Retrofit of Low Impact Design: Experience from London

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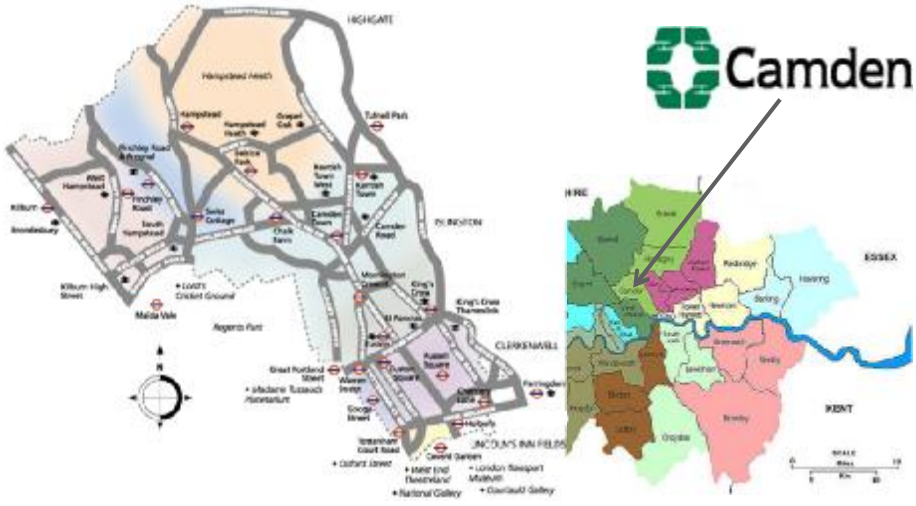
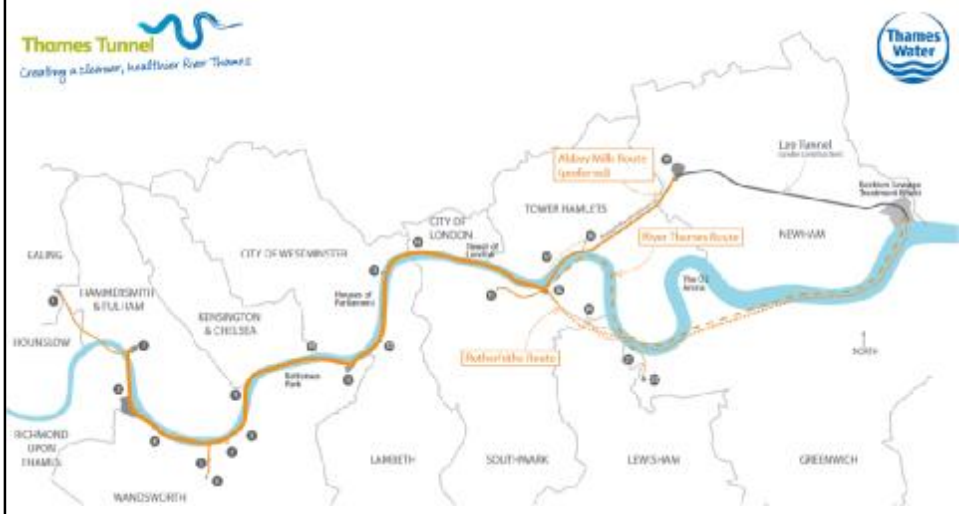
Retrofit of Low Impact Design



London's existing stormwater system



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Project aims

- Two locations for exemplar street scale public realm SUDS projects
- The proposed schemes should:
  - Improve the quality of the public realm (amenity, biodiversity and urban design)
  - Respond to the technical challenge of flood risk mitigation
- Project aims promote dual use of space within the street

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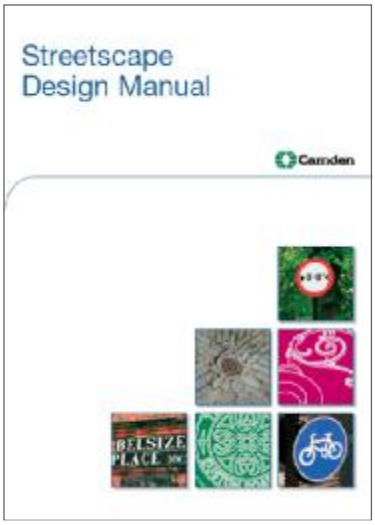
Project drivers

- Make progress against indicators related to planning and climate change
- Provide information about SUDS techniques that can be replicated elsewhere
- Update Streetscape Design Manual



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Differences in approach

- Auckland
  - Stream erosion
  - Water quality
  - Flood hazard
- UK
  - Design for 1% return period event plus climate change

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Site selection - approach

- GIS analysis
  - Topography
  - Stormwater network
  - Surface water flood risk map
  - Recorded street flooding (1975 & 2002)
  - Camden's Flood Risk Assessment
- Google Earth images
- Site visits to ground truth desktop work

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Workshop for site selection

- Stakeholders
- Criteria
- Key comments
  - Infiltration associated with permeable paving
    - Structural capacity of the clay
    - Basements
  - Existing services
    - Ensure adequate depth for structural capacity
  - Trees and vegetation
    - Consider existing trees
  - Inlet and outlet detail

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Site 1 – Fairhazel Gardens

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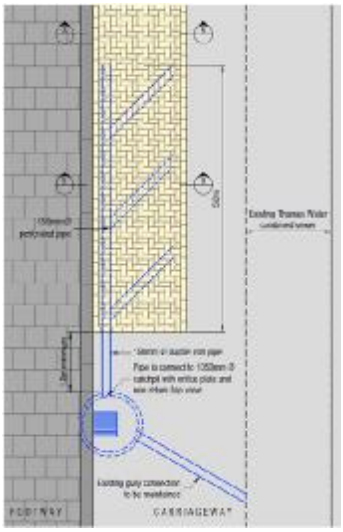
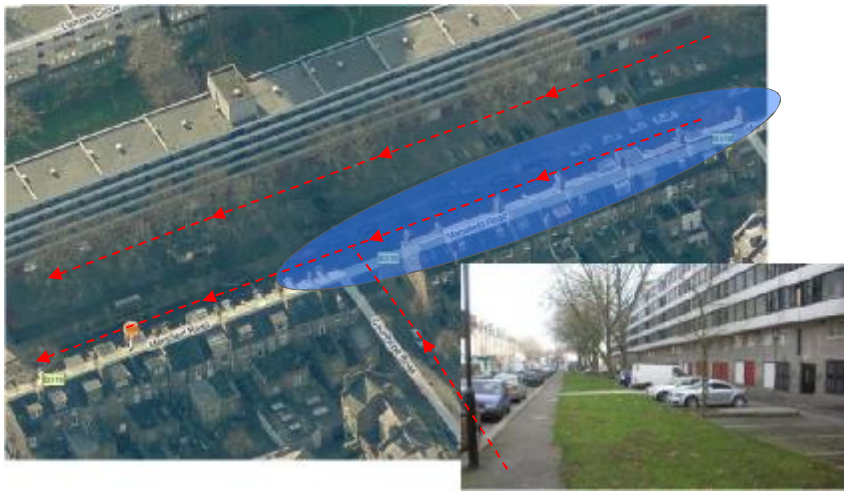
Site 1 - design & modelling

- Constrained site
- Permeable paving for parking areas
- Discharge to existing combined sewer
- Modelling results
  - Runoff reduced to between 35% & 50% of existing
  - Storage requirements for different storms and orifice sizes

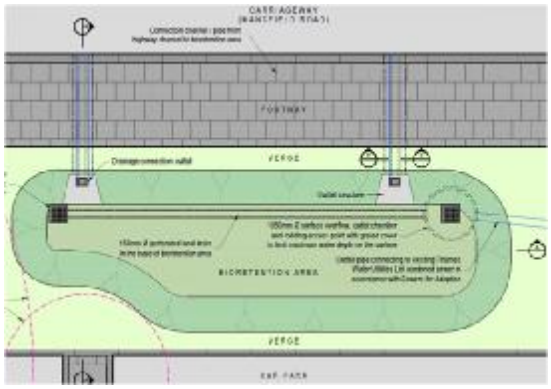


Site 2 - Mansfield Road



Site 2 – design & modelling

- Small ‘cells’
- Connection from street
- Overflow to sewer
- Modelling results
  - Runoff reduced to between 16% and 40% of existing
  - 250mm depth



Replicability

- Permeable paving mostly suited to flat sites
  - Tables of typical details for different slopes and areas
- Bioretention as part of landscaping
- Key design areas
  - Consider exceedance routes
  - Potential for sediment / silt inputs
  - Existing services
  - Mechanism for transferring water to the SUDS features

Design approach for retrofit

- Modelling
  - Use a design package such as MicroDrainage
  - Design for a critical period 1% event
  - Balance inflow / outflow and storage
  - Provide exceedance route
- Non-modelling
  - Provide storage equivalent to 30mm rainfall
  - Provide 80mm dia throttle or greater
  - Ensure system can be exceeded

Lessons learned

- Take retrofit opportunities when they occur
- Add value by
  - Reducing rates and volumes discharged to sewers
  - Improving aesthetics through good design
- Remove surface water by interacting with trees or vegetation where possible
- Maintain overflow back to the system

Application to Auckland

- Take opportunities to retrofit where feasible
- Design criteria
- Mixture of techniques available
  - Aims will define your solutions
- Promote dual use of land
  - Stormwater management can also improve aesthetics

Thank you