
I&I: Can we really find it?

Presented by: Ed Gower

Date: 7th December 2023



I&I?

- Inflow



- Infiltration



Auckland

Bell Block

Waitara

New Plymouth

Glen Avon

Te Henui

Oakura

Wellington

Inglewood

Strath
th



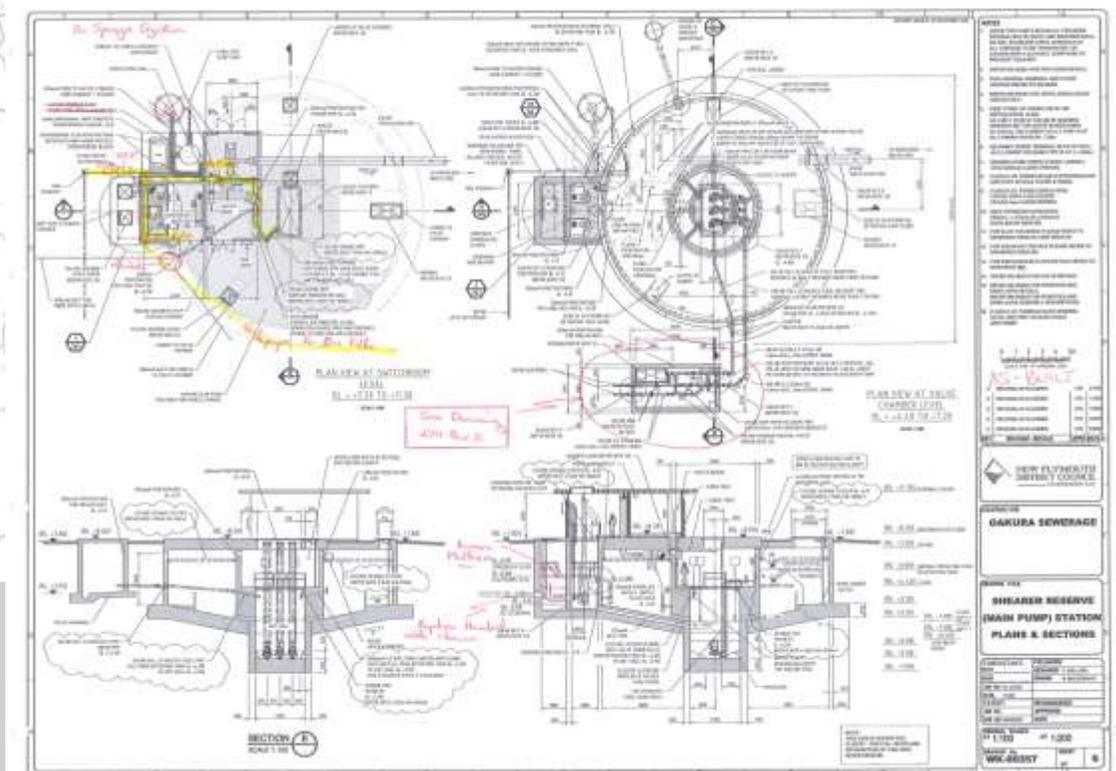
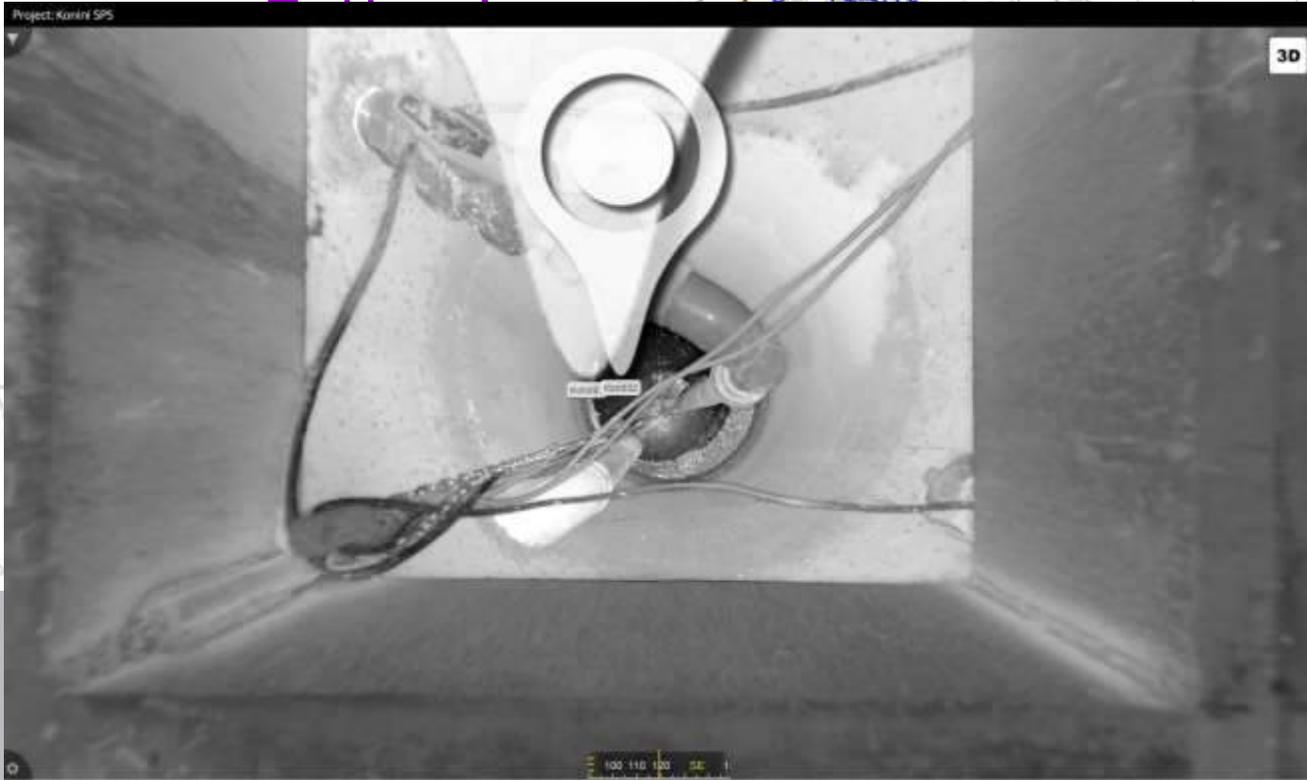
The International Team



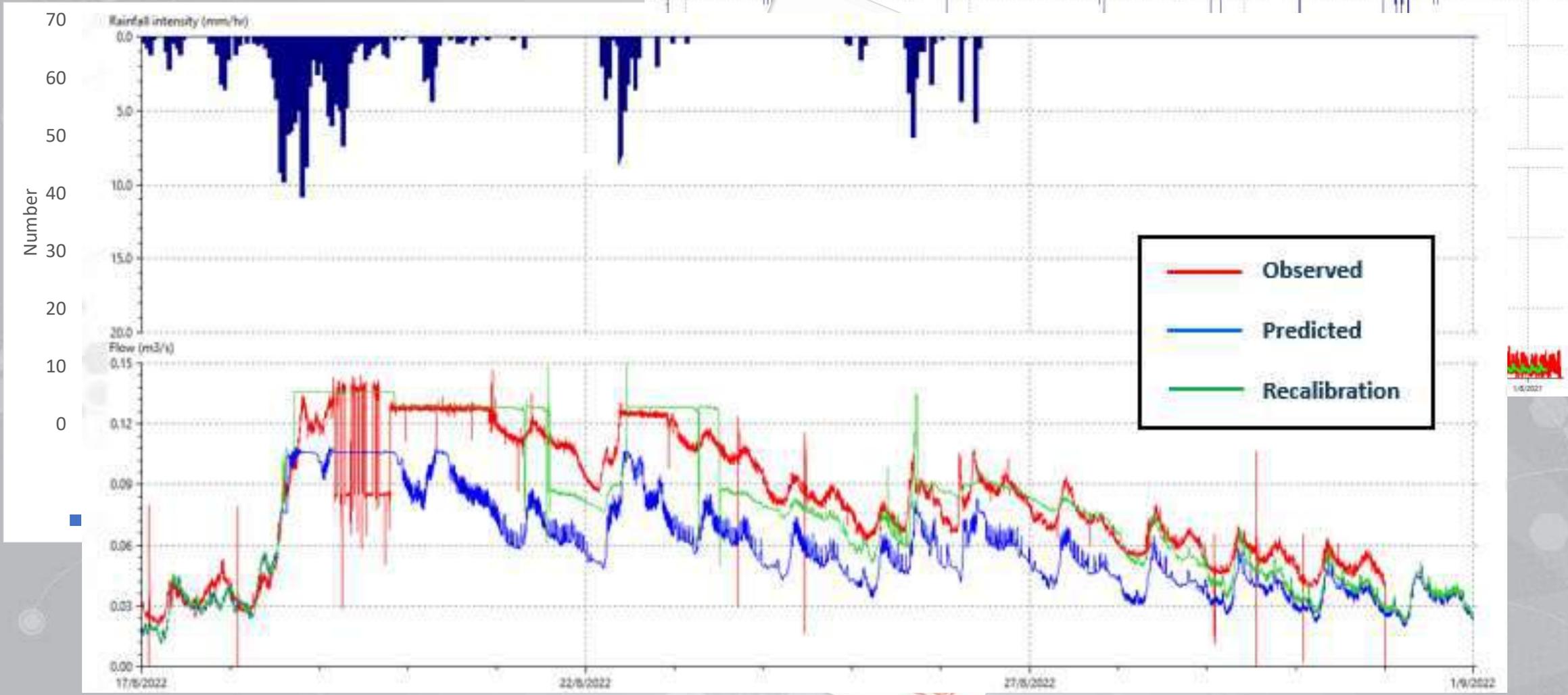
Model Build

Bell Block

Waitara

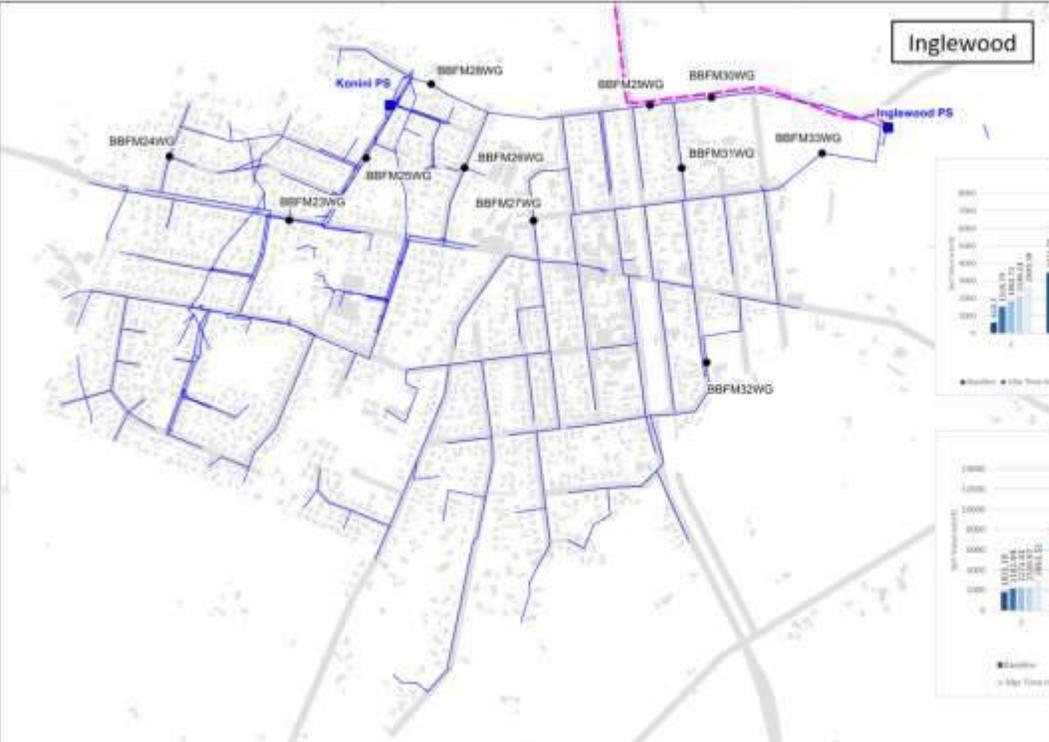
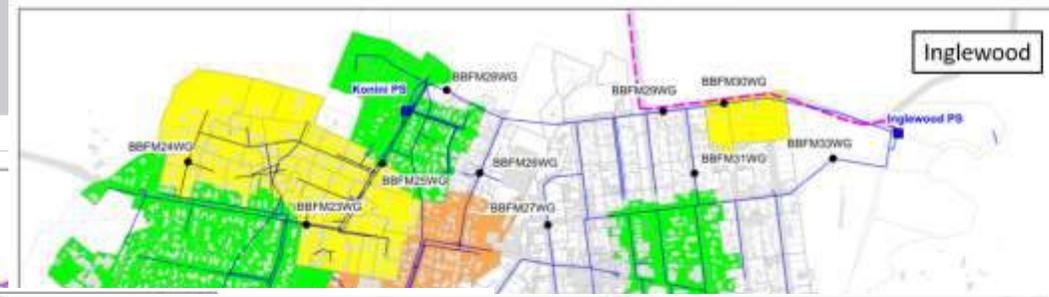
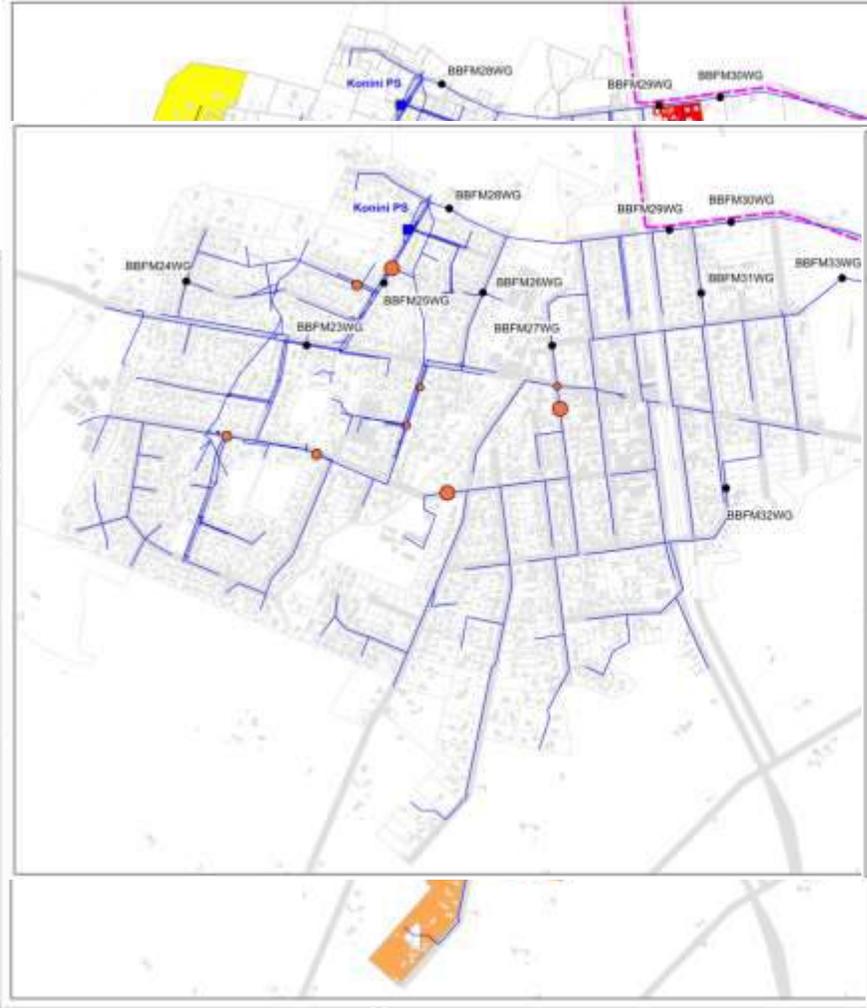


Calibration

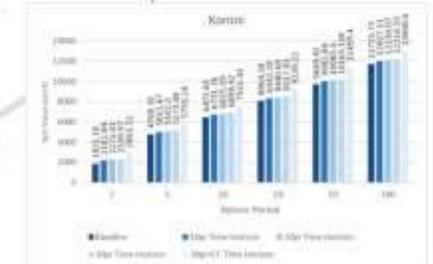
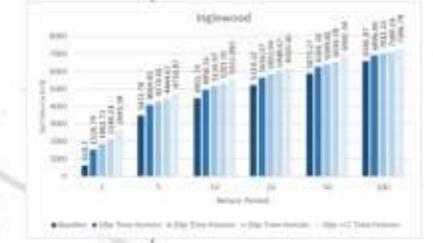


System Performance

100000



- Impermeable Area Per Property**
- - - Rising mains
 - Conduit
 - Flow Monitors
 - Pumping Stations
- Spill Analysis**



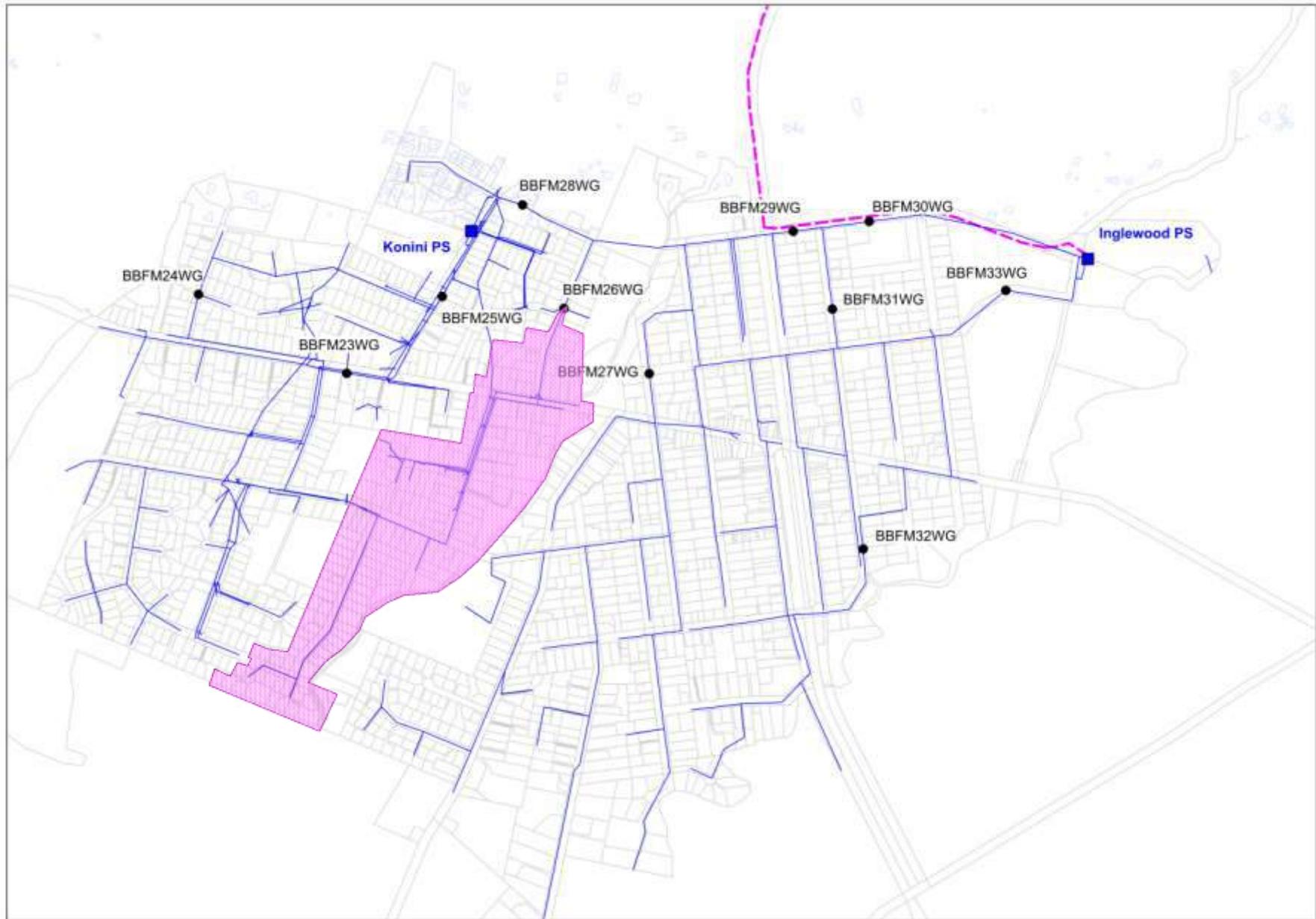
Scenario

Rainfall Uplift

Y
Y
Y
Y
Y
Y
Y



Inglewood



ra



Techniques to find I&I



Flow monitoring



iTrackers



Distributed Temperature Sensing

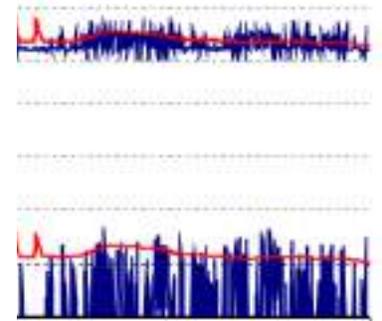
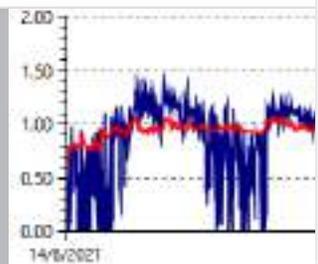
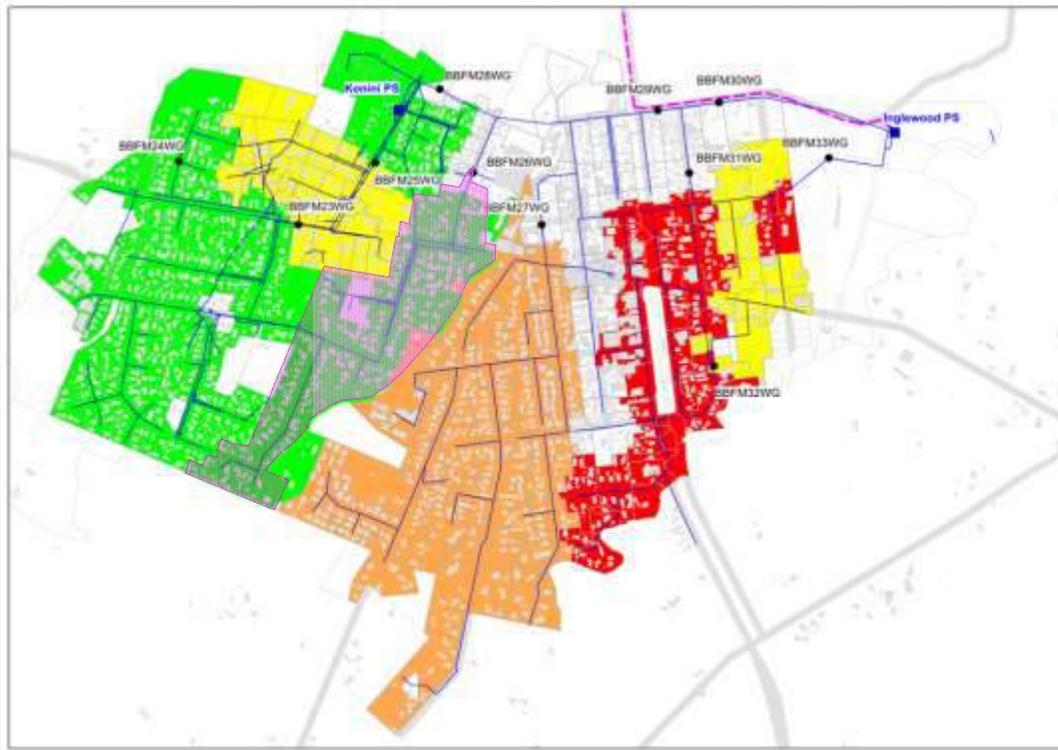
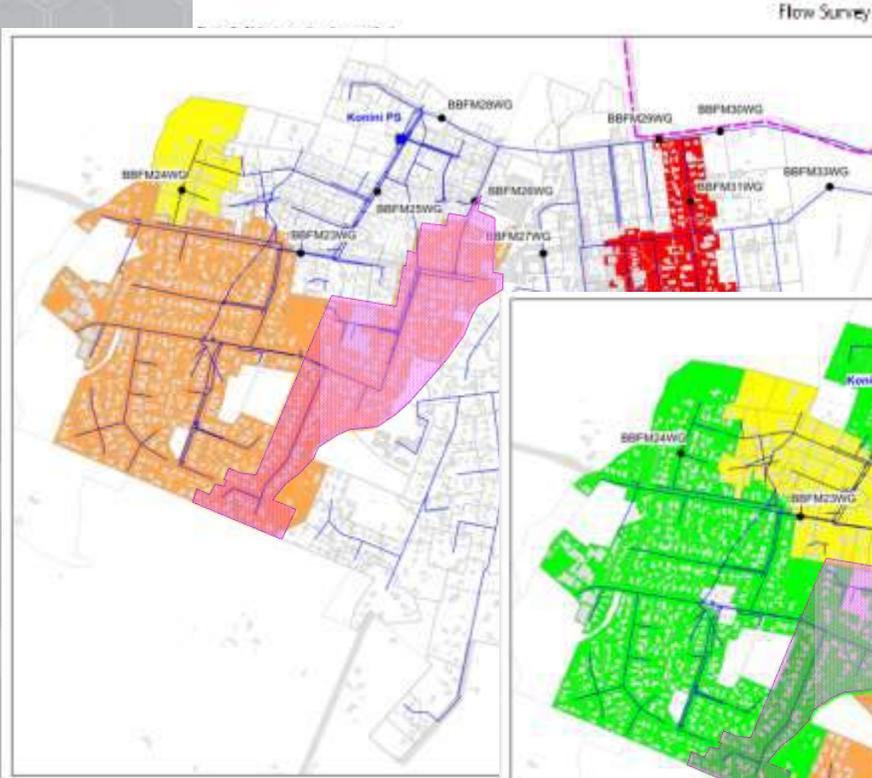


CCTV



Household Inspection

Flow Survey



Impermeable Area Per Property

- - - Rising mains
 - Conduit
 - Flow Monitors
 - Pumping Stations
- Impermeable Area per subcatchment (m²)
- 0
 - 1 – 10
 - 10 – 30
 - 30 – 60
 - 60+

Percentage of Permeable Area

- - - Rising mains
 - Conduit
 - Flow Monitors
 - Pumping Stations
- % of Permeable Area per subcatchment (m²)
- 0
 - 0 – 30
 - 30 – 60
 - 60 – 100
 - 100+

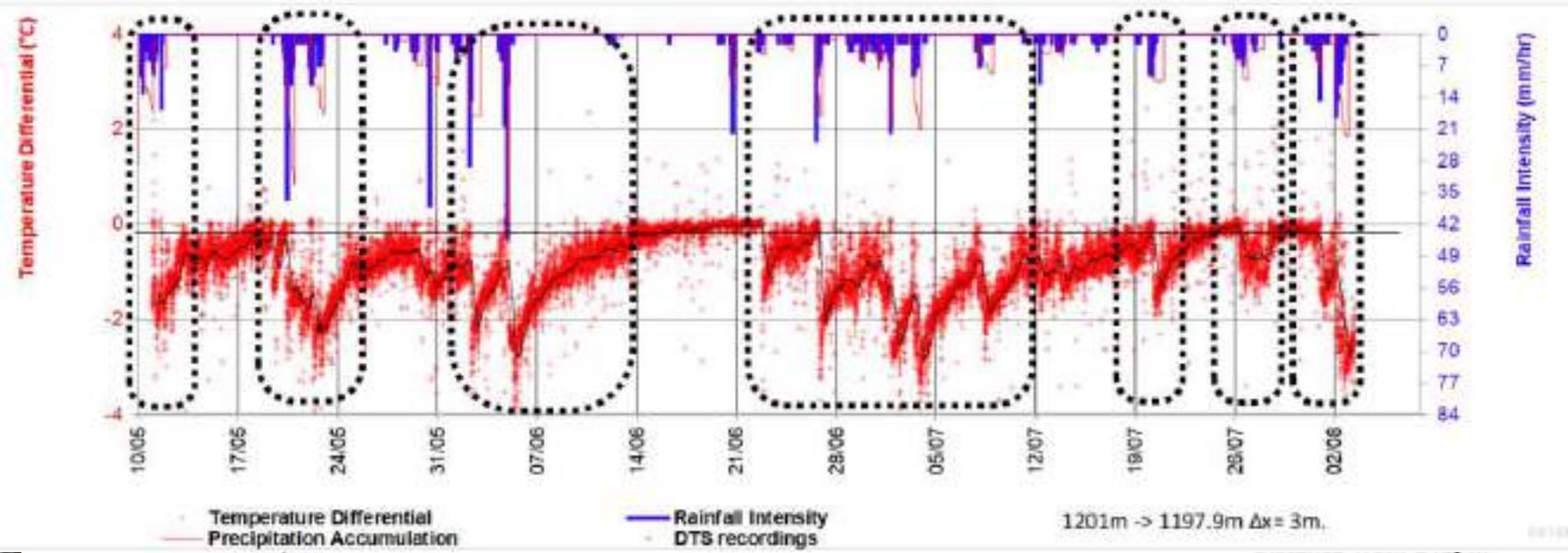
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iTrackers



Distributed Temperature Sensing



Legend:
Average temperature for all time.



CCTV



- Awaiting the results for the trial area

Household Inspections

- Planned work to carry out smoke and dye testing
- Going to every property in trial area
- Plan to compare results with iTrackers and DTS
- Scheduled to be complete by Christmas

Pros and Cons of Techniques

Technique	Cost	Baseflow	Impermeable Area	Permeable Area	Cons
Flow Survey	£	Y	Y	Y	Only gives an area
iTrackers	£	N	Y	Y	Does not identify individual properties
DTS	£££	Y	Y	Y	Expensive
CCTV	£££	Y	Y	Y	Need the right conditions
Household inspections	£	N	Y	N	Direct connections only

Summary

- Detailed models built of four catchments
- Collaborative team working on opposite sides of world
- Undertook a trial in one area to find sources of I&I
- Able to identify several sources
- Each method had pros and cons
- Looking to roll out in other areas

Translation to the UK

- Large number of catchments with I&I issues
- Need to use different techniques
- Not one size fits all
- Look at all issues across catchments
- Can take a long time

I&I: Can we really find it?





Contact us



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