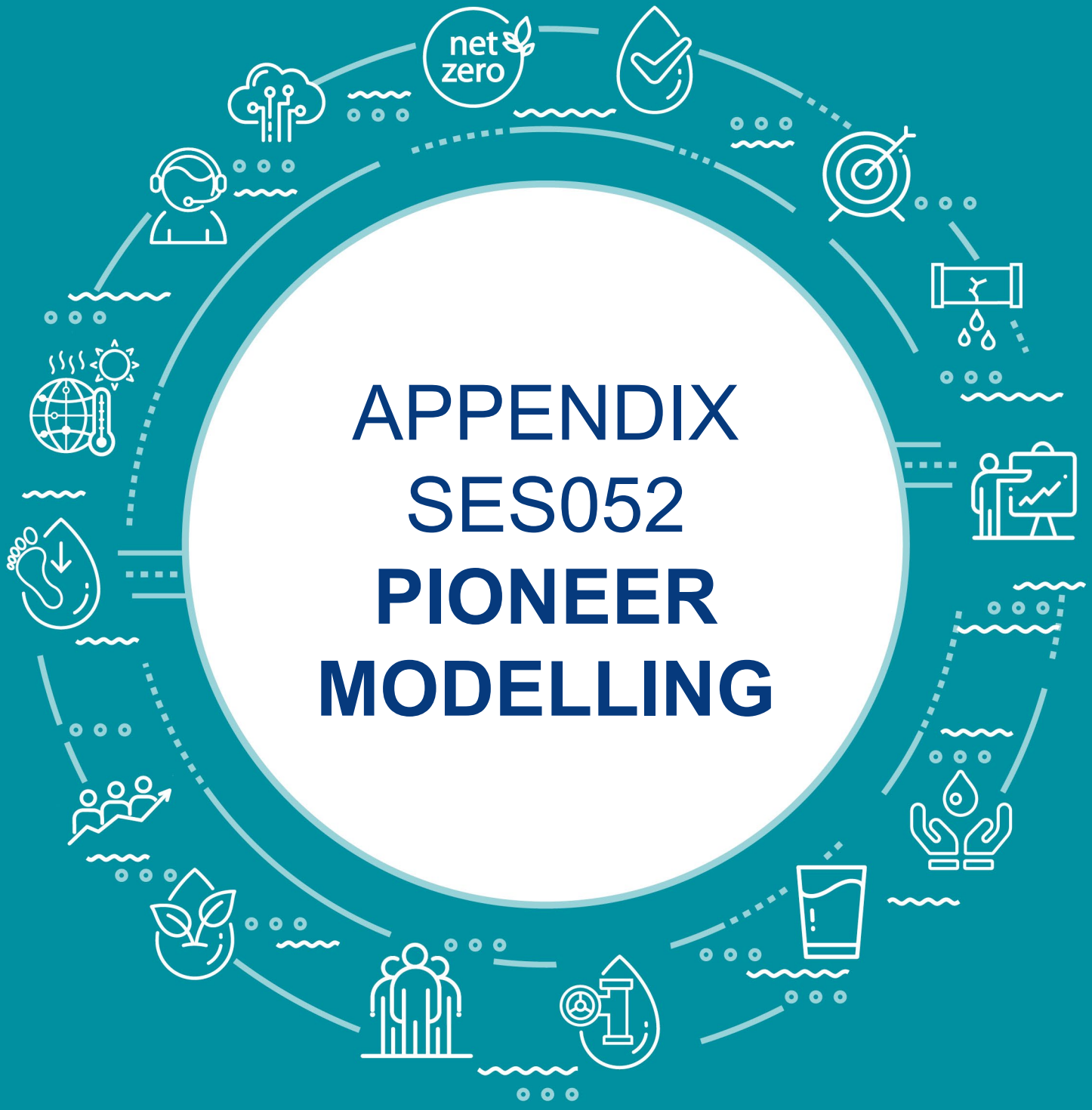
ses WATER



APPENDIX SES052 **PIONEER MODELLING**

SEPT 2023

PIONEER

Analysis for SES PR24

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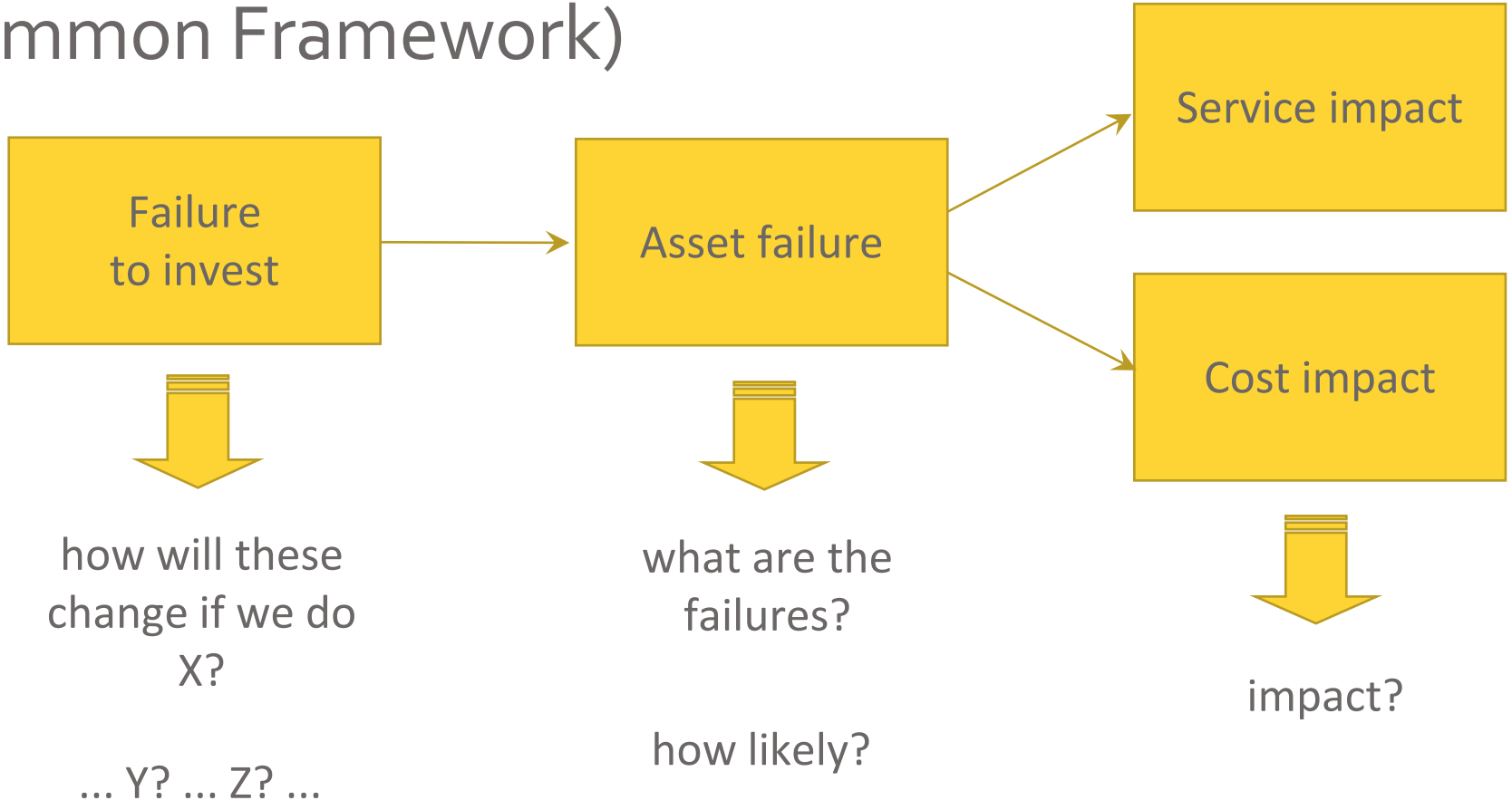
Introduction

- SES PR24 planning uses results from Ovarro's PIONEER asset management planning & risk / expenditure forecasting software.
- Modelling was undertaken by Servelec staff, using an Ovarro PIONEER environment which was then handed over to SES Water.
- SES analysts then continued to run additional scenario analysis on the delivered system.
- Current PR24 analysis builds upon the PR19 analysis undertaken by Ovarro for SES.
- Asset deterioration models have been continually developed and enhanced with SES since 2004

Principles (Capital Maintenance Planning Common Framework)



What combination of X, Y, Z, ... will give the right level of service, at the lowest cost?

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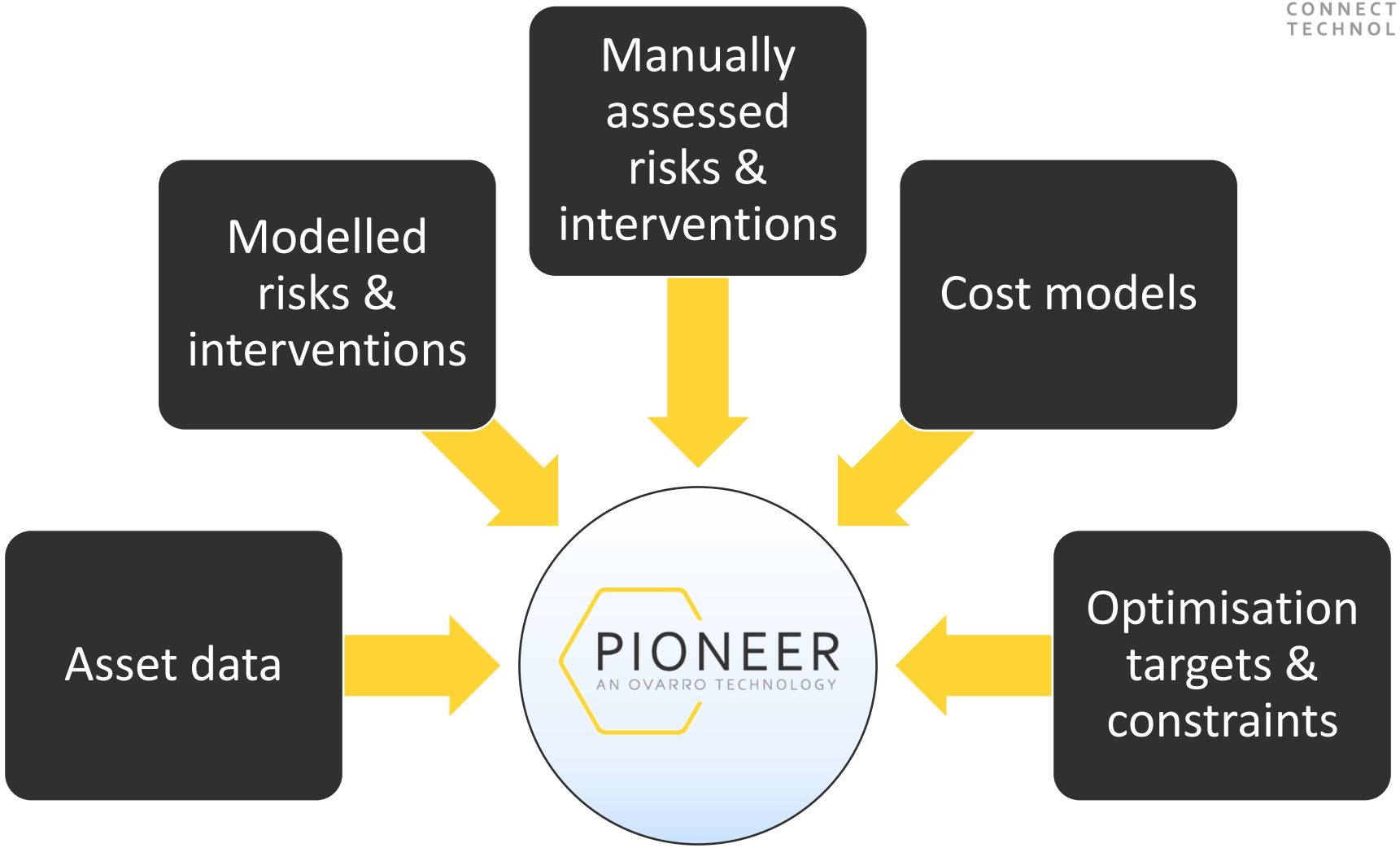
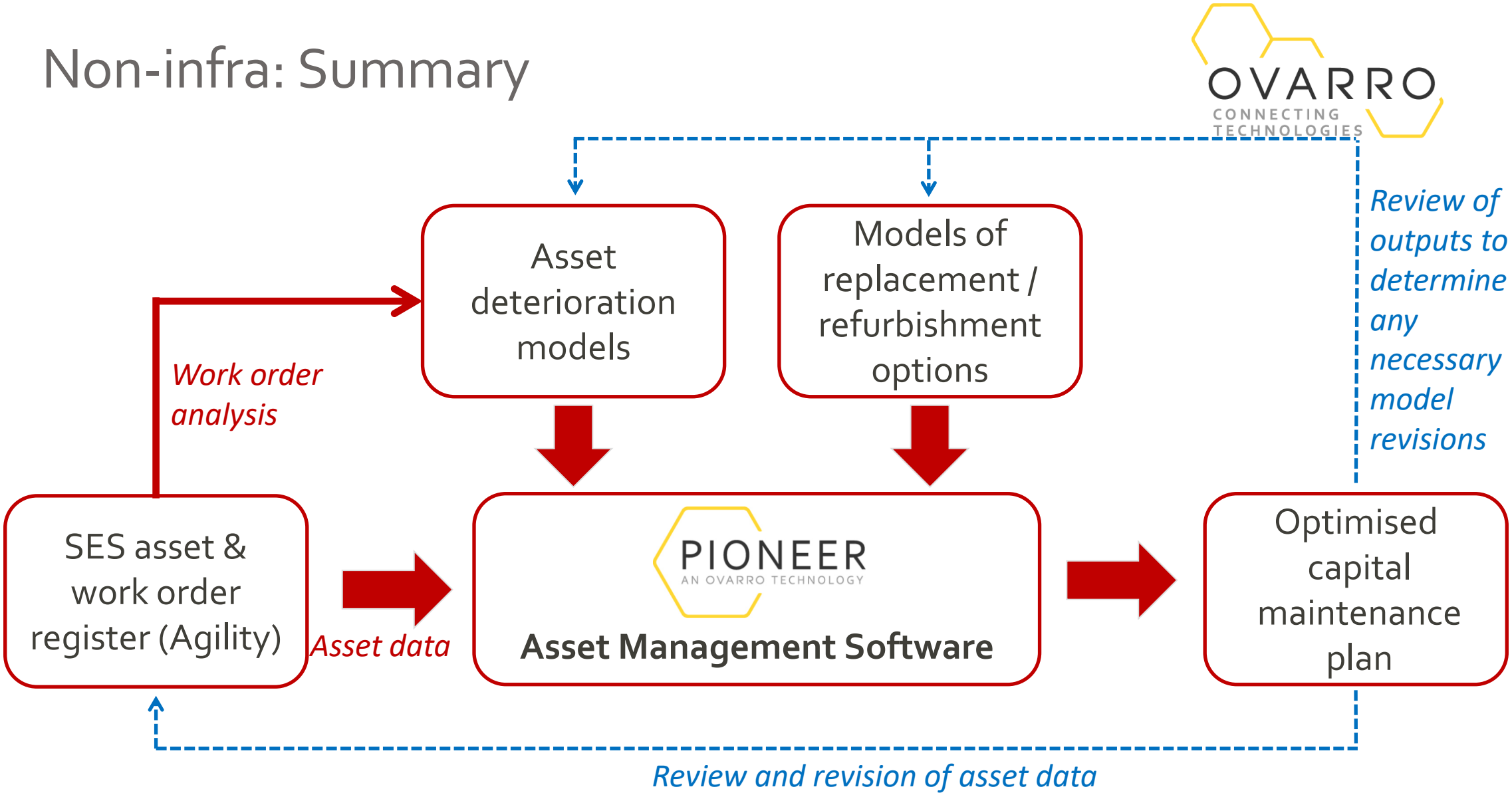

Manually assessed risks & interventions
Modelled risks & interventions
Cost models
Asset data
PIONEER
AN OVARRO TECHNOLOGY
Optimisation targets & constraints

Non-infra: Summary



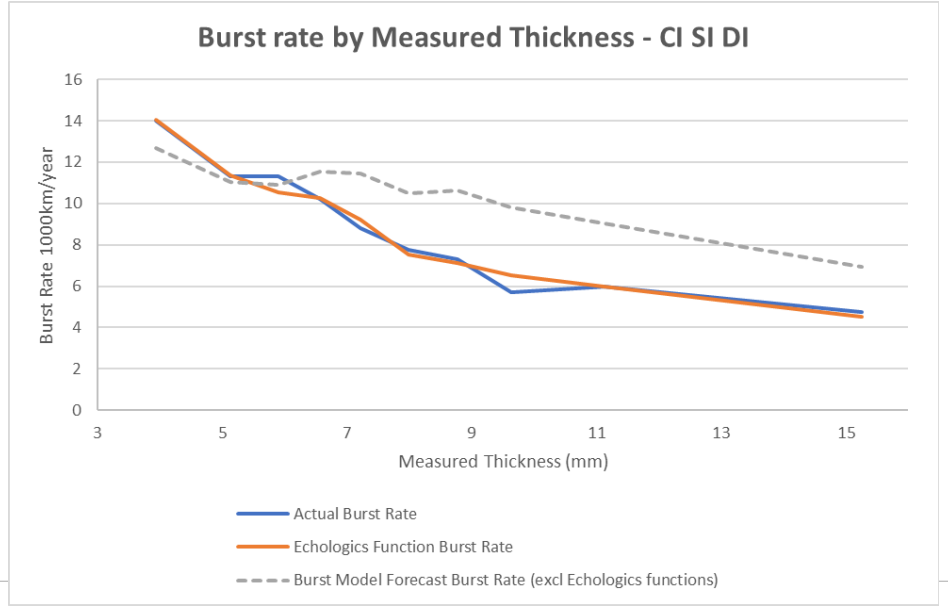
INFRASTRUCTURE

Infra: Summary

- Start point was the PIONEER environment configured for PR19
  - Burst models were enhanced using recently obtained data from Echologics mains condition assessments
  - Leakage models were recalibrated based on recent data
- Ran multi-target optimisations to achieve service targets at minimum net (whole-life) cost
- Ran 'Base' scenario optimisations and leakage reduction optimisations
- Additional scenario optimisations were run under different future conditions satisfying Ofwat requirements

Infra: Burst models

- Additional elements were added to the burst models to account for newly available mains condition data (remaining wall thickness)
- This provides significant improvement to forecasts and therefore investment targeting where these data are available



Infra: Checks and validation

- Mains data validation, including are pipe age and material 'consistent'
- Burst data validation e.g. checking for bursts matched to wrong pipe
- Review of modelled vs observed for different variables
  - As well as totals agreeing, the share of bursts, leaks, interruptions across different materials, diameters etc should reflect SES observations; examples are shown in preceding slides
- QA processes and peer review applied as per Servelec ISO 9001 accreditation

SCENARIOS

SES PR24 Scenarios - Introduction

- SES PIONEER has been configured so that the following Scenarios can modelled:
  - Technology – faster technology and slower technology
  - Demand – high demand and low demand
  - Climate change – high climate change and low climate change scenarios
  - Abstraction reductions – high abstraction reduction and low abstraction reduction
  - Supply chain disruption – supply chain disruption / labour shortages

- Note that for *some* Scenarios it was agreed that:
  - It would not be beneficial to model for both infrastructure and non-infrastructure assets
  - Or that the Scenario could be considered to be identical to the Baseline
- See the next slide for detail for each of the Scenarios.

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SES PR24 Scenarios - Introduction

Scenario Category	Scenario Name	Changes apply for Infrastructure	Changes apply for Non-infrastructure
Technology	Faster technology	✓	✓
Technology	Slower technology	✗	✗
Demand	High demand	✓	✓
Demand	Low demand	✓	✗
Climate change	High climate change	✓	✗
Climate change	Low climate change	✓	✗
Abstraction reductions	High abstraction reduction	✗	✓
Abstraction reductions	Low abstraction reduction	✗	✗
Supply chain disruptions	Supply chain disruption	✓	✓

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