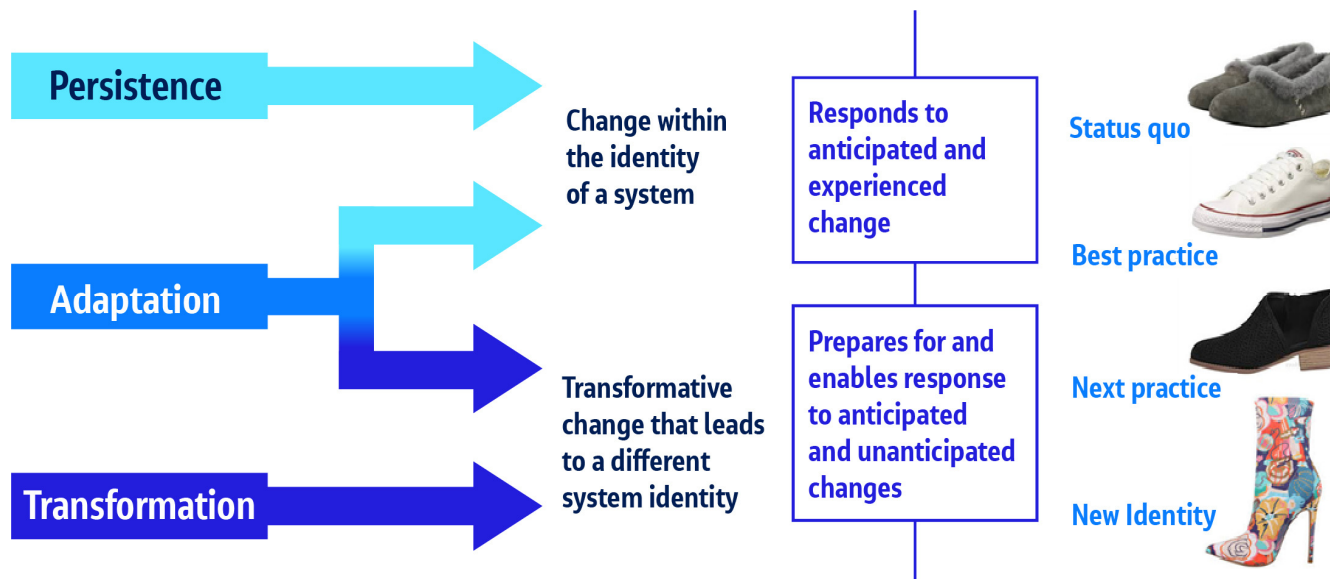
What would a resilient system look like?

- Prepared for, able to withstand and then recover and learn from disruptive trends or events
- Change toward desirable outcomes can be achieved
- Opportunities can be taken-up
- Changing system performance objectives continue to be met

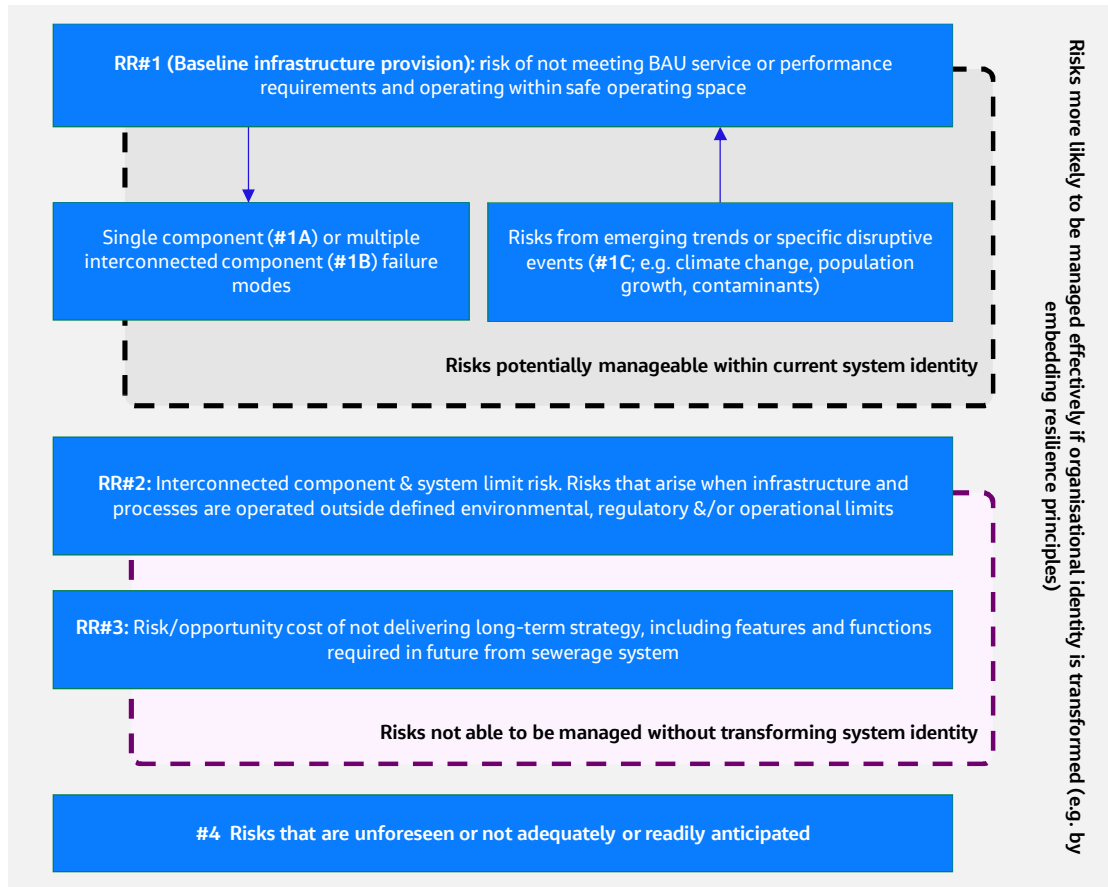


What would a resilient system look like?

- Ability to **persist, adapt or transform** at any given point in time
- Build on the strong culture of risk management and extend this to resilience
- Including resilience will increase the safe operating space
- Focusing on risk alone will narrow the safe operating space as we focus on maintaining the status quo



Resilience Risks



- **RR#1:** BAU risk management – providing infrastructure to meet current and anticipated regulatory obligations and customer service requirements
- **RR#2:** Arise when interconnected system limits are approached or exceeded without recognition
- **RR#3:** Opportunity cost from not delivering on long-term strategy
- **RR#4:** Risks that are difficult to foresee or anticipate and rely on organisational resilience

A case for change?

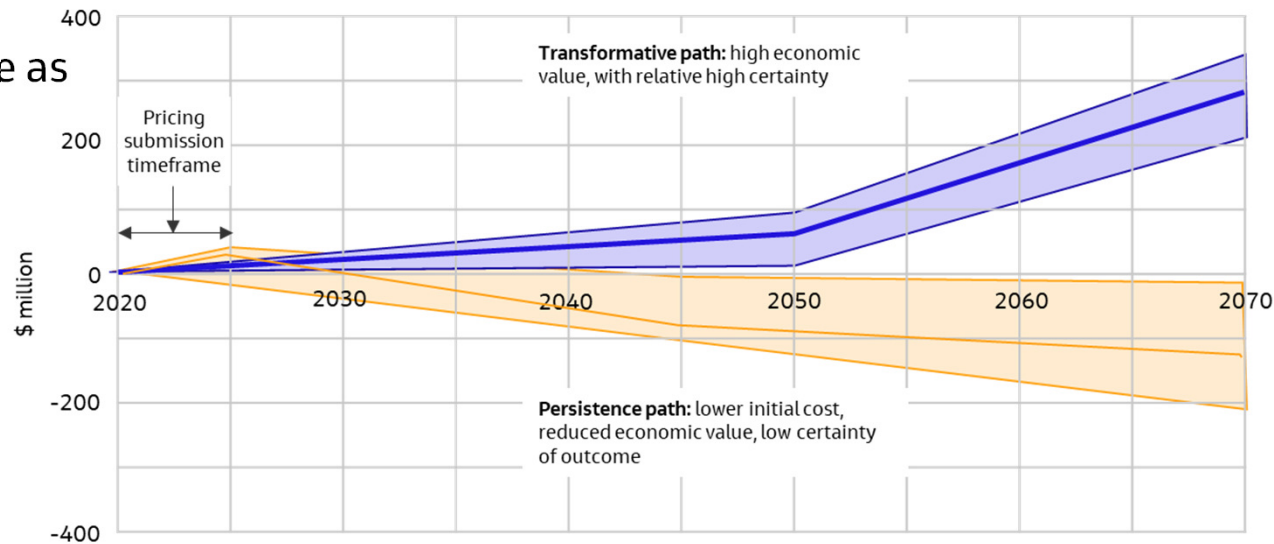
■ Persistence path:

- Lower initial cost - as risk responses are deferred
- Reduced long-term economic value as risks *come home to roost*
- Higher uncertainty of outcomes

■ Transformation path:

- May have higher initial costs
- Building resilience provides better long-term value and improves certainty of outcome

- Five-year regulatory pricing reviews may not capture the bigger picture until it's too late



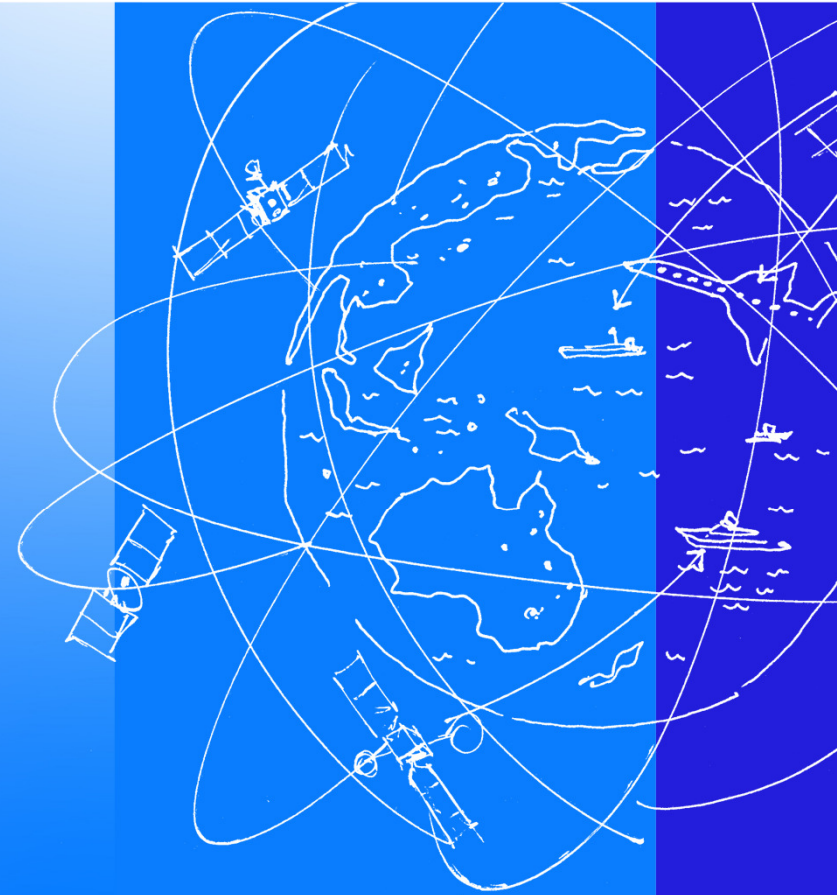
Poll Question #1



From Risks to Resilience: the TEAM2100 Adaptive Asset Management Approach

Abby Crisostomo, Environment Agency, Strategic Asset
Management Lead, Thames Estuary 2100, UK

Richard Windsor, Jacobs, Asset Management Lead,
TEAM2100, UK



Flood Risk in the Thames Estuary

- **1953**
- 100 deaths
- 30,000 people evacuated
- Over 50,000 acres of land flooded (7,000 residential/industrial)



- **2020**
- Thames Barrier & 350km of defences
- 1.3 million people live in areas of tidal flood risk and benefit from defences



What is at Risk?

1.3 m people



£275bn of property



300 km+ of roads



167 km of railway



51 railway stations



35 tube stations



400 schools



16 hospitals



4 world heritage sites



8 power stations



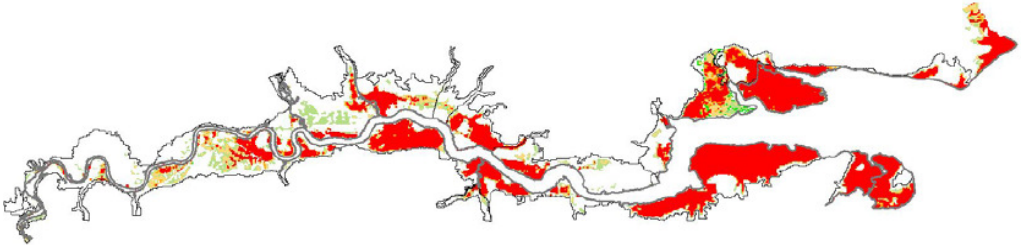
55km² designated habitat



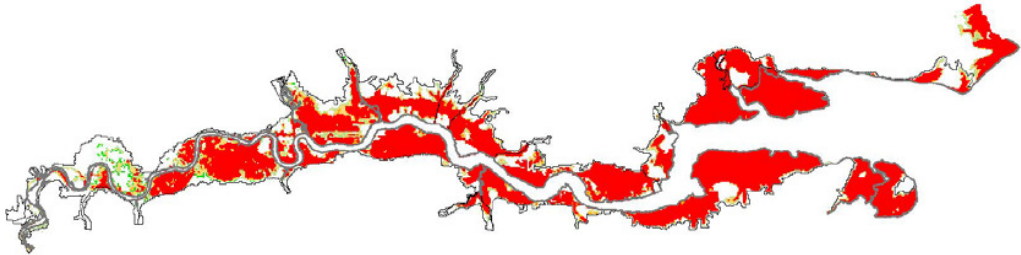
Future Flood Risk If No Action Is Taken



2030



2080



2170

Thames Estuary 2100 Plan

- Established 2002 and published 2012 after extensive consultation with partners and stakeholders.
- Sets out a strategic approach to tidal flood risk management for London and the Thames Estuary to the end of the century and beyond.
- Takes an adaptive approach to managing rising sea levels by developing Adaptation Pathways.
- Promotes a riverside strategy approach to ensure that future changes to the riverside take place in a planned and integrated way which maximise the potential environmental, social, cultural and economic benefits.



Aims of the Thames Estuary 2100 Plan



Manage the risk of flooding to people, property and the environment



Ensure sustainable and resilient development in the floodplain



Protect the social, cultural and commercial value of the tidal Thames, tributaries and floodplain



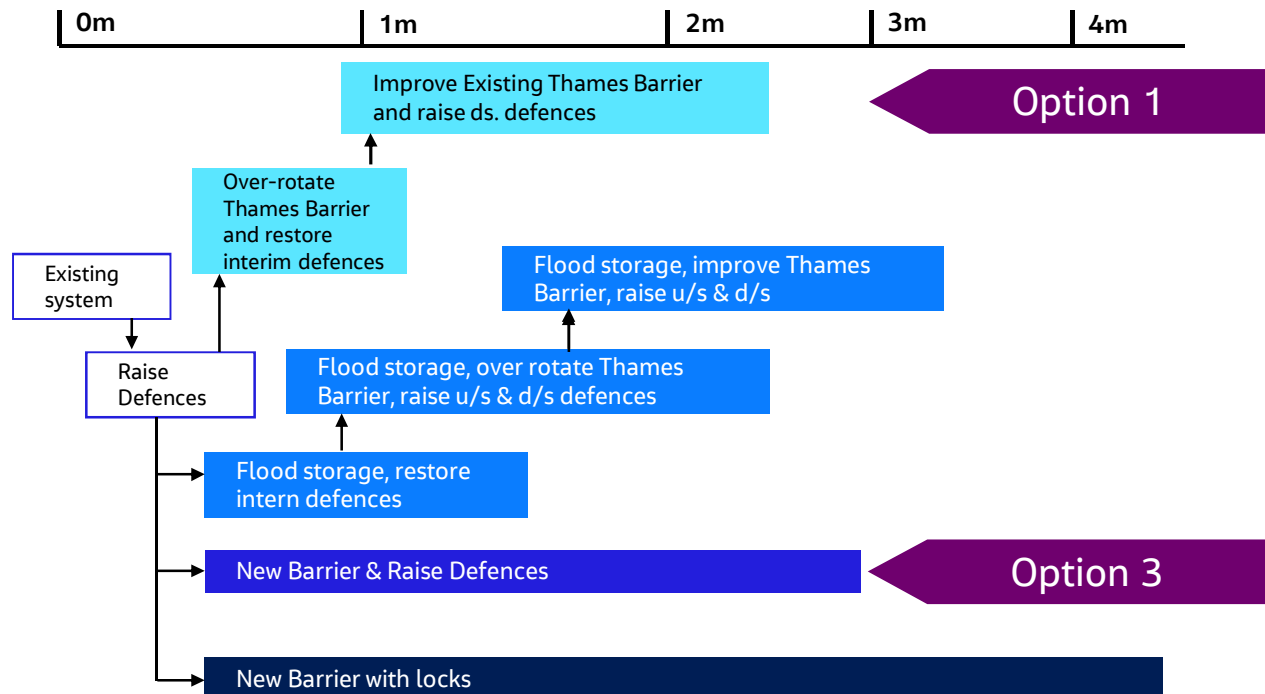
Adapt to the challenges of climate change



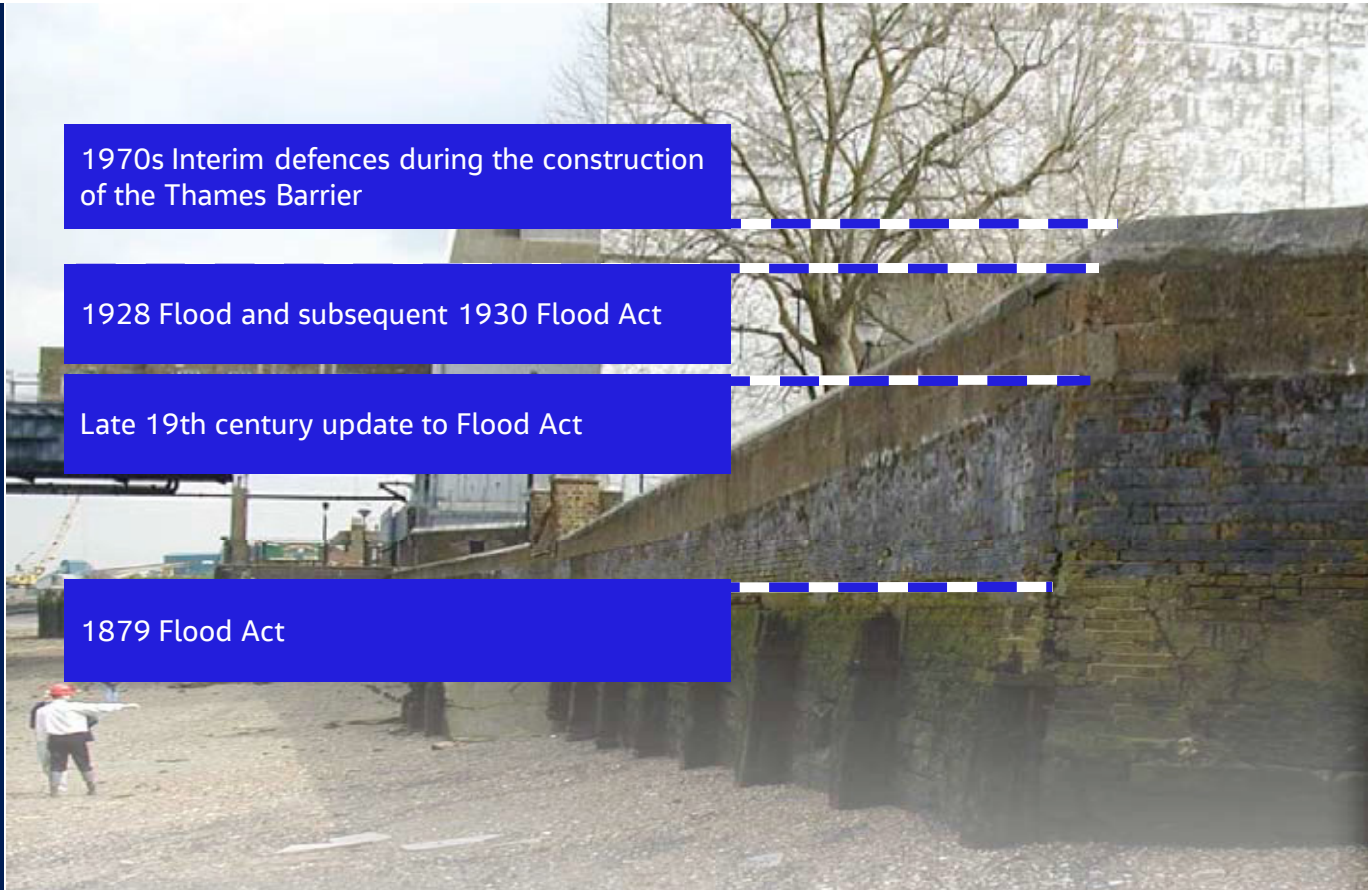
Enhance and restore ecosystems, maximise benefits of natural floods

Adaptive Pathways

The Plan takes an adaptive pathways approach to managing flood risk and climate resilience, recommending that the proposals it makes are adjusted as the climate changes and we develop our understanding of the impacts.



Challenges for Delivery



1970s Interim defences during the construction of the Thames Barrier

1928 Flood and subsequent 1930 Flood Act

Late 19th century update to Flood Act

1879 Flood Act

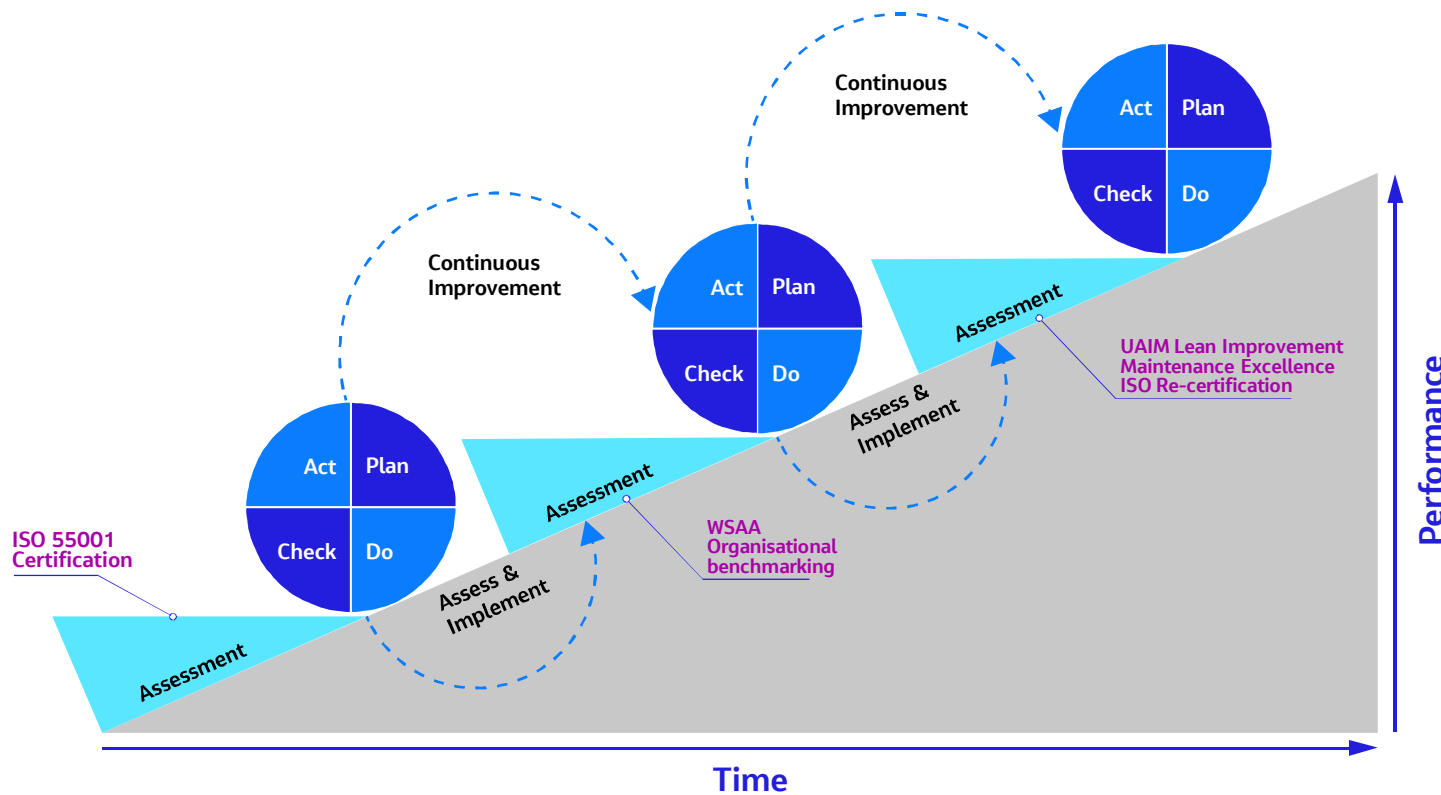
Strategic Asset Management Approach

1. Understand connection between health of assets and when intervention is needed
2. Improve how we collect information about the defence system
3. Optimise how defences are maintained/repared to extend their life
4. Ensure we adapt for future defence raising when defences are replaced
5. Enable defences to be raised, setback, retreated, etc. at the right time

Make sure that all of the above is done on assets that we don't own or maintain

Make sure that all of the above maximises opportunities for sustainability, environmental improvement, greening, etc.

TEAM2100 Continual Improvement and Resilience



Business Strategies

- Emergency Preparedness
- Innovation
- Maturity Assessment
- Certification
- Risk Management

TEAM2100 Continual Improvement and Resilience

The 'New Normal' Challenges in times of financial uncertainty

- A new focus on **emergency operations and remote working**
- **Depressed economy** and business function
- Pressure from customers to be more sensitive to **costs and affordability**
- Need to **optimize** and fund capital projects amid changing **priorities**
- **Staffing challenges**, including illness / forced absence among staff plus decisions about short-term and long-term personnel needs
- **Change in customer demand** for services and forced shutdowns of offices and facilities
- New operational **efficiency, performance, and service delivery imperatives**
- **Supply chain disruption**



Implementing social distancing best practice at a TEAM2100 site in Central London

Applying Tools and Strategies

Proven Approaches & Tools Help Manage the New Risks

Approaches that can help make informed decisions amid current uncertainty include:

- | | | | |
|---|---|---|---|
|  | Short-term and long-term demand and financial forecasting |  | Strategic planning |
|  | Scenario planning |  | Systems for financial planning and delivery analysis |
|  | Programmatic and work planning |  | Risk and performance management |
|  | Prioritization and decision analysis |  | Change management, training, and business process improvement |

TEAM2100 Maturity Assessments – Value Proposition

"I've seen it first hand. You gather up a diverse group of employees, put them in a room and allow them to discuss and ultimately score the assessment questions. Through this practice, the team gains a greater understanding of the business processes being assessed, and a greater respect for the differing viewpoints from each team member. It's real...paradigms shift and momentum for real change begins."

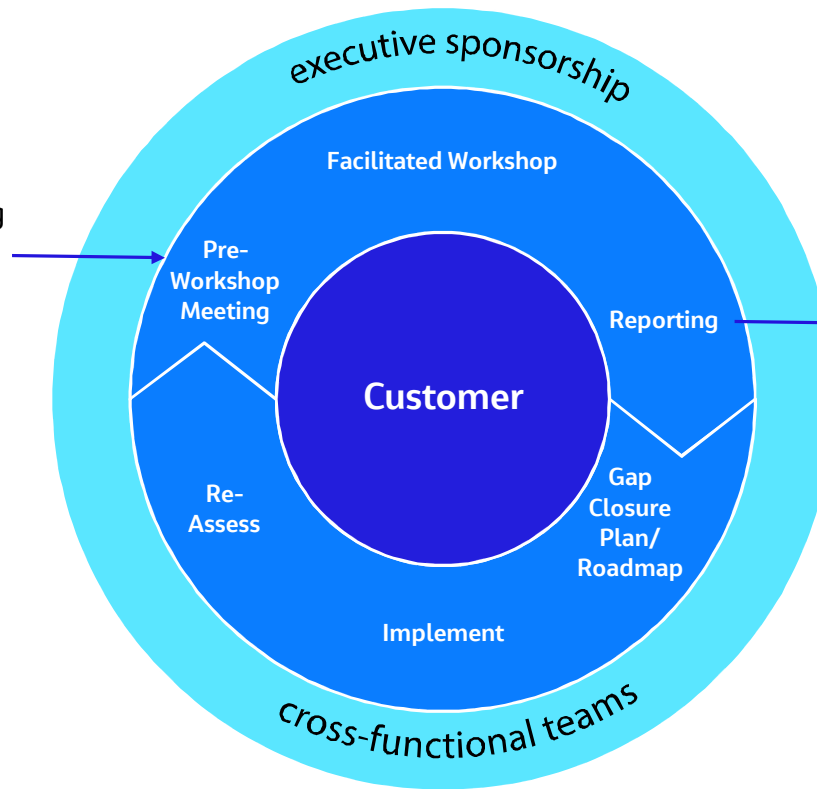
Andrew Pearce, Deputy Director –
Asset Management, Environment Agency



Industry Collaboration - Organizational and Asset Management Benchmarking

Focus Areas:

- Strategy & Planning
- Finance & Decision-Making
- Life Cycle Delivery
- Information & Systems
- Organization & People
- Risk & Resilience



- Organizational Report
- Industry Report
- Leading Practice Conference
- Peer Exchanges

**Assessment
Networking
Improvement**



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Industry Collaboration- Business Process Improvements Utility Analysis and Improvement Methodology

Business Processes Describes

- Who is involved in the business process (swim lanes)
- Work flow (sequence paths of activities)
What decisions need to be made (and by whom)
- What resources (e.g. time, staff, equipment) are needed
- The metrics impacted by the process
- What data is required to execute work and make decisions
- Where (in what systems) the required data resides

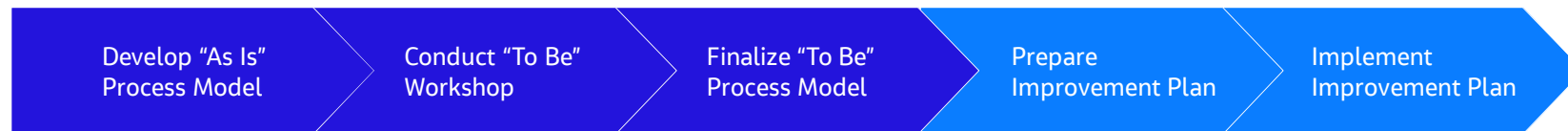
Major Features

LEAN Six Sigma

19 participating utilities

Research and Develop "To Be" processes for:

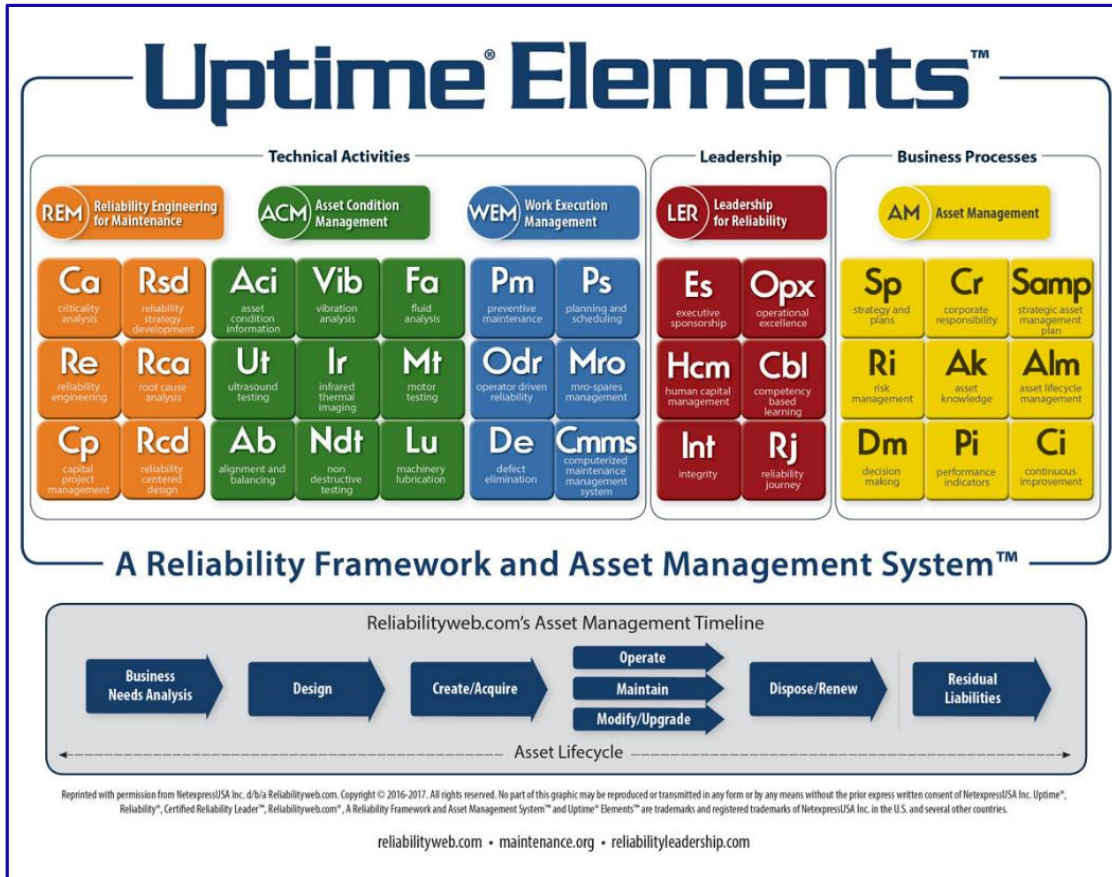
- CIP Delivery (TEAM2100 Lead)
- Asset Management Planning (TEAM2100 Lead)
- BCE/CIP Prioritization (DC Water Lead)
- Enterprise Risk (Portland Water Lead)
- Change Management
- Organization Culture
- Workforce Development



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Industry Collaboration - Maintenance Excellence

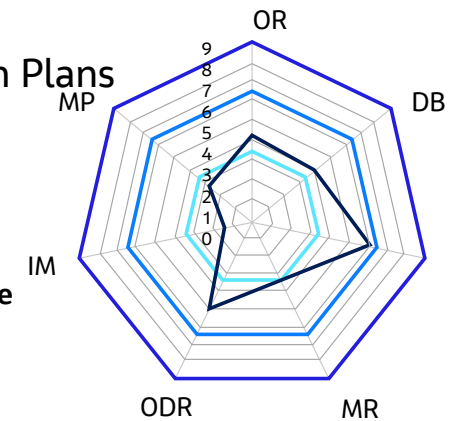


The UPTIME ELEMENTS Framework by ReliabilityWeb is an Industry Framework

TEAM2100

- Training & Networking
- Peer Conferences
- Maintenance Excellence Maturity Assessment
- Chartering
- Implementation Plans

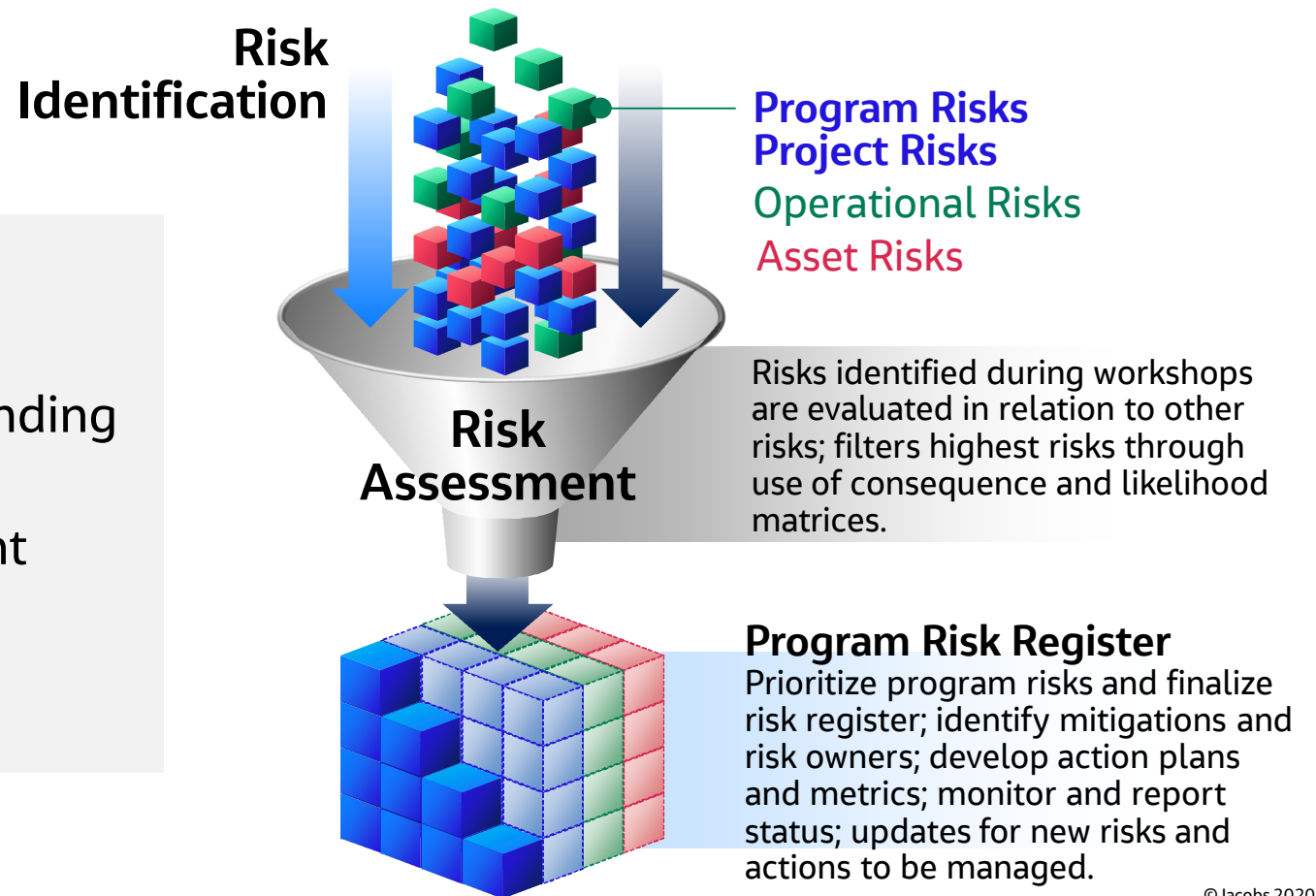
TEAM2100 Average Maturity Scores



Tools and Strategies Applied - Risk Management

TEAM2 100 Major Risks Include

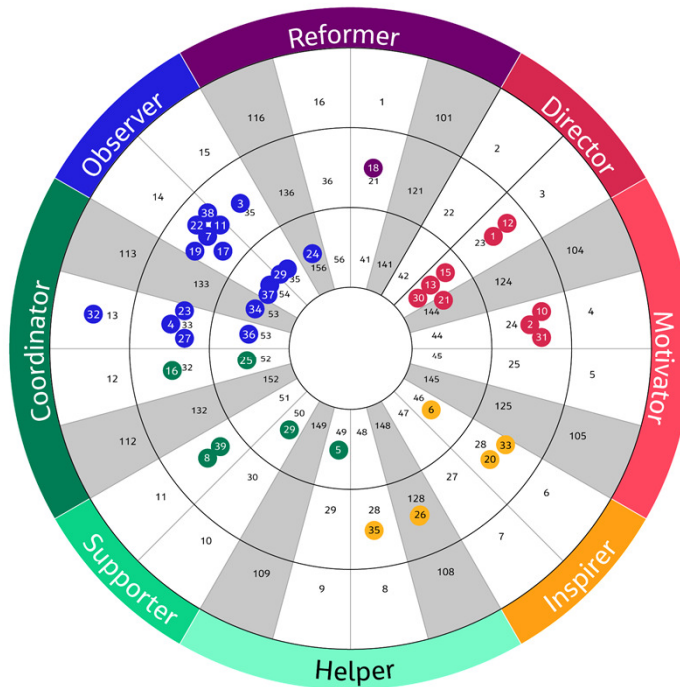
- Securing partnership funding in medium term
- Significant weather event
- Third party owned asset interventions



TEAM2100 Tools and Strategies Applied – Collaboration, Diversity, Innovation

Align organization, culture, tools and processes to future strategic direction

- Insights workshops – fostering diversity
- Positive challenge – ‘zones of uncomfortable discussion’
- Leadership example, team empowerment
- Staff rotations across our organizations
- Interchangeability - best person for the role



Results of Adaptation in Application across TEAM2100

- Improved decision-making (MODA, Prioritization, updated Strategic Asset Management Plan, Process Improvements)
- Implementing AM Improvement recommendations; leading practices
- ISO55001 AM certified – focus on world class journey
- Over £30m of efficiencies recorded to date
- 300+ innovation ideas submitted, over 50 implemented
- Zero lost-time incidents since day one – over 1.5M hours
- Team Innovation Award from Institute for Asset Management



Poll Question #2

Thank you!

Questions & Answers

Jacobs Challenging today.
Reinventing tomorrow.

