

# Jehovah's Witnesses Britain Headquarters, Chelmsford



## SuDS used

- *Green roofs*
- *Rain gardens*
- *Permeable paving*
- *Roadside swales with filter strips; conveyance swales*
- *Bioretention beds*
- *Treatment ponds; attenuation ponds*

## Benefits

- *Flood risk reduction downstream*
- *Remediation of contaminated site and existing ditch watercourses*
- *Three-stage management train for storm water treatment*
- *Significant biodiversity and amenity improvements*

## 1. Location

Jehovah's Witnesses Britain Headquarters, 1 Kingdom Way, Chelmsford CM2 8FW

## 2. Description

Redevelopment of a 33-hectare brownfield site for a new live/work charity headquarters including buildings for accommodation, offices, production and support services, together with on-site roads and parking, footpath network and expansive landscaping scheme. The previous site use was a car breakers yard. Some existing ponds and the site ditch network were in real need of remediation.

## 3. Main SuDS components used

Residence blocks have **green roofs** and **rain gardens**. The production buildings feed a **rainwater harvesting** system. **Permeable paving** was used for parking courts and footpaths. Roads drain via **sheet runoff** into **roadside swales**. Treatment is provided in **online ponds**, **pocket wetlands** and a **bioretention bed**. Conveyance is via **swales** and **existing ditches** into final **attenuation ponds**.

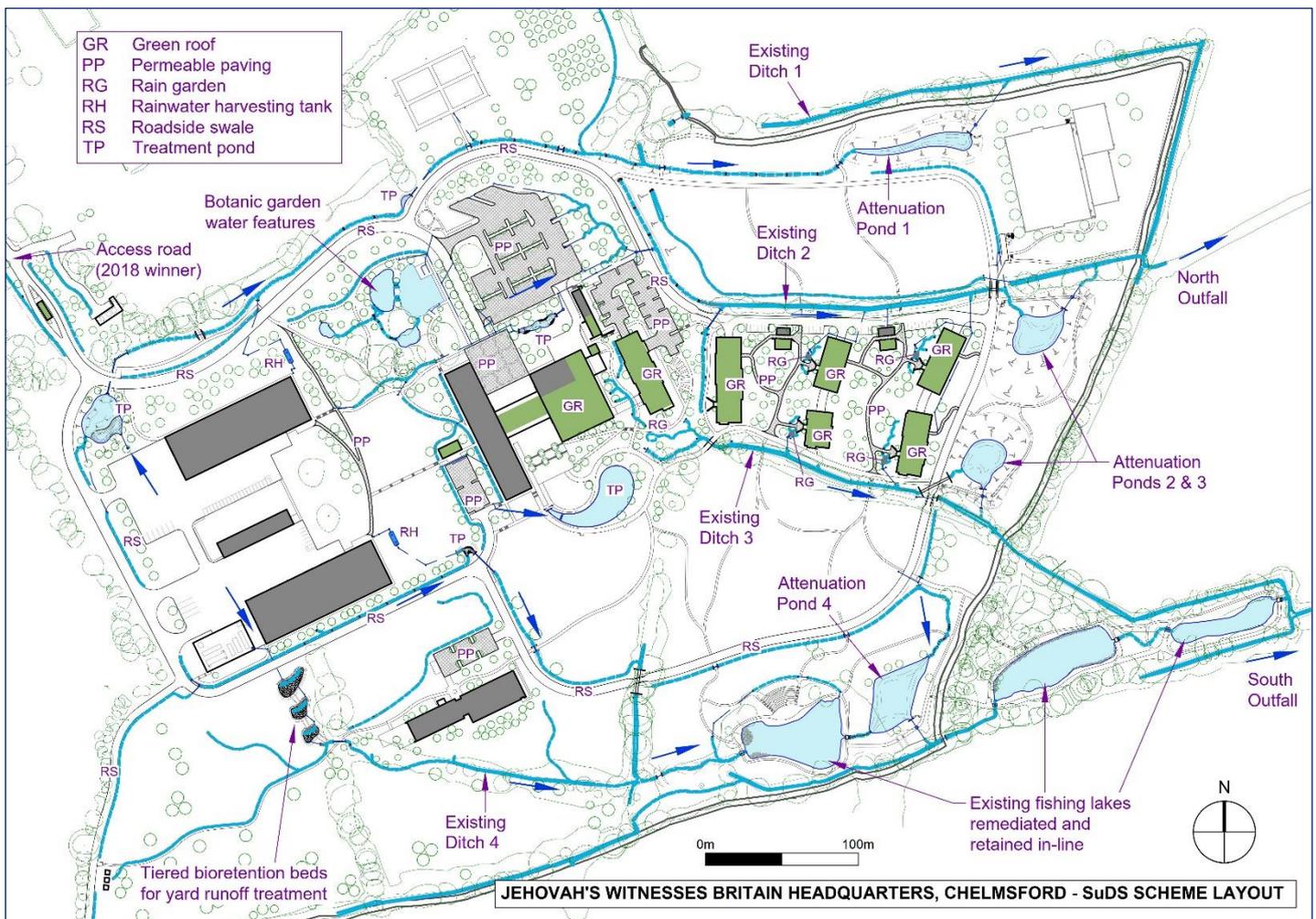


Fig 1 Scheme layout

## 4. How it works

The scheme successfully achieves these core design principles established at the outset:

1. Managing runoff on the surface as early in the system as possible.
2. Provide a comprehensive SuDS treatment train for all surface types.

3. Reduce off-site discharges to greenfield rates (from pre-development brownfield rates).
4. Blend the SuDS into the landscape design for a natural, soft appearance.
5. Retain and utilise the four existing site ditch catchments.

Infiltration was ruled out due to low permeability clay soils. Four existing ditch corridors drain the site eastwards, converging at two outfall locations. Flows are limited to greenfield rates for the 1:1 (2.4 l/s/ha) and 1:100 +20% AEP events (9.1 l/s/ha). Additional runoff volume is captured in the attenuation ponds and released at 2 l/s/ha through two-stage orifice flow controls. In practice, much of the volume is intercepted in the upstream soft SuDS.

Exceedance routing was carefully considered with designated flow pathways created around buildings and spillways designed into pond embankments.

The rain gardens, pocket wetlands and ponds all have vibrant, native planting schemes to encourage biodiversity. The ditch culverts beneath the perimeter road include mammal shelves.

Along with attractive planting schemes, the SuDS features are blended into the landscape with gentle gradients and perimeter footpaths to maximise the amenity experience.

## 5. Specific project details

Close collaboration with the landscape architect, Murdoch Wickham, proved vital to the success of the scheme. Initial attenuation designs included inorganic cross-catchment engineering features. A closer look at the existing four linear ditch catchments resulted in an enhanced scheme with more ponds, smaller and better integrated into the landscape.

## 6. Maintenance & operation

The scheme is in single ownership. The Client has a dedicated on-site maintenance team and is implementing the drainage maintenance plan as part of routine activities. The plan remains a live document which will be updated as needed based on site monitoring observations.

## 7. Benefits and achievements

Ease of maintenance is a key benefit with less buried infrastructure to care for. The ecological benefits are clearly visible with local species quick to populate the ponds and soft landscaping. The combined amenity value of the SuDS features set in the landscaping is also very evident – many new residents make a beeline for the ponds when heading out for leisure time.

## 8. Lessons learnt

A reversed splay kerb was used to facilitate sheet runoff while balancing silt control and driver safety. However, the concrete haunching limits adjacent grass growth due to the shallow soil depth above it and the heat build-up in summer. This could have been overcome using alternative edging details, e.g. cast in situ kerbing or metal edgings.

In a few locations the soil levels alongside footpaths have been installed too high because the allowance for settlement was over-estimated. This has led to some sediment accumulating on the paths after rainfall.

The architectural aspirations included setting some of the buildings slightly below adjacent ground levels to help bed them into the landscape. This had obvious drainage implications involving additional piped drainage and careful exceedance pathway design which could have been reduced with a simpler building design.

## 9. Interaction with local authority

Early engagement with the Environment Agency, Essex County Council (the Lead Local Flood Authority) and Chelmsford City Council was valuable in establishing design parameters. A suite of Ordinary Watercourse Consents was needed to modify existing ponds and ditches for the scheme. Pre-application consultations really helped to smooth the process.

## 10. Project details

**Construction completed:** Remediation started July 2016, Phase 1 development completed Dec 2019

**Cost:** Whole scheme: withheld. Site works: £19m. SuDS: £1.3m (including rainwater harvesting)

**Extent:** 33 Ha development (SuDS integrated)

## 11. Project team

Client	<ul style="list-style-type: none"> <li>Jehovah’s Witnesses (Watch Tower Bible and Tract Society of Britain)</li> </ul>	
Designers	<ul style="list-style-type: none"> <li>Landscape Architect – Murdoch Wickham</li> <li>Architect, Civil Engineer and SuDS Design – Jehovah’s Witnesses Staff Design Team</li> </ul>	 
Contractors	<ul style="list-style-type: none"> <li>Jehovah’s Witnesses</li> </ul>	



Fig 2 Biodiverse green roofs on residence blocks attenuate storm runoff and provide habitat for native species.



Fig 3 Rain gardens by the residence block entrances receive roof runoff.



Fig 4 Permeable paving under construction at arrival plaza; discharging to treatment pond behind. Green roof on adjacent reception and service/events buildings.



Fig 5 The estate perimeter road drains via sheet runoff across a 2m wide filter strip at 1:20 into a 3m wide swale.



Fig 6 Attenuation pond serving Catchment 2 – embankments were sown with wildflowers



Fig 7 View of east half of development: roadside swale in foreground; porous asphalt parking areas discharging to swales; attenuation pond at back left.