

Introduction

The delivery of Sustainable Drainage Systems (SuDS) in up to 6 London Boroughs (LBs) was a primary aim of the London Strategic SuDS Pilot Study (LSSPS). To achieve this, the individual boroughs led on the delivery of their respective projects. This allowed those with local knowledge to decide the most appropriate locations for SuDS and make site-specific choices to optimise delivery. In addition, it was an opportunity to see how delivery success differed across organisations if funding was made available for each project.

The boroughs involved in the LSSPS were (see map overleaf):

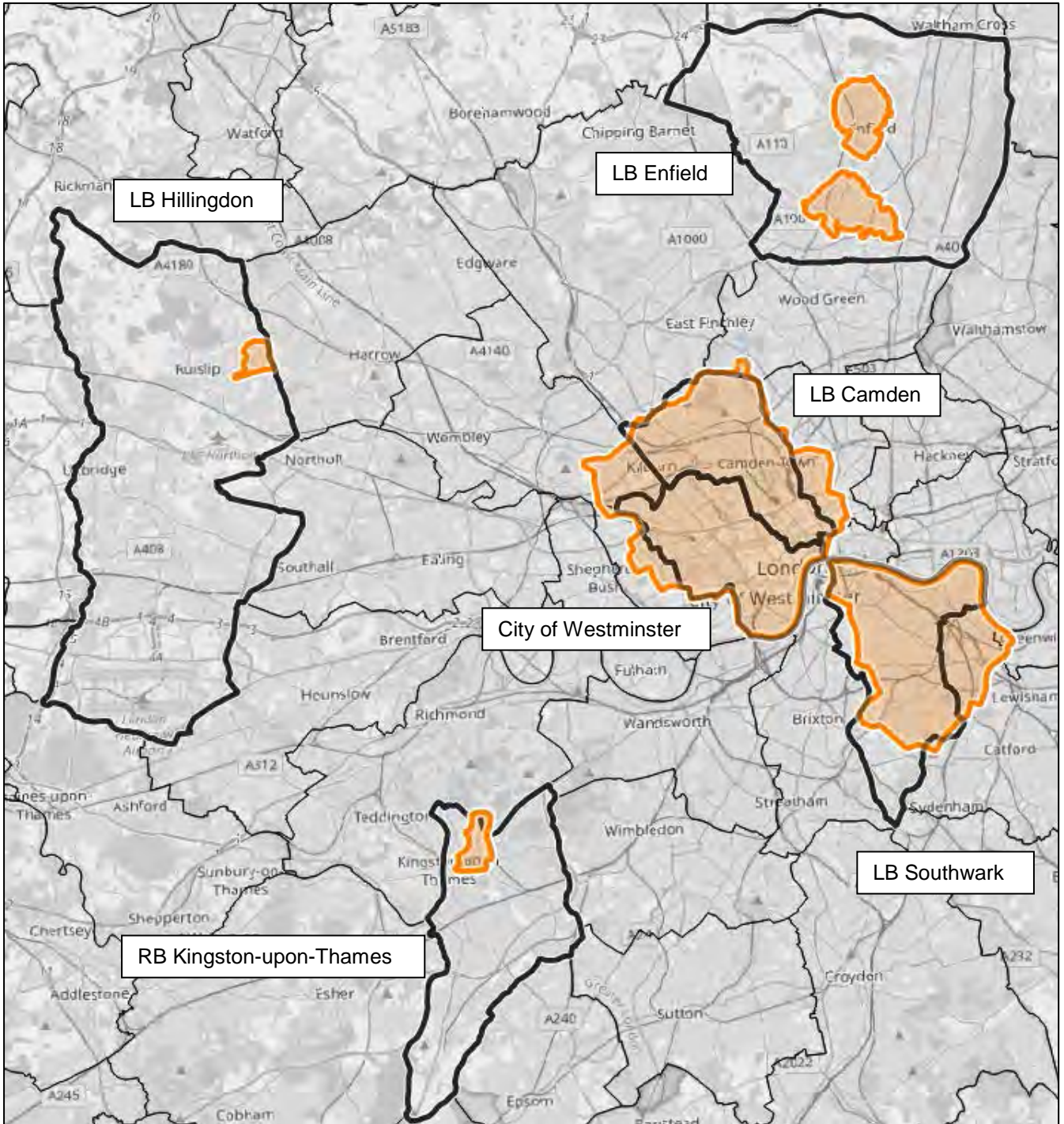
- London Borough of Camden
- London Borough of Enfield
- London Borough of Hillingdon
- London Borough of Southwark
- Royal Borough of Kingston upon Thames
- City of Westminster/Transport for London

These boroughs each applied to be involved in the pilot and were selected by the Pilot Steering Group (PSG). Multiple factors were considered, including the availability of existing modelling, in-house resourcing, potential benefits (flood and wider) and whether the sewer is a combined or separate network.


A key factor of the LSSPS was that the delivery of SuDS was new for 3 of the boroughs involved (LBs Camden, Hillingdon and RB Kingston). In addition to this being a success in itself, it highlighted some of the opportunities and difficulties in introducing a new way of working to a Lead Local Flood Authority (LLFA).

Coronavirus

Coronavirus has had an impact on most elements of the LSSPS. This includes the delivery of a number of the SuDS projects. Among the challenges faced by LLFAs delivering their projects was a reduced on-site capacity due to social distancing rules, furloughed staff unable to progress work and staff being re-assigned to support the response to the Coronavirus incident. It is important to recognise that the projects were delivered despite these challenges, which is testament to the effort put in by the project leads. Project-specific challenges will be outlined under each project section, where relevant.




Boroughs included in the LSSPS. The black outlines are the borough boundaries, the orange areas are the extents of the models created during the pilot.

Borough / TRFCC Partnership	LB Camden / Central North London	Properties at risk of surface water flooding	19,100 (greater than 0.5% chance)
Sewer network	Combined	Prior experience of SuDS delivery?	None
River / sewer catchment	River Thames / Beckton	LLFA setup	Full time officer
Project name	Camley Street SuDS		
Project Description	<p>This intervention is located along an existing section of highway that is overlooked by the LB of Camden Council's main offices at 5 Pancras Square. It runs in between the train line into Kings Cross St Pancras and the Camley Street Natural Park (operator: London Wildlife Trust).</p> <p>LB Camden has retrofit a series of cascading bio retention rain gardens along the western kerb line of Camley Street. With a catchment area of 1,575m² and designed to attenuate up to 49 m³ of runoff, the bio retention features have been planted with a mixture of herbaceous grasses and perennials with evergreen ground cover planting. These provide a dense foliage and root mat creating a large surface area for biofilm establishment, a high degree of filtration and promote ready soil infiltration through their extensive root systems. Their height and density should improve air quality when in the peak of the growing season. Additionally, a central spine of taller and denser evergreen planting on a low mesh fence could enhance air quality benefits provided by the planting.</p> <p>Eleven SuDS tree pits, containing drought-and-saturation-tolerant species, complete the bio retention functions by increasing the feature's transfoliation/evaporation capacities. Infiltration and evaporation (from plants and open storage) are the up to and including the design rainfall event. An overflow connection to the sewer is present at the foot of the lowest-lying garden, facilitated by a domed grating drain, and manages any excess volumes from greater than 1 in 30 year storms.</p>		
			



Project Outputs


Date of completion	March 2020
Area disconnected from sewer	1,537m ²
TWUL funding allocation	£118,050
Total project cost	£223,000
Area of additional GI created	142m ²
Additional benefits	<ul style="list-style-type: none"> • Additional greening to highway: local amenity, biodiversity & reducing urban 'heat island' effect. • Carbon sequestration via trees.

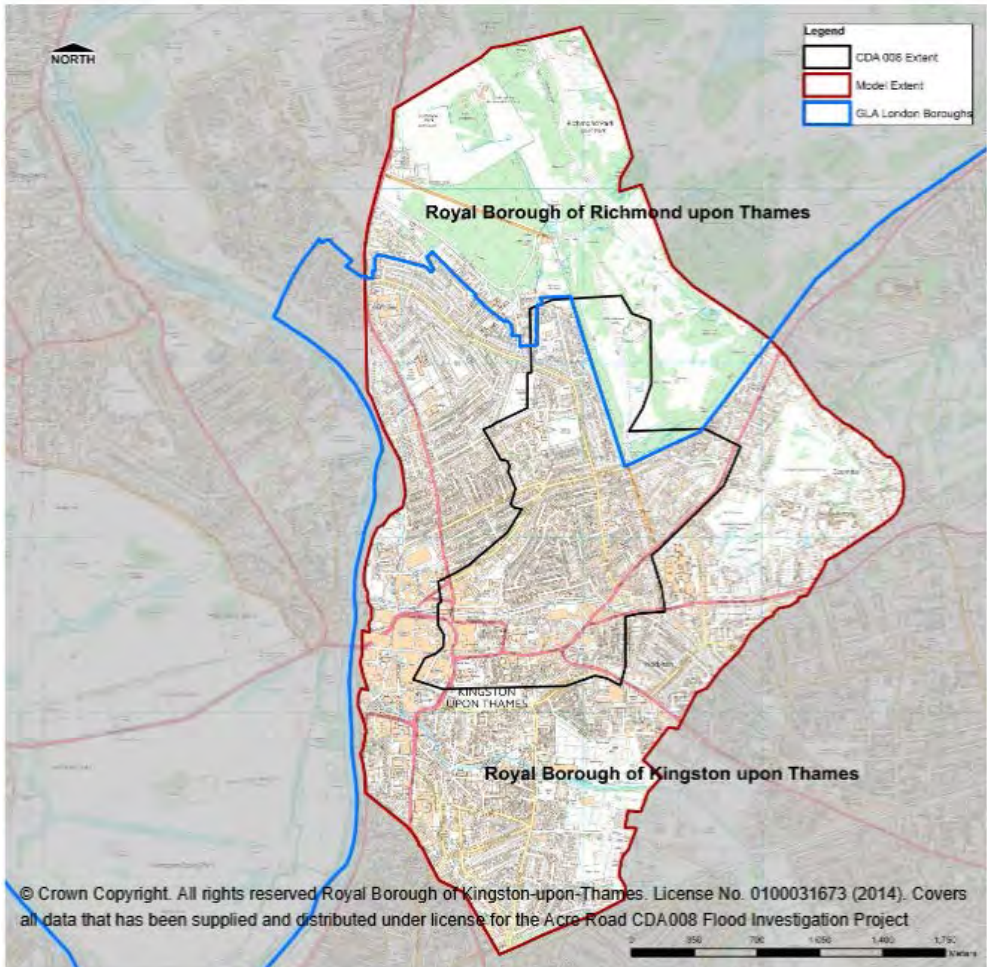
Borough / TRFCC Partnership	LB Enfield / Lee Valley	Properties at risk of surface water flooding	30,300
Sewer network	Separate	Prior experience of SuDS delivery?	Experienced
River / sewer catchment	River Lee / Deephams	LLFA setup	Full time officer
Project names	Moore Brook and Enfield Town Centre		
Project descriptions	<p>A continuation of LB Enfield's strong track record of SuDS delivery, the focus of the two LSSPS projects were on Enfield Town Centre and the Haslebury Neighbourhood area of the Moore Brook catchment. A range of interventions were used, including the creation of up to 50 rain gardens and other GI SuDS features in Haslebury through collaborative working with Cycle Enfield and the Quieter Neighbourhood team. Many of these features were constructed along the route of the Moore Brook Green Link – this is a walking route linking the Firs Farm and Pymmes Park Wetlands that follows the route of the culverted watercourse. The route passes the entrance to Haslebury Primary School on Westerham Avenue where a number of key SuDS features and traffic calming measures are planned.</p> <p>Combining traffic calming build outs with bio retention rain gardens means achieving multiple outcomes with a single intervention. It creates efficiencies in the use of space for public realm improvements and leads to improved cycle and pedestrian safety, including a road crossing outside a primary school. The Enfield Town Centre project also saw 1500m² of footway resurfaced, improved pedestrian crossings and new step free access to ground floor flats.</p>		
			


Project outputs

Date of completion	Early 2021
Catchment area	9,950m ²
Thames RFCC Levy allocation	£350,000
Total project cost	£820,000 (incl. ~£100k footway resurfacing)
Area of additional GI created	1030m ²
Additional benefits	<p>Public realm improvements at Westerham Shops include re-surfacing and seating, traffic calming measures improved safety for cyclists and pedestrians including at crossing outside school.</p> <p>Enfield Town Centre saw the re-surfacing of 1500m² of footways, 260m² of new footway created, improved road safety by enhancing pedestrian crossings and provided step free access to ground-floor flats.</p>



Borough / TRFCC Partnership	LB Hillingdon / North West London	Properties at risk of surface water flooding	29,300				
Sewer network	Separate	Prior experience of SuDS delivery?	None				
River / sewer catchment	River Pinn / Mogden	LLFA setup	Full time officer				
Project name	Eastcote Town Centre						
Project Description	<p>The Eastcote Town Centre project used existing reservations between the main and side road carriageways along Field End Road in LB Hillingdon to install bio retention rain gardens.</p> <p>The installation of bio retention planters on the footpaths has also increased the amount of greenspace and improve the amenity of the area.</p> 						
Project Outputs	<table border="1"> <tr> <td>Date of completion</td> <td>2020</td> </tr> <tr> <td>Thames RFCC Levy allocation</td> <td>£100,000</td> </tr> </table>			Date of completion	2020	Thames RFCC Levy allocation	£100,000
Date of completion	2020						
Thames RFCC Levy allocation	£100,000						

Borough / Thames RFCC Partnership	RB Kingston / South West London	Properties at risk of surface water flooding	22,095
Sewer network	Separate	Prior experience of SuDS delivery?	None
River / sewer catchment	Beverley Brook, Crane, Hogsmill, Thames / Hogsmill	LLFA setup	Part time consultant
Project name	Acre Road SuDS		
Project Description	<p>The Acre Road area is located in the north west of the Royal Borough of Kingston. The Critical Drainage Area (CDA) is bounded to the west by the River Thames and the north eastern part of the CDA sits within Richmond Park. The general topography of the site falls from north east to the south. Several flooding incidents have occurred within the study area, with the most significant in 2007. The outcomes of the modelling process will support Kingston Council's desire to reduce surface water flood risk in this area through the installation of SuDS and the awareness raising of SuDS across Council teams.</p>		
Project Outputs	Date of completion (forecast)	2021	
	Thames RFCC Levy allocation	£150,000	
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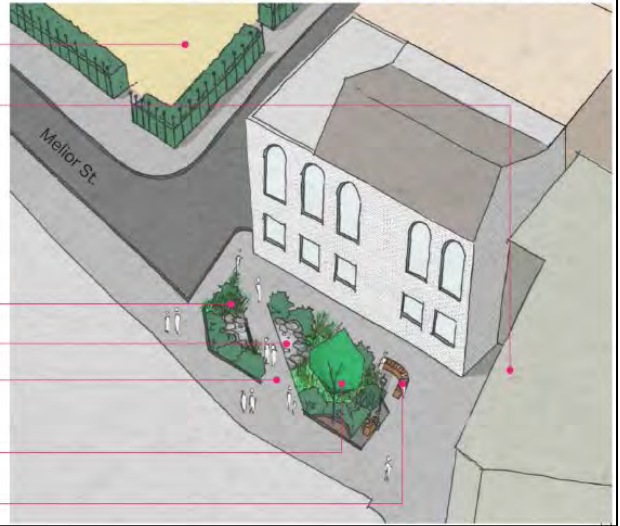
Borough / Thames RFCC Partnership	LB Southwark / Central South London	Properties at risk of surface water flooding	30,278						
Sewer network	Combined	Prior experience of SuDS delivery?	Experienced						
River / sewer catchment	River Thames / Crossness	LLFA setup	Both internal officer and consultant						
Project names	Lewes House, Melior Street, Snowsfield								
Project Descriptions	<p>Covering three separate sites, this project installed features ranging from blue-green roofs to bio retention rain gardens.</p> <p>The Lewes House site saw the installation of a blue roof and a green roof on a garage outbuilding at one of LB Southwark's social housing sites.</p> <p>A cul-de-sac on Melior Street has been repurposed to take road and roof runoff into bio retention rain gardens and subterranean storage tanks. Further to the surface water attenuation, this site offers greatly improved amenity to the immediate area.</p> <p>At Snowsfield, highway runoff is directed into a bio retention rain garden on the edge of the carriageway. This site, outside Snowsfield Primary School, offers additional greenspace and amenity area between the road and footpath.</p>								
Project Outputs	<table border="1"> <tr> <td>Date of completion (forecast)</td> <td>2021</td> </tr> <tr> <td>Area to be disconnected from sewer</td> <td>2,223m²</td> </tr> <tr> <td>TWUL funding allocation</td> <td>£166,275</td> </tr> </table> <p>Lewes House</p> 			Date of completion (forecast)	2021	Area to be disconnected from sewer	2,223m ²	TWUL funding allocation	£166,275
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Melior Street

MELIOR STREET Concept Sketch



- Existing Public Park
- The Horseshoe Inn
-  Low Maintenance Planting Mix
-  Bio-retention Basin
- Path Through Planting
- Existing Tree
-  Backless Bench

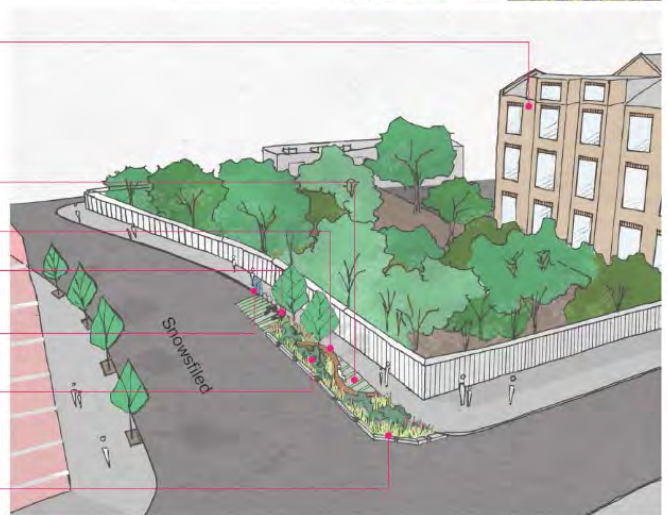


Snowfield

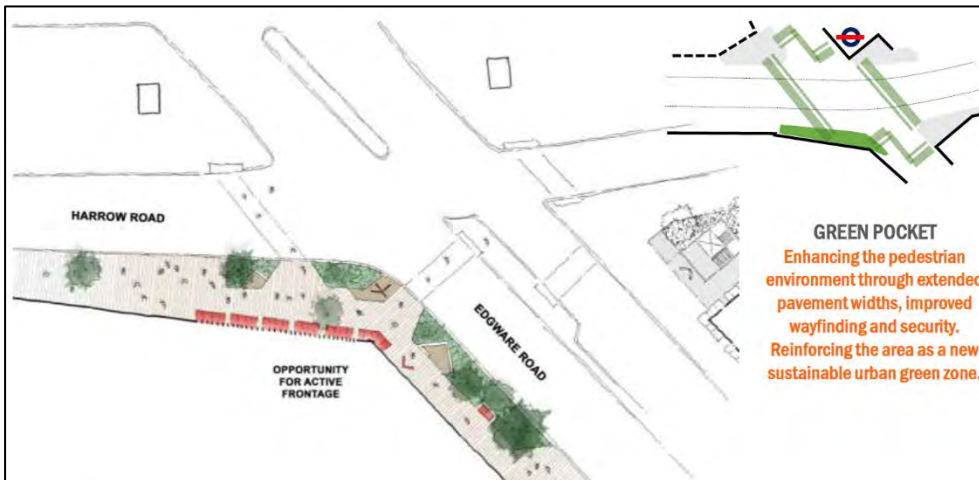
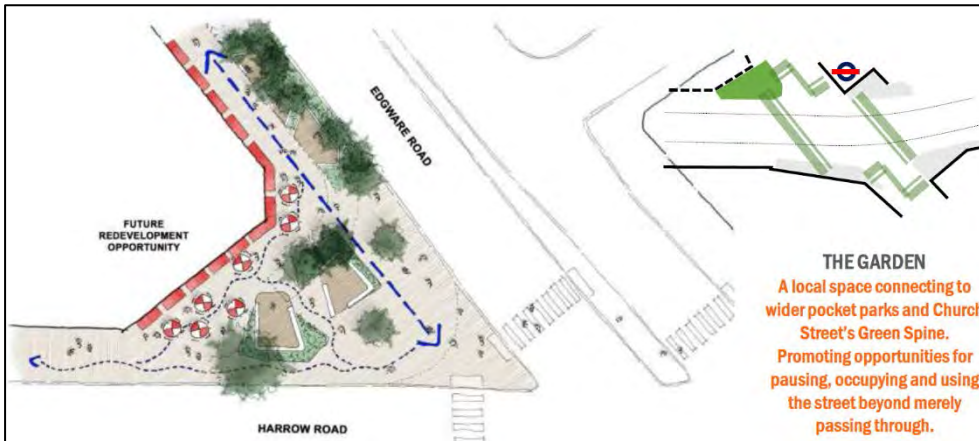
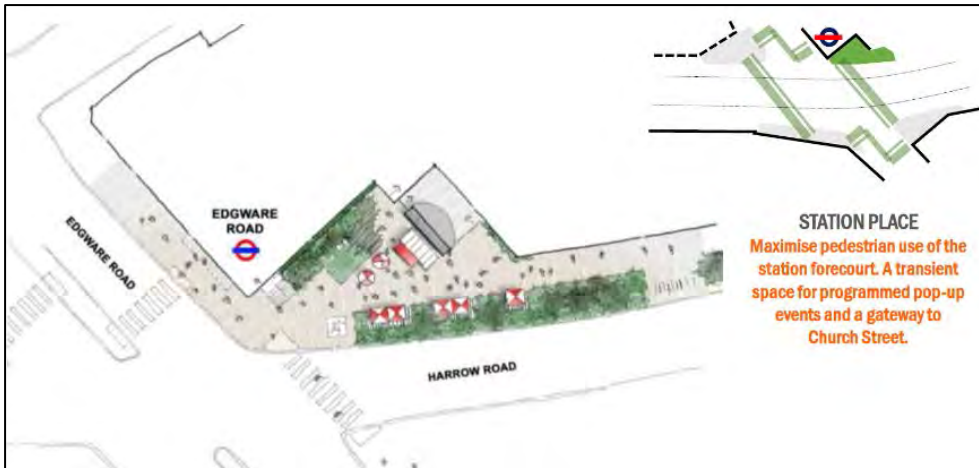
SNOWSFIELD Concept Sketch



- Snowfield Primary School
-  Permeable Paving/
Grass
-  Curved Bench
-  Bicycle Stand
- Electric Vehicle
Charging Station
-  Low Maintenance
Planting Mix
- Permeable Kerb



Borough / Thames RFCC Partnership	City of Westminster (Transport for London) / Central North London	Properties at risk of surface water flooding	46,000 (greater than 0.5% chance))						
Sewer network	Combined	Prior experience of SuDS delivery?	Limited						
River / sewer catchment	River Thames / Beckton	LLFA setup	Full time consultant						
Project name	Edgware Road Flyover								
Project Description	<p>Located at the junction of Edgware Road and the Westway, next to Edgware Road London Underground Station, this project looks to repurpose the existing access ramps to the Joe Strummer underpass on the north eastern, north western and south western corners. Surface water will be directed from the adjacent footways and carriageway (catchment area of c. 3,000m²) into the bio retention basins. The existing drainage connections at the base of the ramps will ultimately connect these basins to the main sewer via a flow control chamber.</p> <p>The bio retention basins will help to reduce the flow (rate and potentially volume) of the surface water into the sewer and improve the water quality of this runoff in the process. The street-level planting in the bio retention basins improves the visual amenity and biodiversity, whilst also providing shading for the significant number of pedestrians that use this area.</p>								
Project Outputs	<table border="1"> <tr> <td>Date of completion (forecast)</td> <td>2021</td> </tr> <tr> <td>Area to be disconnected from sewer</td> <td>c. 3,000m²</td> </tr> <tr> <td>TWUL funding allocation</td> <td>c. £200,000</td> </tr> </table>			Date of completion (forecast)	2021	Area to be disconnected from sewer	c. 3,000m ²	TWUL funding allocation	c. £200,000
Date of completion (forecast)	2021								
Area to be disconnected from sewer	c. 3,000m ²								
TWUL funding allocation	c. £200,000								
	<p>The map shows the Edgware Road area with several key features and annotations:</p> <ul style="list-style-type: none"> CHURCH STREET MASTERPLAN: Indicated by a dashed green line. PADDINGTON BASIN: Located in the lower-left quadrant. CREATION OF FOUR GI ZONES DEFINED BY MOVEMENT AND DESIRE LINES: Four green lines radiating from the center of the map. SIMPLIFIED DIRECT N-S CROSSINGS: Two blue circles with red lines, indicating crossings. INTEGRATION OF SUBWAY ACCESS WITHIN DESIGN AND IMPLEMENTATION OF S-E GI ZONE: A red square on the S-E GI zone. ENHANCEMENT OF SURROUNDING ROUTES TO CREATE COHERENT FLOWS THROUGH THE NEIGHBOURHOOD: A dashed green line following the main road network. 								



Lessons learnt

The lessons learnt through the delivery of the LSSPS apply to the delivery of both dispersed SuDS within a discrete catchment and of a programme of SuDS across multiple LLFAs.

The main lessons learnt, which are elaborated on below, can be summarised into the following list:

1. SuDS delivery is possible
 2. Money isn't everything
 3. Relationships help
 4. Resourcing is key
 5. Inconsistent delivery due to a range of organisations responsible for delivery
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1. The most important lesson learnt through the LSSPS is that SuDS delivery is possible. While the challenges experienced have taught a number of lessons, it is important to acknowledge the successful delivery of SuDS in 3 boroughs so far, which was new for 2 of them.
 2. One of the key points of learning over the course of the LSSPS is that money is not everything. On its own, increased funding does not necessarily lead to increased probability or ease of successful SuDS delivery. While there needs to be funding available for the delivery, simply providing a pot of capital monies from which to draw will not always result in SuDS delivery. This has been exemplified by the range of delivery within the LSSPS-funded SuDS projects.
 3. Something that was made clear over the course of the LSSPS is that having the right relationships is as important for SuDS delivery as having sufficient funding. These relationships are both those with internal colleagues, for example highways and green space departments, and those with external contractors carrying out the construction. It is key that those involved understand the project specifics and how SuDS delivery differs from typical capital project delivery.
 4. Another key requirement of successful SuDS delivery is adequate resourcing. It is important for those involved to fully appreciate from the outset the time required to implement a SuDS project. Without this understanding, it is easy for inadequate resourcing to hinder progress.
 5. When delivering a programme of SuDS across multiple LLFAs, it can be expected that each project will progress at different rates, with different levels of ease and success. While this is true of capital delivery in general, the LSSPS has illustrated how varied it is when looking specifically at SuDS.