

IN-PERSON EVENTS | Involving. Informing. Inspiring

CIWEM Urban Drainage Group Annual Conference 2022

8 – 10 November 2022

Hilton Birmingham Metropole

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Introduction



Steve Kenney

*Chief Engineer of Network
Modelling*

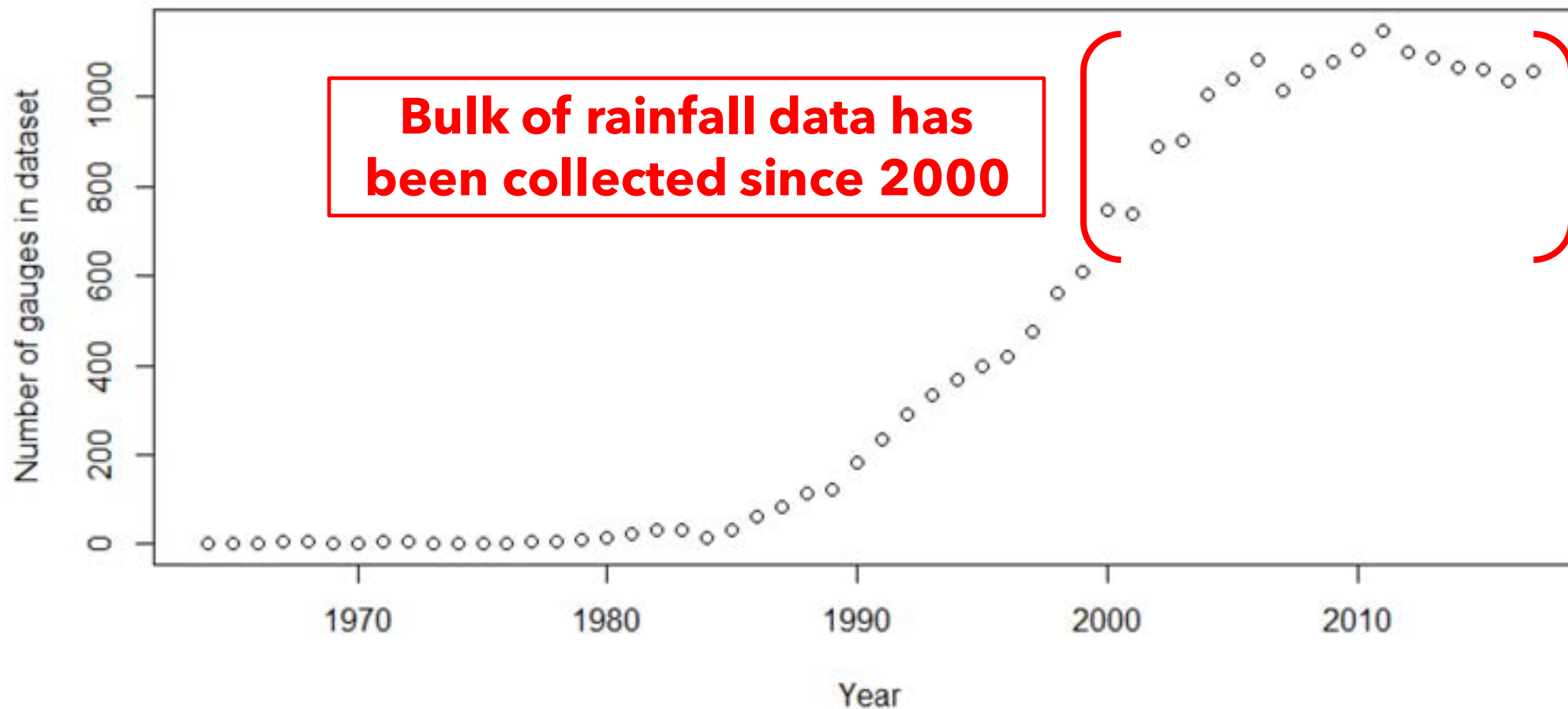
United Utilities

Ari Feldman

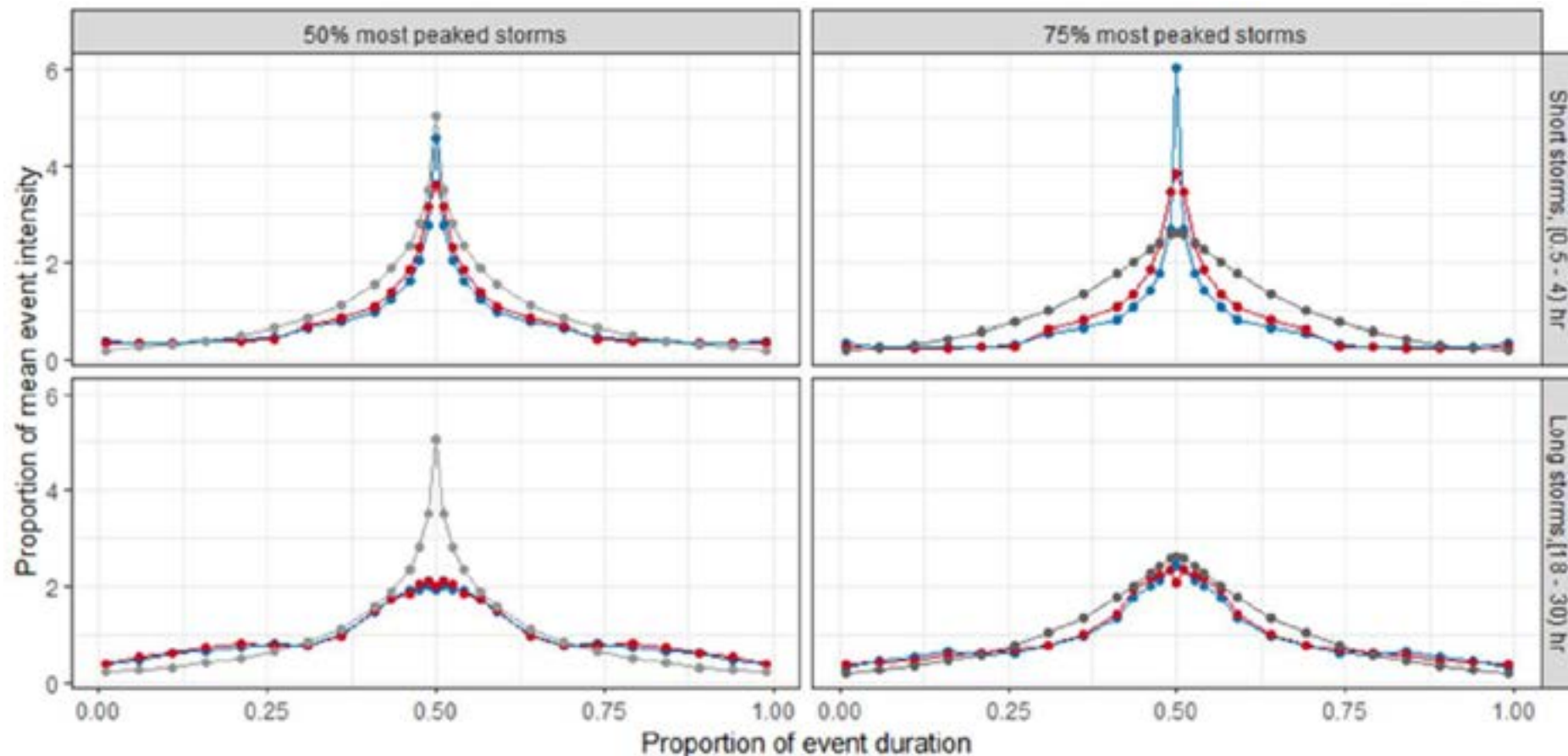
*Optimization
Engineer*

Optimatics

Number of Rain Gauges with Sub-Hourly Records in Great Britain, per year



FSR Summer and Winter Profiles



Season — FSR 50% Summer — FSR 75% Winter — Summer observed — Winter observed

[0, 0.333)

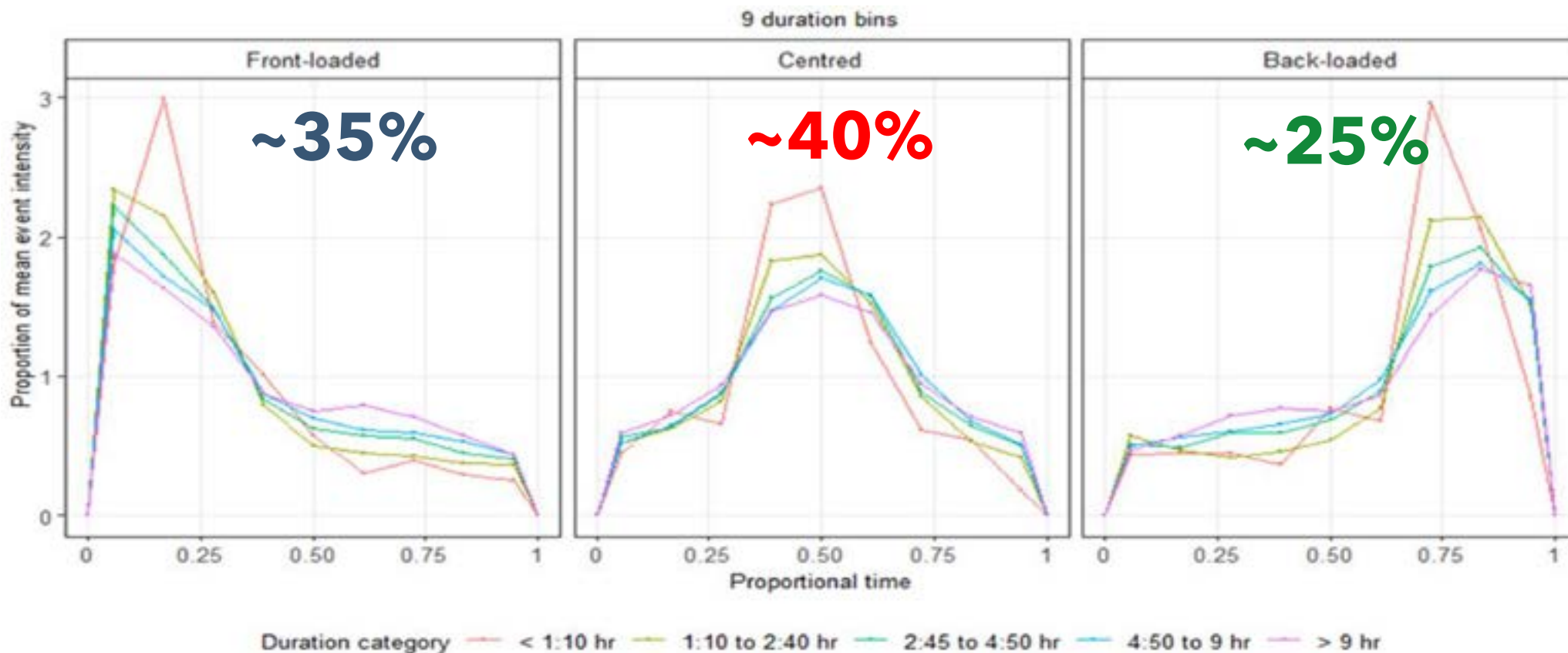
Front-Loaded

[0.333, 0.666)

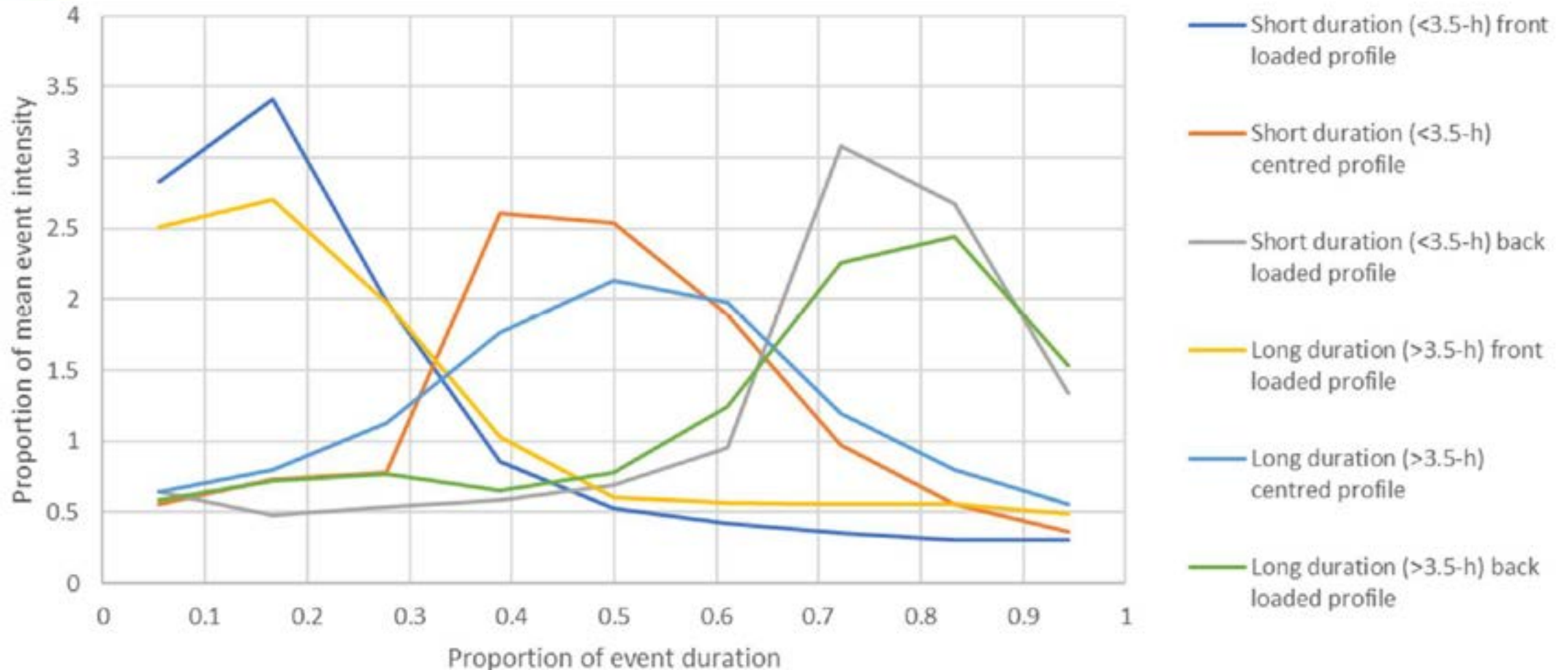
Centred

[0.666, 1]

Back-Loaded



Three Trial Summary Storm Profiles for Two Event Duration Cases

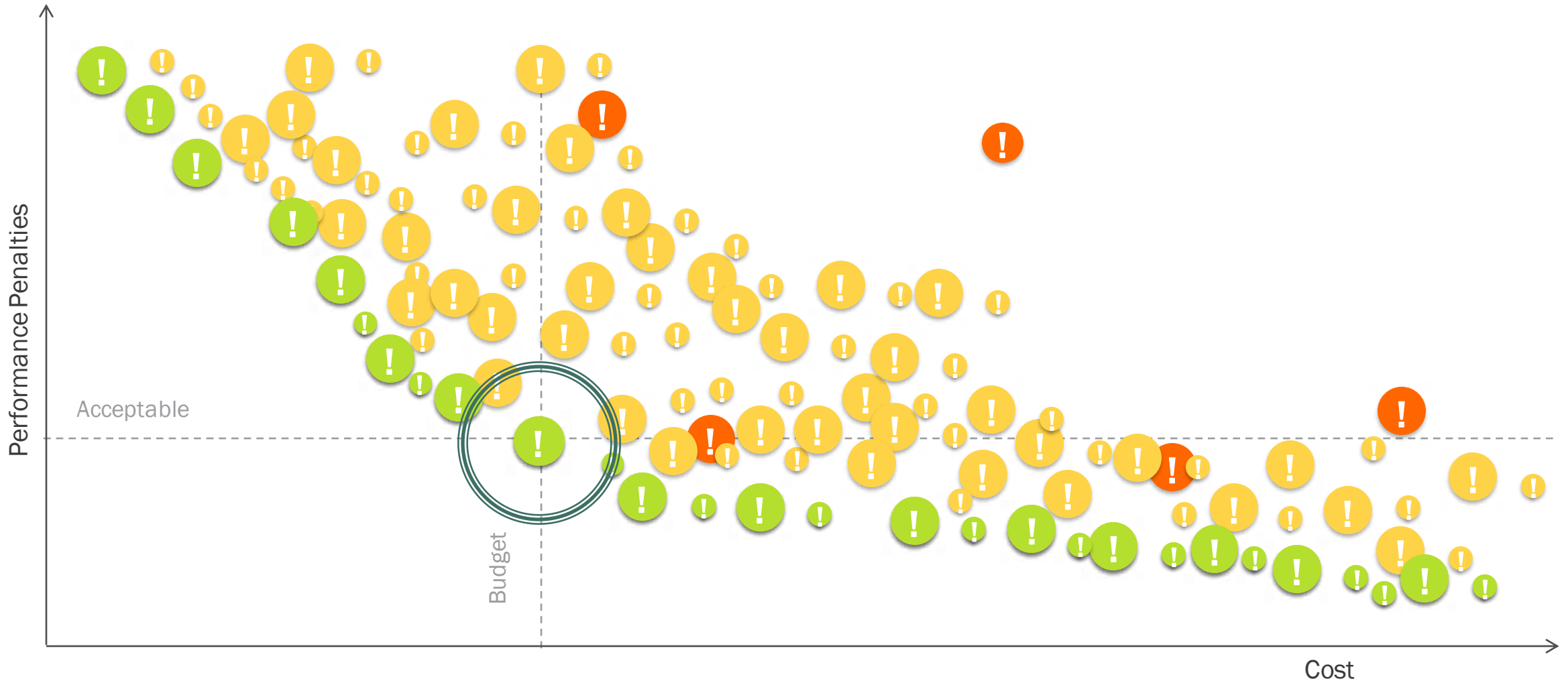


Outcome-driven data analytic strategy

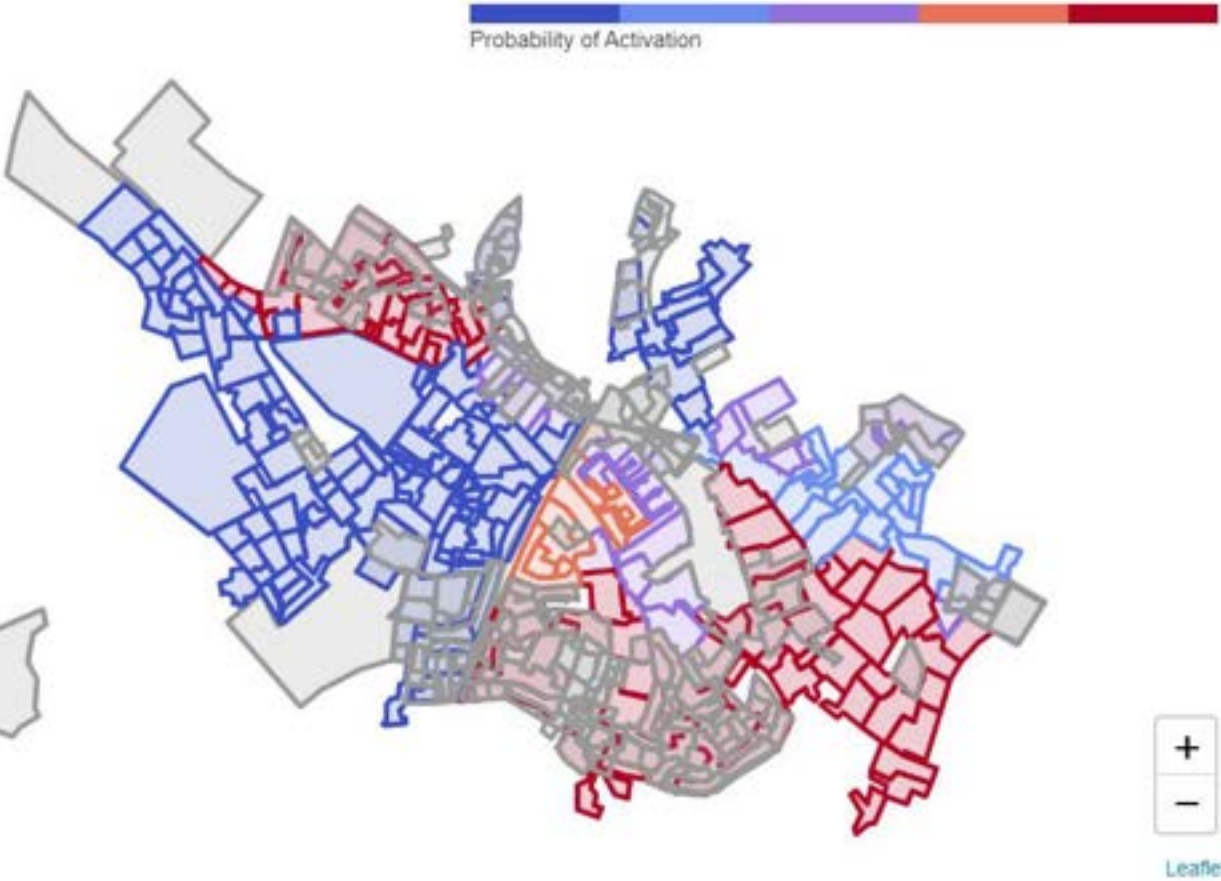
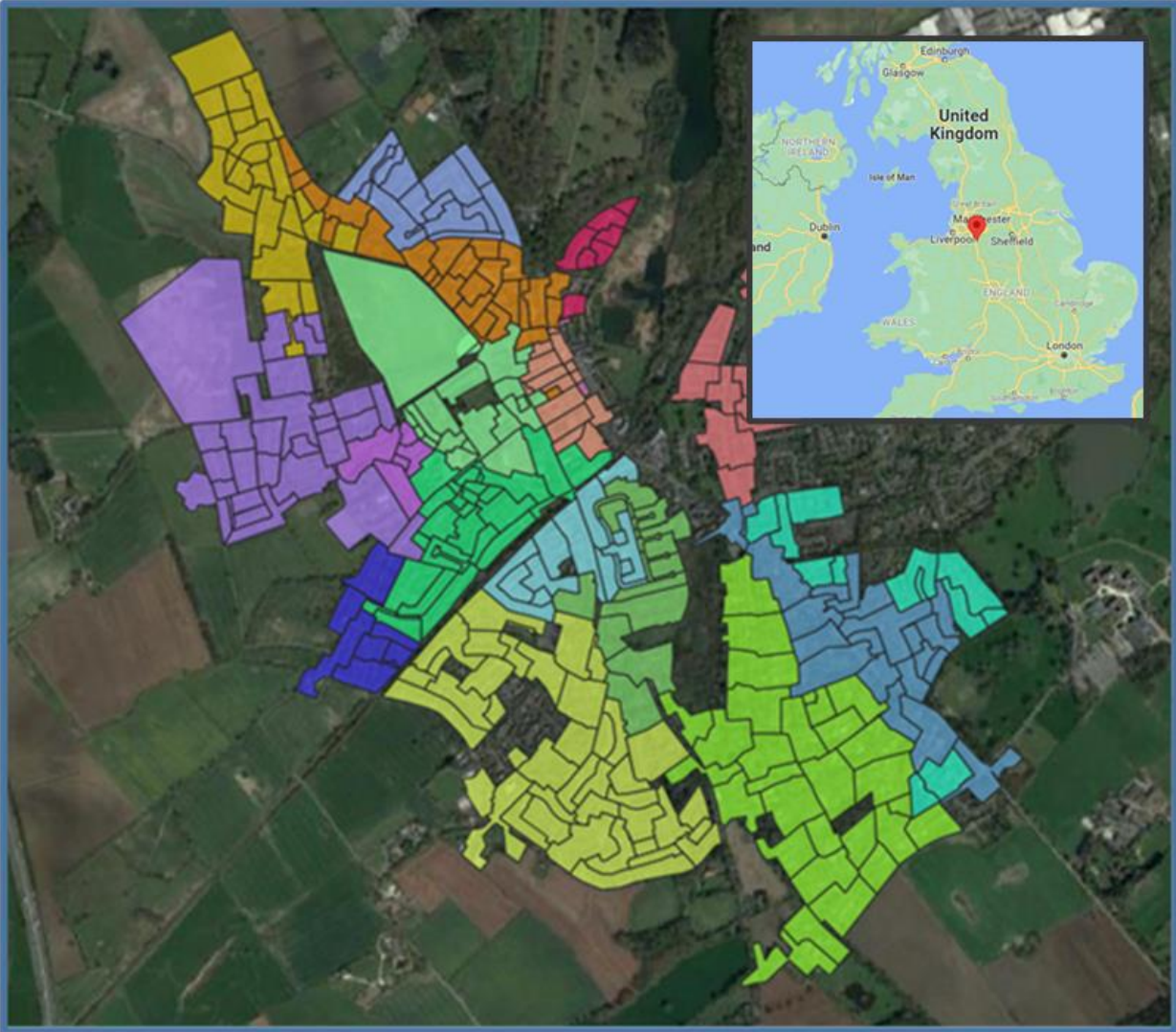
Consider millions of alternatives and select the optimal strategy



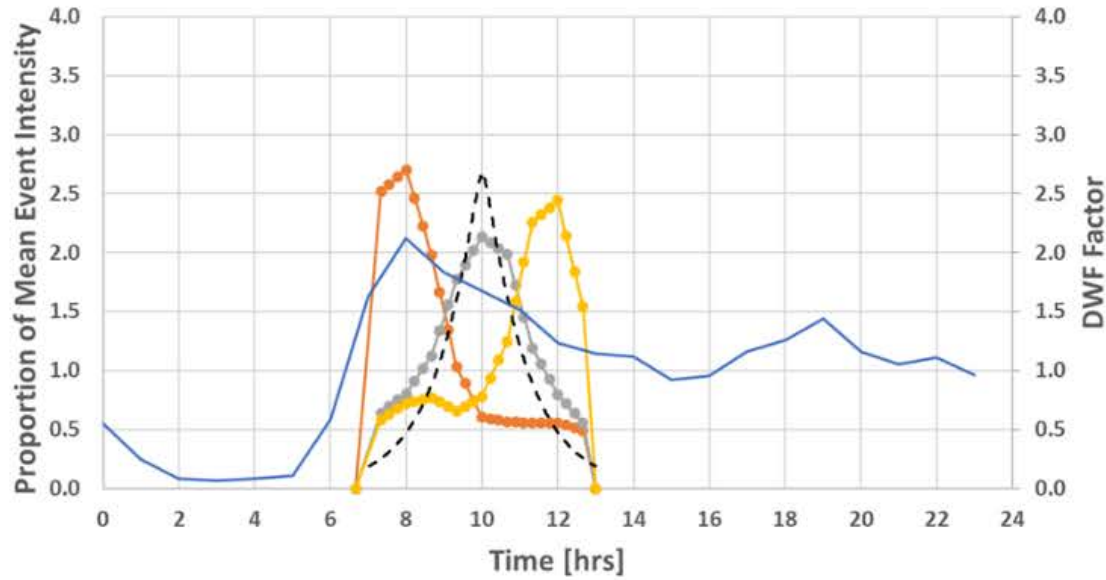
Every dot represents a different strategy and combinations



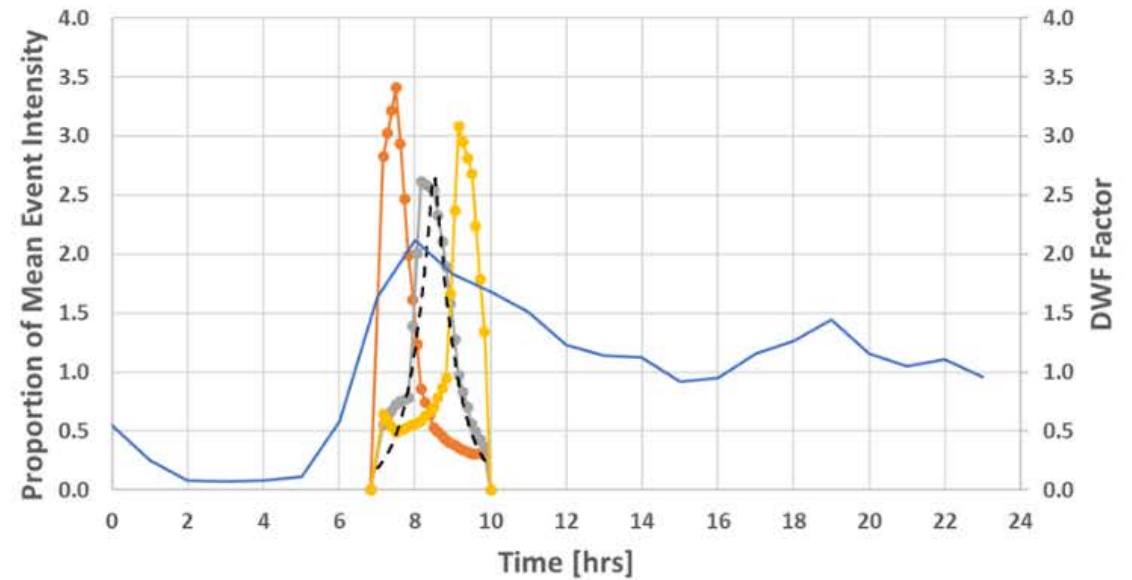
Knutsford SuDS Optimisation for CSO Spill Mitigation



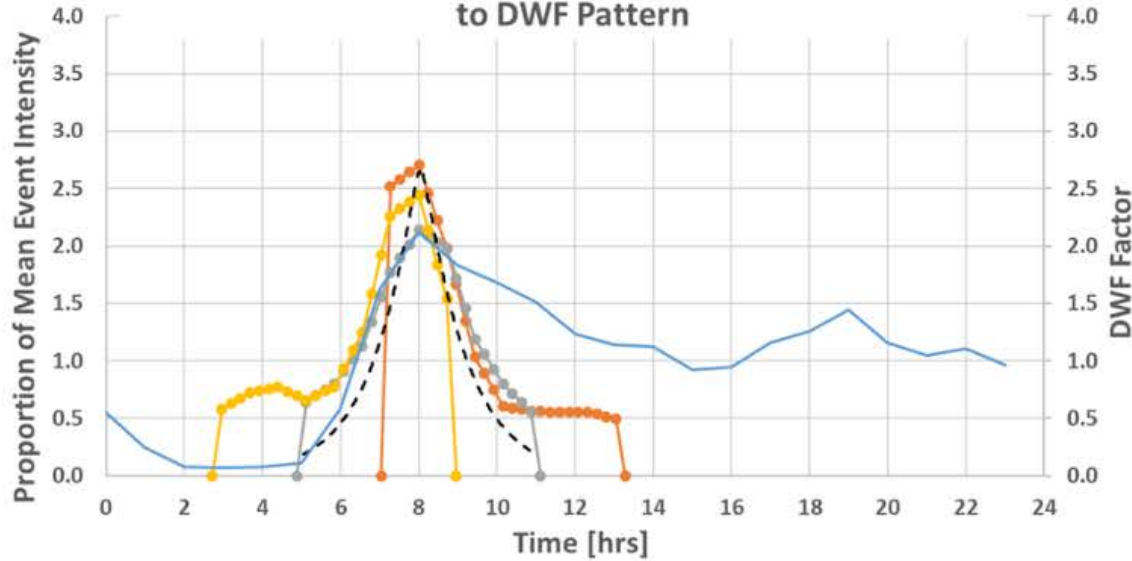
Isochronous Start: 360 min Rainfall Patterns in relation to DWF Pattern



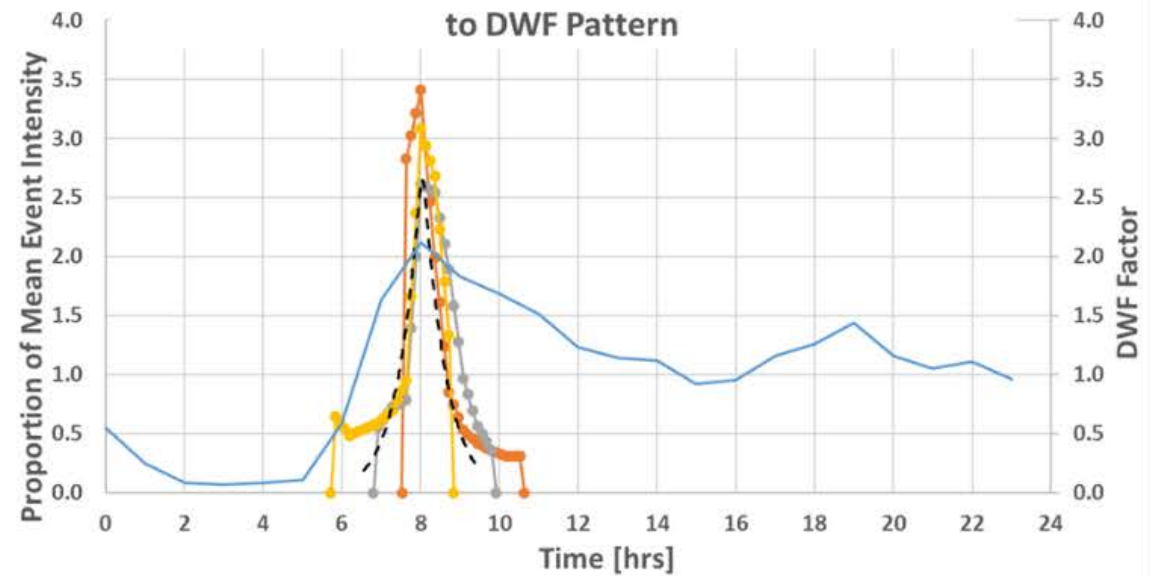
Isochronous Start: 180min Rainfall Patterns in relation to DWF Pattern



Isochronous Maximum: 360min Rainfall Patterns in relation to DWF Pattern

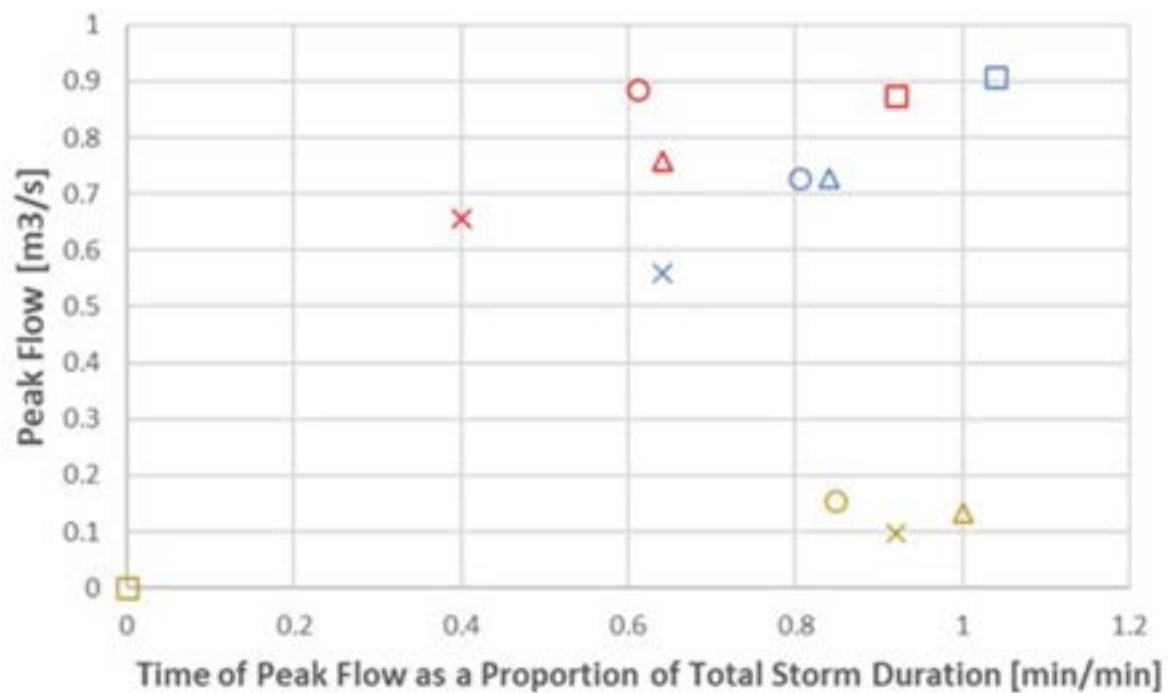


Isochronous Maximum: 180min Rainfall Patterns in relation to DWF Pattern

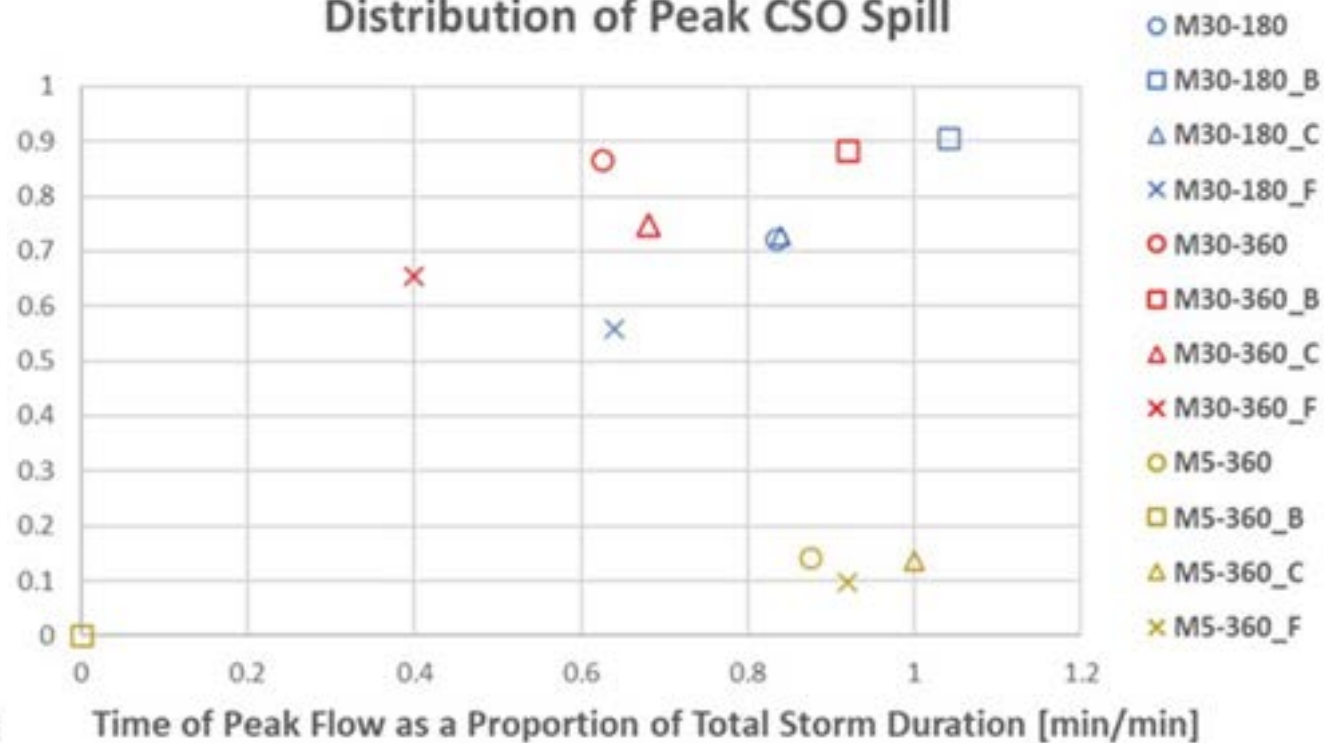


—●— Short duration (<3.5-h) front loaded profile
 —●— Short duration (<3.5-h) centred profile
 —●— Short duration (<3.5-h) back loaded profile
 - - - FSR profile
 — DWF

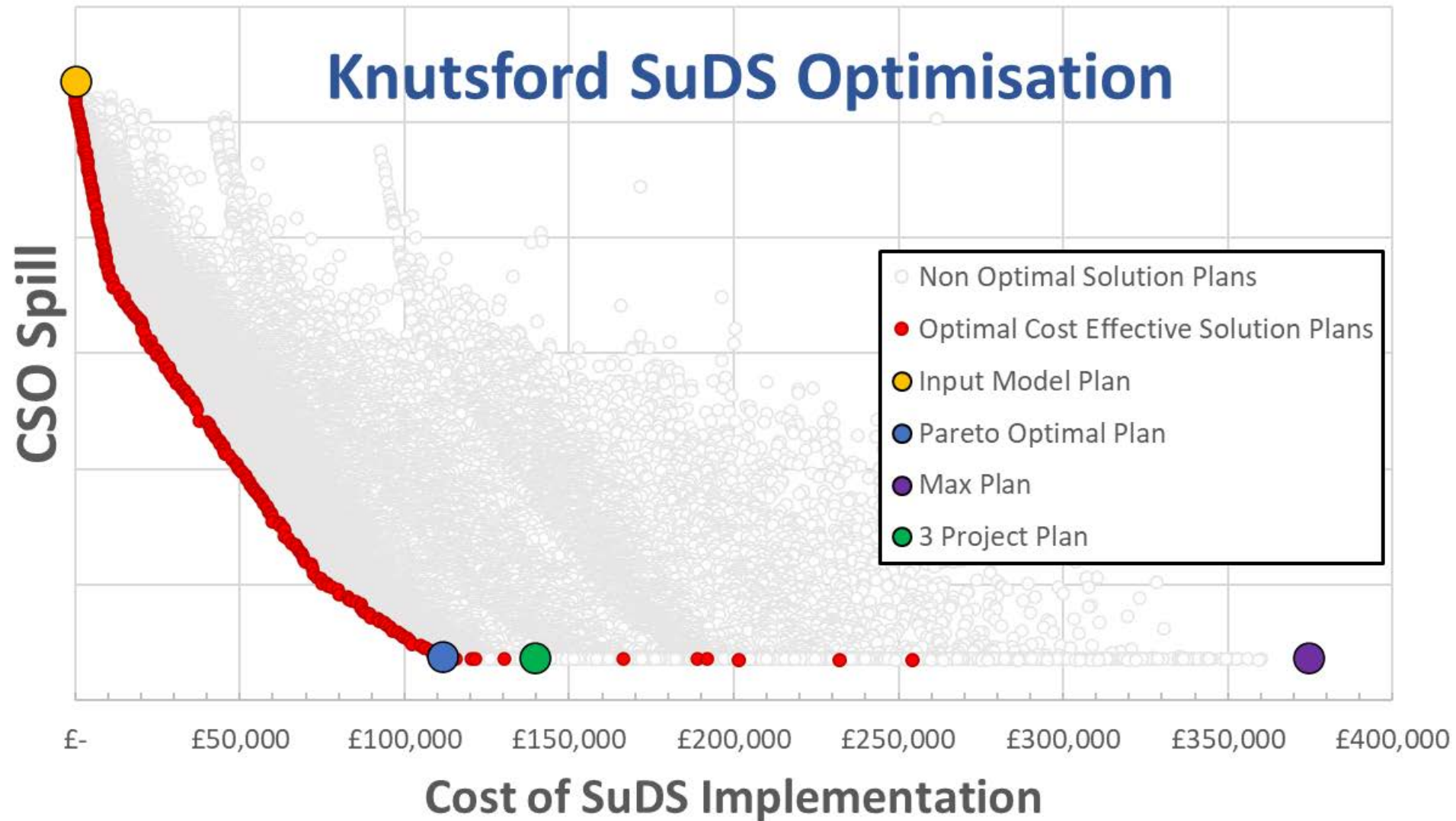
Isochronous Start: Normalised Temporal Distribution of Peak CSO Spill



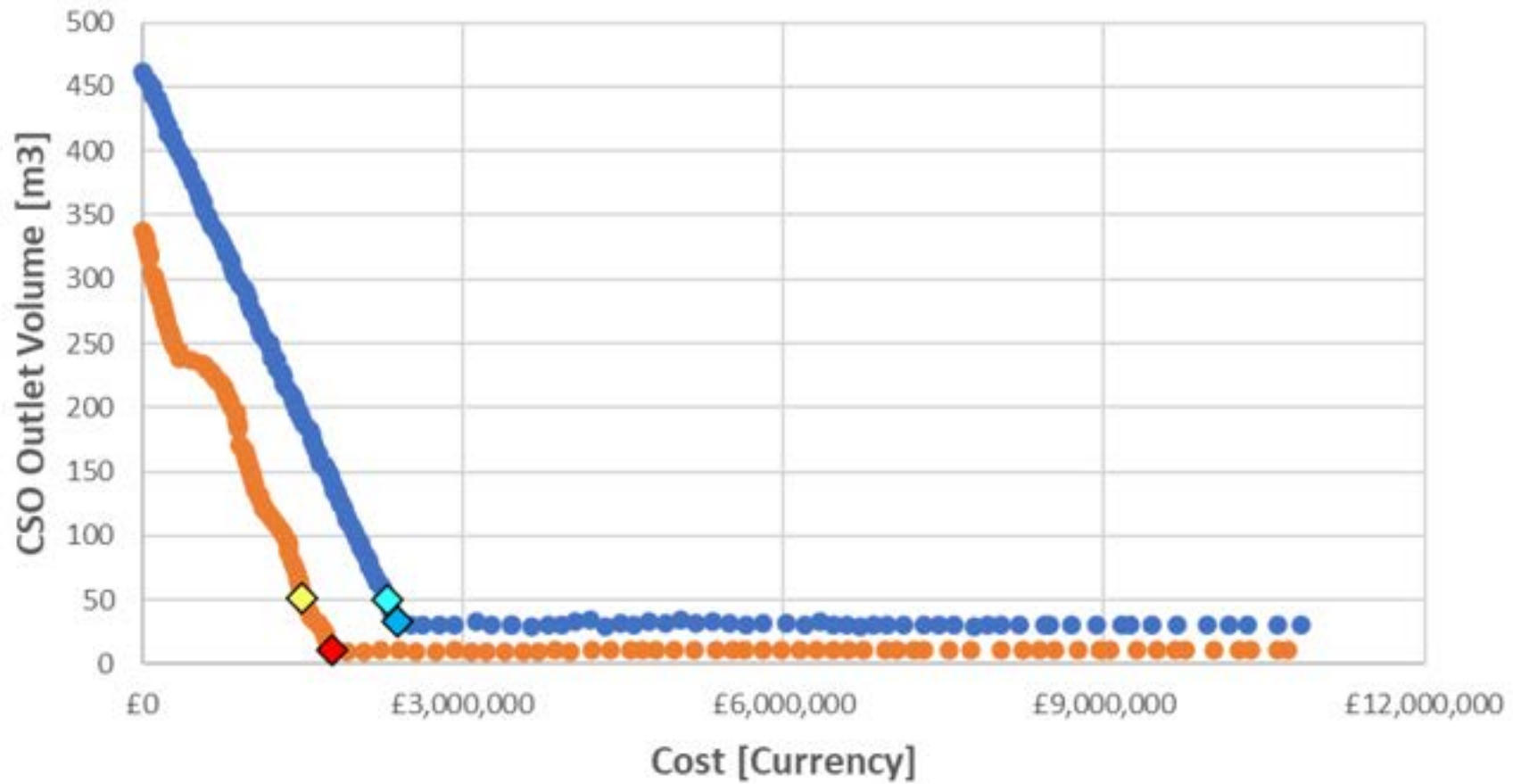
Isochronous Maximum: Normalised Temporal Distribution of Peak CSO Spill



Knutsford SuDS Optimisation



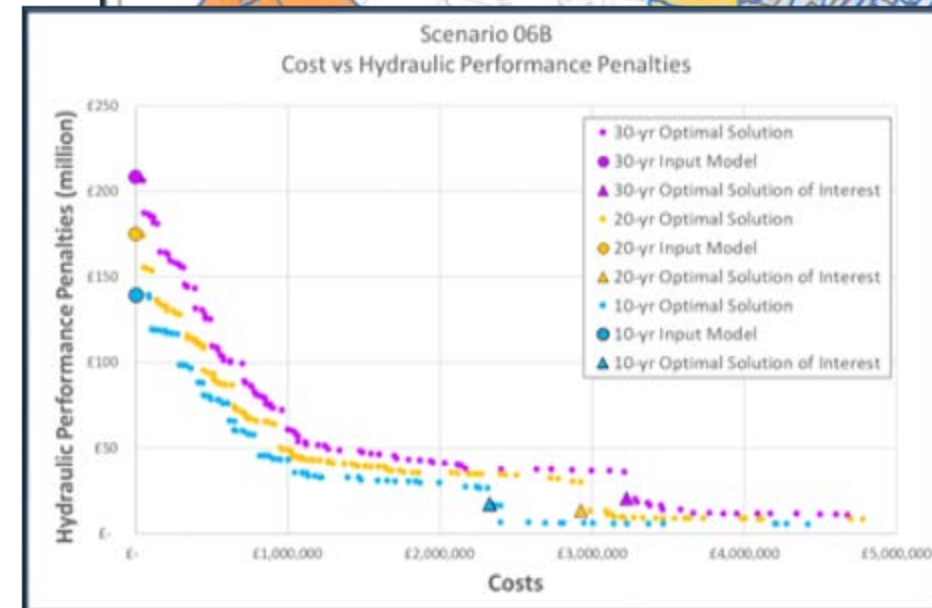
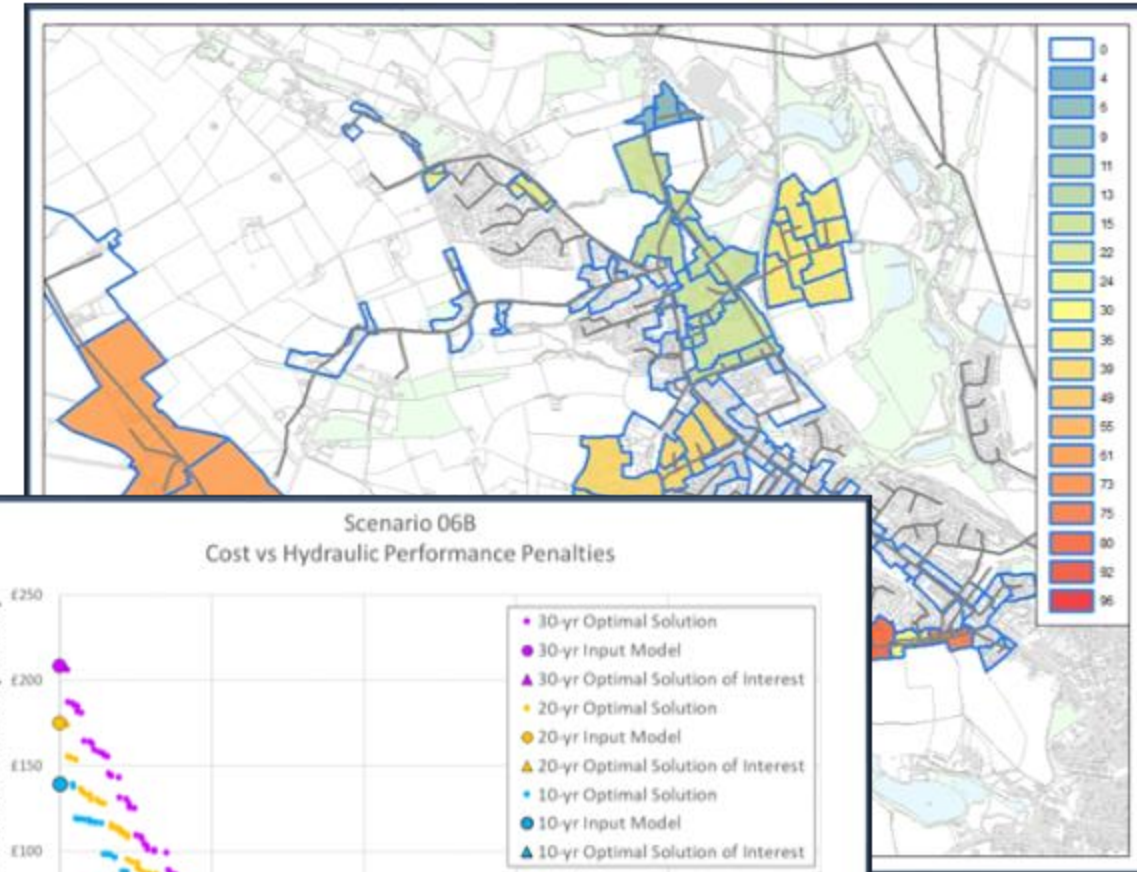
Optimisation Pareto Comparison - Total CSO Volume



- M5-360 FSR
- M5-360 Centred
- ◆ Optimal Centre
- ◆ Optimal FSR
- ◆ 50m3 Spill FSR
- ◆ 50m3 Spill Centre

Scobell St. Analysis: Optimising Traditional & SuDS Strategies for Flood Reduction

- Use Optimizer to identify the best overall combination of SuDS, conveyance, and storage strategies to solve flooding problems.
- Are SuDS a significant part of a high performing solution for this catchment?
- Explore a range of 'what if' scenarios & sensitivity tests – how do different assumptions impact results?



CONCLUSION



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Q&A Session

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