

Pastures Way Flood Alleviation Scheme



SuDS used

- *Rain Garden*
- *Dry Swale*
- *Dry Detention Pond*

Benefits

- *Protection of 18 properties against flooding*
- *Water quality enhancement (pollutants are treated using this SuDS train)*
- *Biodiversity and ecological enhancement*
- *Community benefits (educational and recreational)*
- *Provision of 2200m³ overflow flood storage*

1. Location

Pastures Way in Lewsey is a sizeable industrial, residential and commercial suburb between Luton and Dunstable.

2. Description

Pastures Way in Luton has suffered repeated flooding over the years to both the highways and nearby properties. Flooding has been recorded in 2005, 2009, 2010 and 2016 and records from Thames Water suggest that in 2012 there was sewer flooding reported. Based on the modelling

carried out by Project Centre, it was understood that flows from the wider catchment (0.87km²) ended up on Pastures Way as it forms the lowest part of the catchment in terms of topographic levels.

The hydraulic modelling demonstrated the incapacity of the public sewer which is affecting the ability of the public sewers to convey the runoff towards Lewsey Brook at a speed that could prevent upstream flooding. This meant that the site could benefit from a bypass system which can alleviate the flooding on Pastures Way.

The initial idea was to use a swale running parallel to Pastures Way which could provide overflow storage and attenuation during higher order events and eventually release it back to the sewer system. However, this meant that in an extreme event the swale would flood the park including the footpath which runs parallel to the proposed swale. This footpath is currently used by school children and must be functional at all times. In response to this issue, Project Centre redesigned the flood routing system to consist of an interconnected rain garden swale and detention basin system which will attenuate water before releasing it slowly into Lewsey Brook.

The proposed scheme is intended to protect 18 houses along Pastures Way from surface water flooding from overland flows up to a one in 75-year event. It is envisaged that the swale will offer an overflow storage relief of 2200m³.

3. Main SuDS components used

The flood alleviation scheme consists of a rain garden at the mouth which conveyed flows from the highways to a flood relief swale connected to a detention pond (mostly dry) discharging to Lewsey Brook through a 300mm pipe and an outfall weir. (See Figure 7 - Final Project Layout below).

4. How it works

The principal behind the functionality is that, once water overflows the kerb level within Pastures Way the flow will be captured within the SuDS mechanism and conveyed away from the source reducing flood depth on the road and nearby properties.

The scheme is intended to convey excess surface water during higher order flood events from the carriageway to a local watercourse (Lewsey Brook), as well as to provide flow attenuation and water quality benefits during lower order events. Stormwater runoff will enter the system via a rain garden located in the lowest point at Pastures Way at kerb level which gets conveyed through the swale into a detention pond via 450mm pipe. The detained water then discharges through a 300mm outfall connected to Lewsey Brook. During an extreme event, water will flow over the timber weir set at a higher level. The swale could be amended to provide additional storage in future years, to adapt to the impacts of climate change.

5. Specific project details

The outfall elements are designed to address all flow conditions, to be safe, and to protect the receiving environment. Vandalism has been prevented by the use of boulders (minimum rock diameter 0.35m) at the entrance within the rain garden. The visual impact of the rocks has been softened through planting. A bund has been proposed around inlet and outfall pipes and weirs which consists of bags filled with subsoil, stone and seeded. Locally sourced timber has been used for the

weir overflow control, bank stabilisation and erosion control. A Gabion mattress has been installed at inlet and outfalls for erosion control purposes. Planting design was based on local wildflower and grass mix.

6. Maintenance & operation

The maintenance consists of trimming down excess growth of wildflowers, weeding and litter picking. Inlets and outfalls are to be checked routinely to prevent blockages.

7. Monitoring and evaluation

The project has been monitored since its construction in 2019. The area was predicted to flood on the 25th September 2019 however, the SuDS train and the flood attenuation system handled the extreme storm effectively as predicted (See Figure 1 - Detention pond in action below).

8. Benefits and achievements.

This project provided protection to 18 properties against flooding and offered water quality enhancement as pollutants are treated using this SuDS train. Biodiversity has been improved due to wildflowers spread as the area attracts bees, butterflies and other wildlife. This project benefits community and supports educational purpose in propagating an understanding of Sustainable Drainage Systems. It also provides 2200m³ of flood storage volume during extreme events before flows are conveyed to Lewsey Brook.

9. Lessons learnt

Ensuring an effective liaison with stakeholders would from the start prevent last minute changes to the design and would save time. Involving the local community to alleviate concerns made by the public as they are the ultimate users of the area.

10. Interaction with local authority

Project Centre was instrumental in the successful delivery of the project along with active participation from various departments (such as ecology, trees, biodiversity, parks, highway maintenance and archaeology) and supported by the Environment Agency and the wider community. Consultation was carried out to ensure all interested parties are well informed and active feedback sought, which helped to shape the project to its current form. It also sought to enhance the community's sense of place through cultural integration and shared ownership.

11. Project details

Construction completed: *May 2019 and inaugurated in July 2019.*

Cost: £300K

Extent: The structure will hold 2200m³ of water at any time.

12. Project team

Funders	<ul style="list-style-type: none"> Environment Agency Luton Council 	
Clients	<ul style="list-style-type: none"> Luton Council 	
Designers	<ul style="list-style-type: none"> Project Centre Ltd 	
Contractors	<ul style="list-style-type: none"> Maydencroft 	
Other	<ul style="list-style-type: none"> VolkerHighways 	



Figure 1: Detention pond in action - flooding on 25th September 2019



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Figure 2: Swale during construction phase – unseeded



Figure 3: Swale further to establishment of vegetation July 2019



Figures 4a and 4b: Detention Pond - July 2019



Figure 5: Rain garden with wildflowers and trespass prevention boulders July 2019

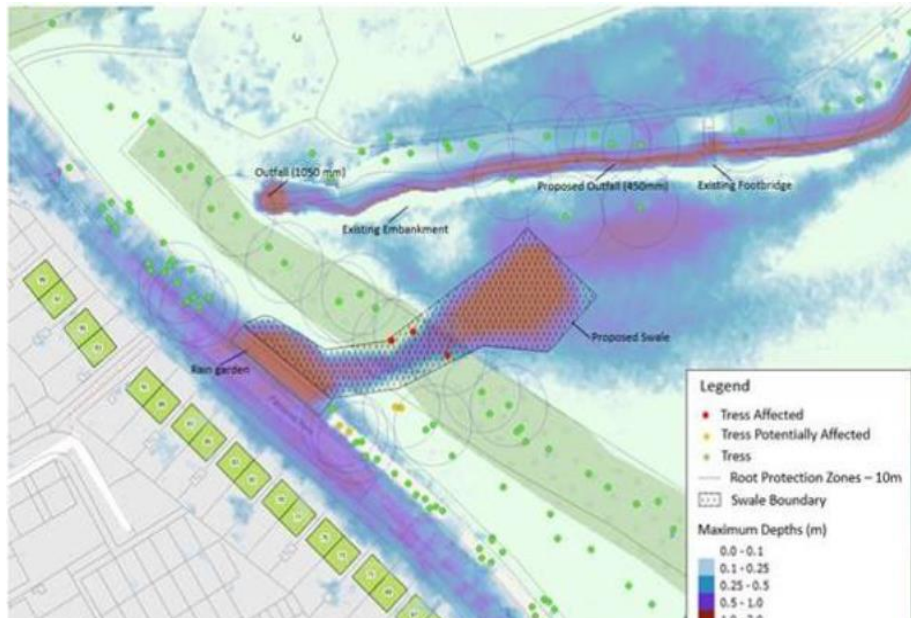


Figure 6: Initial envisaged scheme - Detention pond was added later

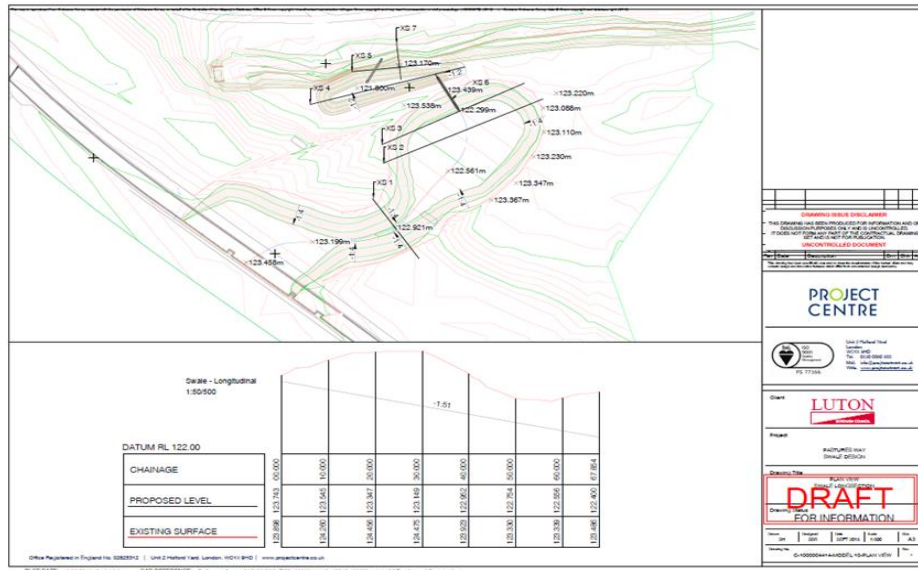


Figure 7: Final agreed layout