

# Rathbone Market, London



Fig. 1: Communal area for residents

## SuDS used

- *Blue roof stormwater attenuation system*

## Benefits

- *Versatile to allow multiple finishes – adaptable at minimum cost*
- *Fitted in tight working environment – manageable integrated components minimising delay*
- *Eliminated attenuation tanks at ground level – saving in cost and complex groundworks activity.*
- *Installed directly on to membrane roof – avoiding costly/bulky protection materials saving on storage capacity*

## 1. Location

Rathbone Market, Barking Rd, London, E16 1EH

## 2. Description

Owners English City Fund (ECF) entered into an agreement with landowner Newham Council to deliver a sustainable and mixed-use community at Rathbone Market, including 652 homes with shops and public landscaped amenity squares to produce a pleasant living environment. Facilities include public walkways and ornamental ponds at podium level and an allotment for residents to develop at roof level.

### 3. Main SuDS components used

The blue roof utilises the roof construction for the attenuation of storm water, releasing it at a controlled rate via restrictor chambers in the period following the storm. The attenuated water was also utilised to sustain a biodiverse green roof in certain areas.

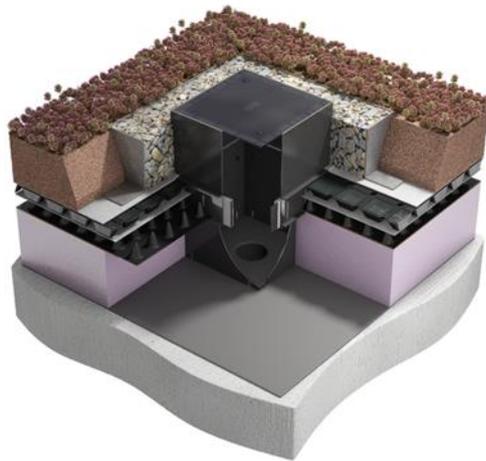


Fig. 2: Cross section of the blue roof

### 4. How it Works

The blue roof manages stormwater by dealing with rainwater ‘at source’. It is based upon the concept of utilising roof and podium areas to temporarily store rainwater during storm events. This can be seen in Fig. 7.

As rainwater percolates down through the top layer of the system it fills the storage cuspsates in the bluroof system. This provides irrigation for vegetation in relevent areas. When the storage cuspsates become full, water flows into the storage void layers below and then on into the roof outlet at a controlled rate through the restrictor chambers. During a design storm the system fills to the maximum height usually dictated by the height of the roof parapet. System designs are typically designed to the 1 in 100 year storm plus 30% for environmental change. Once a storm has finished the system empties at a controlled rate ready for the next storm. Any water retained in the surface cuspsates is released through evapotranspiration. As a whole the system looks to manage rainwater at stages 2 and 3 of the SuDS train (source and site control). Fig.4.

The Biodiverse roof finishes used at Rathbone Market helped to provide filtration, thus improving water quality by removing suspended solids and pollutants, whilst enhancing ecology through the introduction of new plant species and habitats.

### 5. Specific project details

Rathbone Market Phase 3 was made up of 6 separate roof areas; 2 with paved finishes for maintenance access only, 3 with a biodiverse roof finishes and a sixth roof providing an amenity area for a series of allotment gardens for the residents. Fig. 6.

The challenge was to control stormwater discharge in line with planning conditions. The original proposal was for an attenuation tank at ground level and final parapet levels had been set without specific reference to a roof attenuation system. Attenuation tanks presented a range of problems including; reduction in the already limited space at ground level during its construction, difficult working conditions with high levels of buried utilities close to the building, extending the works programme and significantly reducing site material storage areas due to load restrictions and during earthwork operations. Any displaced soil has also to be taken from site and disposed of. A blue roof

was proposed to overcome each of these issues in addition to providing cost savings over the original proposal.

Three blue roof systems were designed each tailored to suit the surface finishes e.g. paved, biodiverse, and amenity. The fixed parapet height limitations meant that the design team had to consider many options to restrict and contain the flow in the available roof space for the fixed height. The solution was a cascading system from high to low level roofs. These systems varied in depth from 25mm (high levels) to 120mm systems (low level). With the shallow construction checks on any traffic loading also had to be checked.

## 6. Maintenance & operation

The blue roof is supplied as standard with a 3 year maintenance plan. This consists of 2 visits per annum by the manufacturer to clear roof outlets and replace blue roof filters. The blue roof restrictor chamber maintenance is recorded along with photographic evidence. The green elements of the design are maintained and irrigation hoses replaced if necessary. The client ensures that water supply is maintained to green areas during dry periods.

## 7. Monitoring and evaluation

The performance of the system is monitored and tested by the manufacturer during maintenance visits. Any necessary action required as a result of this is formally reported to the client.

## 8. Benefits and achievements

The blue roof met the planning requirements while also having a restricted roof area. The service included; concept, design, material manufacture, supply and installation.

Benefits included:

- With this versatile and multi-component system a variety of finishes could be achieved to give a pleasant outside living space for residents.
- The restriction on parapet height engaged the skills of the design team in offering a cascade system between roofs with the highest roof fitting just below the fixed parapet position.
- The modular system meant that items could easily be transported to the roof and stacked in discrete areas in the restricted roof space allowing manageable construction minimising delay
- Eliminated the need for attenuation tanks avoiding a very restrictive earthworks operation which would have involved avoiding utility cables and pipes and limiting space for access at ground level.
- The system can sit directly on the Hot Melt Roof without damaging the water proofing layer avoiding a costly protection layer and using up valuable void space

The blue roof systems positively contributed towards the BREEAM assessment under the following categories:

- POL5: FLOOD RISK To encourage development in low flood risk areas or to take measures to reduce the impact of flooding on buildings in areas with a medium or high risk of flooding.
- LE4: MITIGATING ECOLOGICAL IMPACT - To minimise the impact of a building development on existing site ecology.
- LE5: ENHANCING SITE ECOLOGY –To recognise and encourage actions taken to maintain and enhance the ecological value of the site as a result of development.

## 9. Lessons learnt

The manufacturer was particularly challenged to use every area of void space available which needed close cooperation with the client’s designers to accommodate the range of finishes, loadings, discharge rates and offer a cost saving to the main contractor and client. This proved that the system could be even more versatile especially for other projects where retrofitting is required.

## 10. Interaction with local authority

The manufacturer worked closely with the main contractor, waterproofing subcontractor, architect and engineering teams and provided written proposals and design calculations which were submitted to the local authority for planning approvals for the change in attenuation system.

## 11. Project details

**Construction completed:** April 2017

**Cost:** £85k

**Extent:** 1000m<sup>2</sup>

## 12. Project team

|                              |   |
|------------------------------|---|
| Funders                      | <ul style="list-style-type: none"> <li>English Cities Fund (ECF)</li> </ul>                     |
| Clients                      | <ul style="list-style-type: none"> <li>English Cities Fund (ECF)</li> </ul>                     |
| Manufacturer and roof design | <ul style="list-style-type: none"> <li>ABG</li> </ul>   |
| Designers                    | <ul style="list-style-type: none"> <li>Churchman Landscape architects</li> </ul>                |
| Contractors                  | <ul style="list-style-type: none"> <li>John Sisk and Son</li> <li>Geogreen Solutions</li> </ul> |
| Other                        | <ul style="list-style-type: none"> <li>Newham Council</li> </ul>                                |

## 13. Site images and illustrations



Fig. 3: Installed Void formers fitted in tight working environments

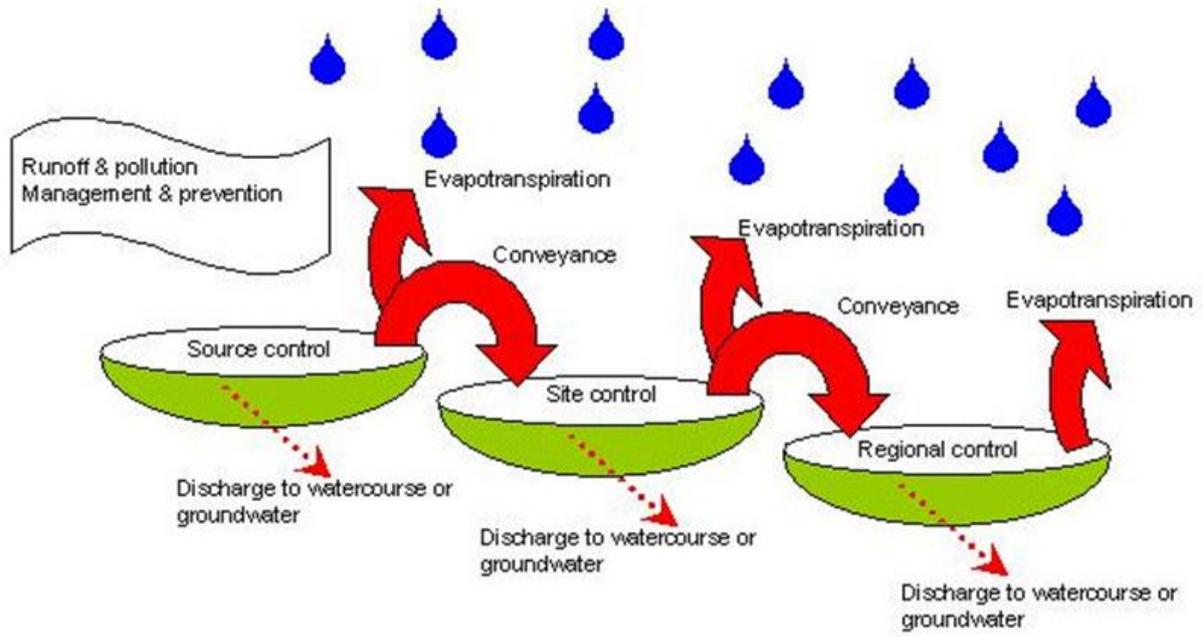


Fig. 4: Stages of SuDS management train



Fig. 5: Biodiverse roof finish



Fig. 6: Allotment gardens for residents

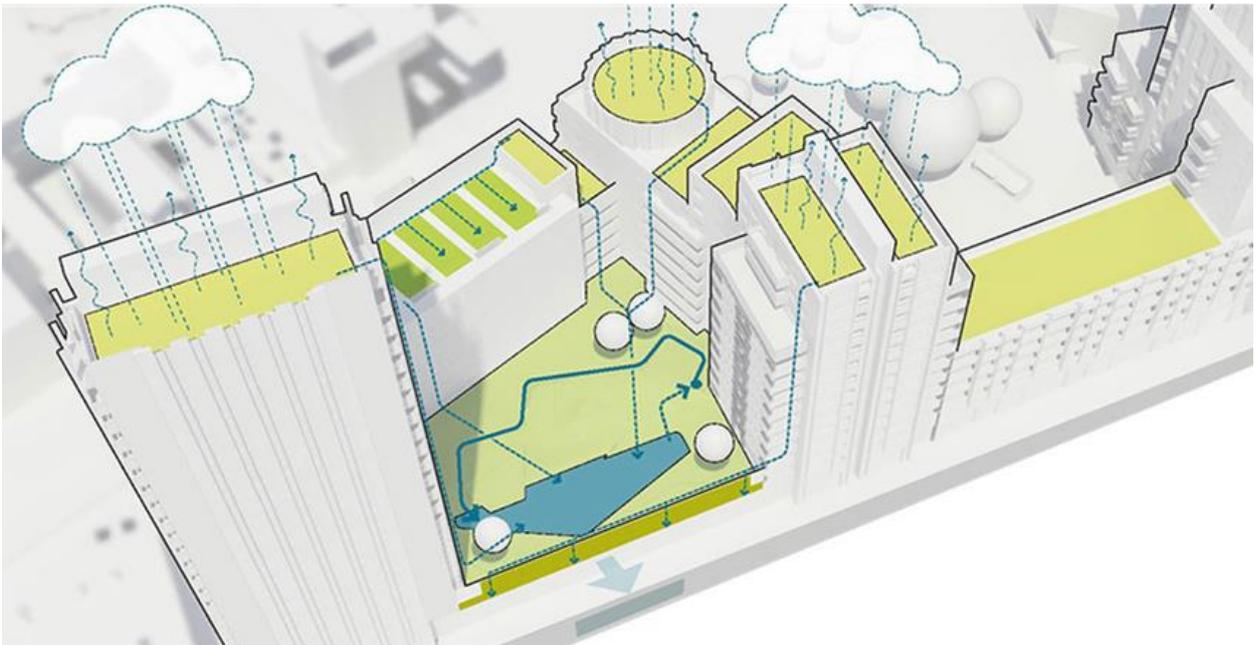


Fig. 7: Site SuDS management plan



Fig. 8: Mixed finish roof