

Introduction

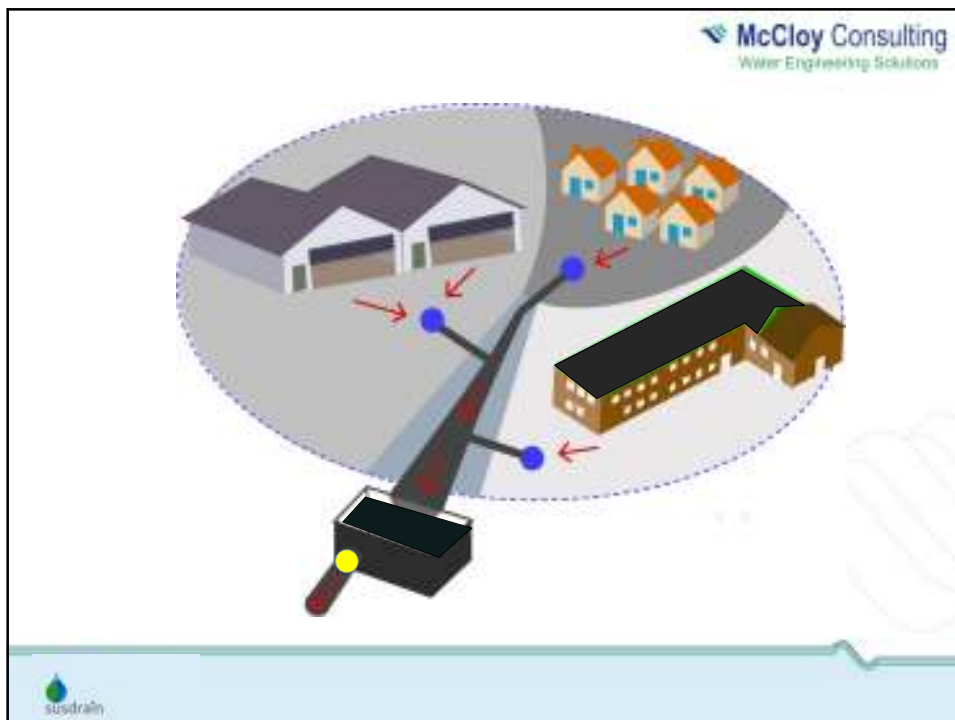
- Designing using 'flexible' figures
- Transparency of design outputs
- Retrofit and betterment

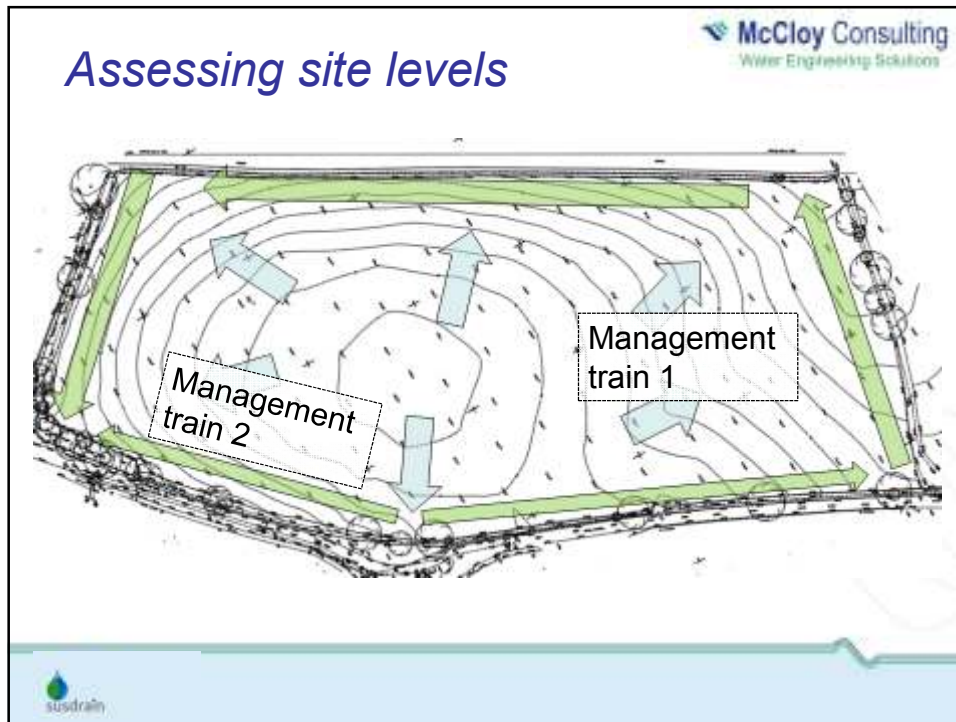


The numbers are coming!



The slide features a woman with a shocked expression, her hands to her face, with a speech bubble saying 'The numbers are coming!'. Surrounding her are large, colorful, 3D-style numbers (1, 2, 3, 4, 5, 6, 7, 8, 9, 0) in various colors like purple, green, red, and blue. The slide also includes the 'McCloy Consulting Water Engineering Solutions' logo at the top right and the 'susdrain' logo at the bottom left.





Flexible design - flows and volumes

- Storage as a volume per m² developed area
- Consider flow rate & storage for a range of return periods

Return period	Flow rate l/s/ha	Storage mm / m ²
1 year	3.6	15
100 yr +CC	11	70

The diagram is titled 'Flexible design - flows and volumes' and includes the McCloy Consulting logo and 'Water Engineering Solutions' text in the top right corner. A 'susdrain' logo is in the bottom left corner.

Opportunity for storage

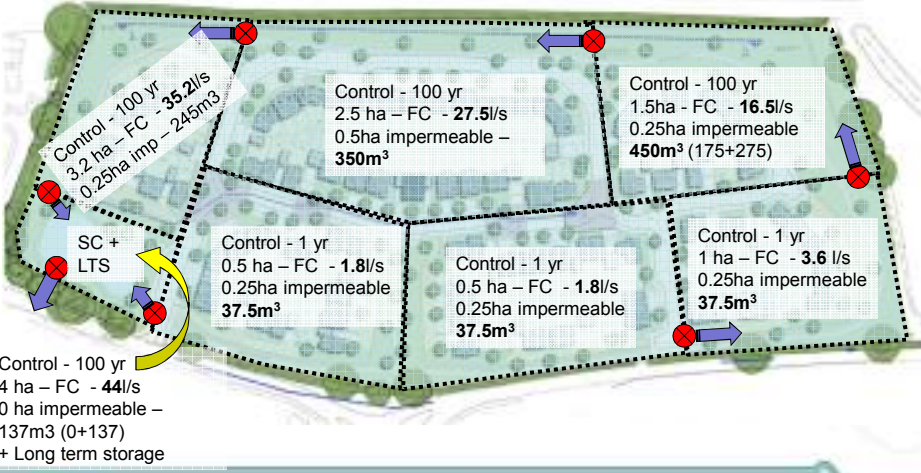


- Starting point for volume design
- More interesting landscape for minimal capital cost



Controlling Flow & Volume throughout the site

Return period	Flow rate l/s/ha	Storage mm / m ²
1 year	3.6	15
100 yr +CC	11	70



Control - 100 yr
3.2 ha – FC - 35.2l/s
0.25ha imp - 245m³

Control - 100 yr
2.5 ha – FC - 27.5l/s
0.5ha impermeable – 350m³


Control - 100 yr
1.5ha – FC - 16.5l/s
0.25ha impermeable 450m³ (175+275)

Control - 1 yr
0.5 ha – FC - 1.8l/s
0.25ha impermeable 37.5m³

Control - 1 yr
0.5 ha – FC - 1.8l/s
0.25ha impermeable 37.5m³

Control - 1 yr
1 ha – FC - 3.6 l/s
0.25ha impermeable 37.5m³

Control - 100 yr
4 ha – FC - 44l/s
0 ha impermeable – 137m³ (0+137)
+ Long term storage

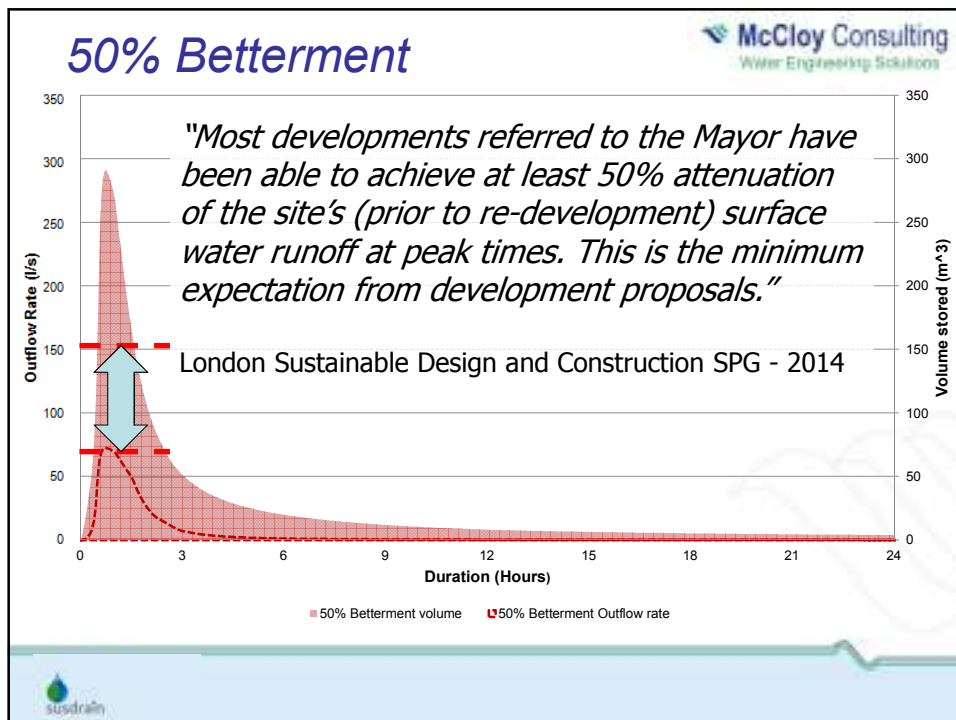


Redevelopment and retro-fit

McCloy Consulting
Water Engineering Solutions

- 50% Betterment – why...
- Which 50%?

susdrain

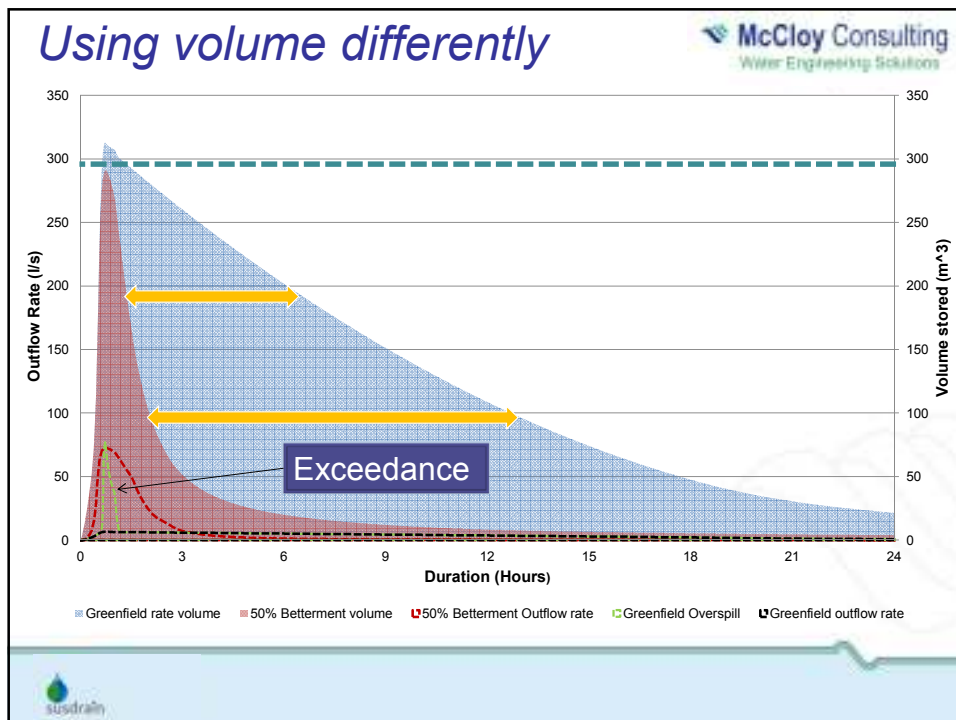
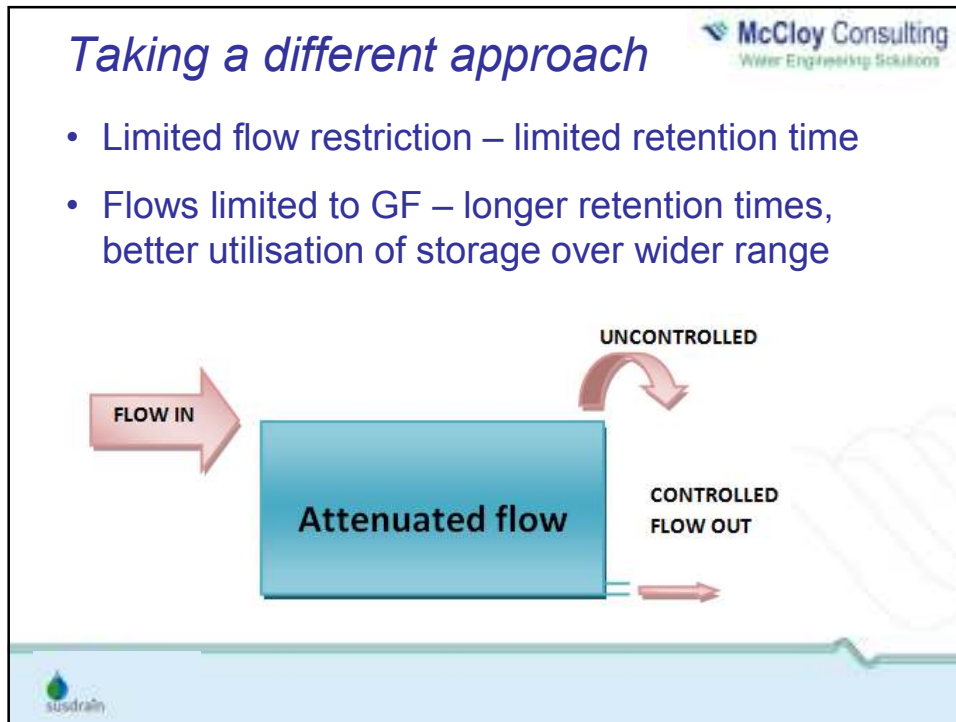


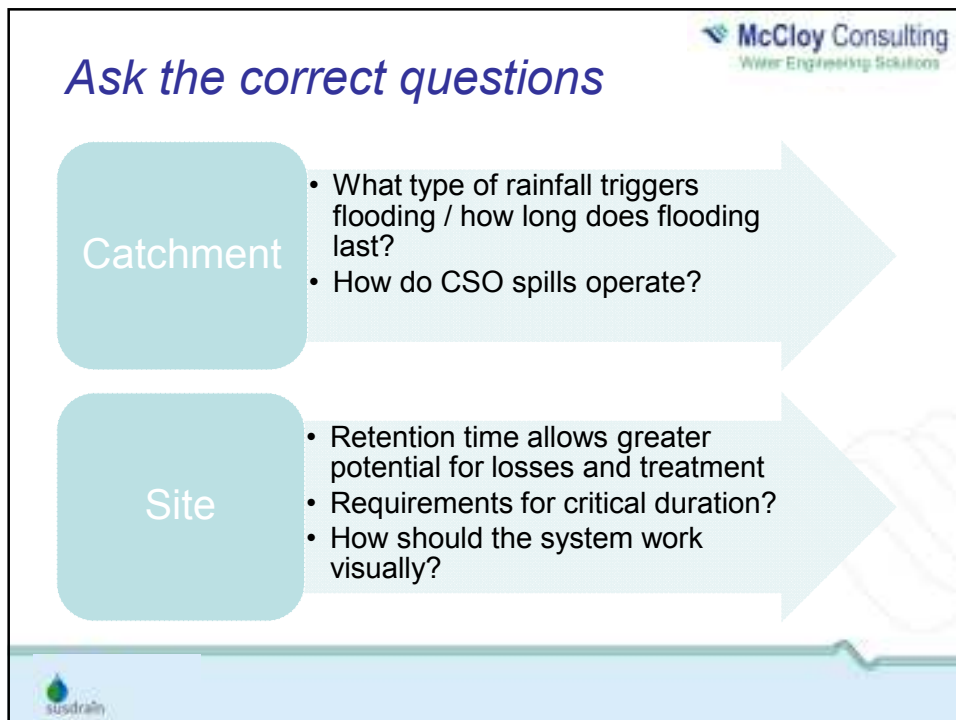
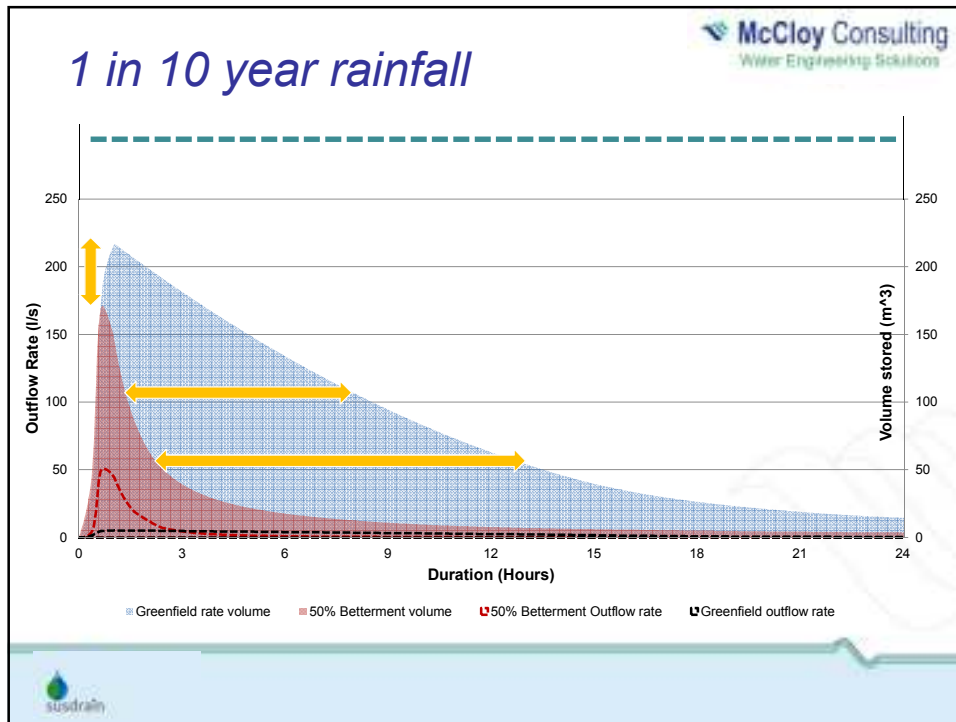



Urban flooding



The combined sewer system








Summary

- *Numbers – your flexible friend – don't be afraid*
- *Managing runoff on surface poses opportunity to **both** value engineer and provide wider benefits*
- *Retrofit SuDS **can** offer a significant contribution in addressing stormwater issues in urban areas*
- *Ask why we are retaining flows before defining how we should use the volume*







*Some people feel the rain.....
.....others just get wet.*

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