

10. Water

- 10.1 Background information on the current situation in Leeds**
- 10.2** Clean and available water supplies are essential for the production of food, for healthy drinking and for the maintenance of natural ecosystems, as well as crucial to commerce, industry and agriculture. The appearance of rivers and streams also contribute to the landscape and natural waterways, lakes and canals are also sources of recreation and natural habitats. The way we use water has a direct impact on the environment. It is therefore essential that society's use of water is appropriate and sustainable. In global terms the world population is expected to rise by three billion by 2026, but nearly a third of the world's population will be living in areas facing water scarcity by 2025. By comparison water consumption per person in the UK is the highest in Europe.
- 10.3** In Leeds water is taken from rivers, streams, reservoirs and aquifers. Most of this water is used for public water supply. When river flows are low, water stored in reservoirs becomes an important source. Water in underground aquifers provides water to rivers and wetlands, but is also extracted for human use.
- 10.4** There are concerns that future climate change scenarios predict increased frequency of drought which is likely to lead to problems in water supply and subsequent usage restrictions. The UK Climate Impacts Programme (UKCIP) has forecast that over this century global warming will lead to significant changes in rainfall distribution and intensity. Summer precipitation in the southwest could fall by a fifth by the 2020s and over 50% by the 2080s (Hulme et al 2002), increasing pressure on water supplies further.
- 10.5** An improving system of water supply and enhanced level of water company regulation has significantly reduced issues of drought risk and water shortage in Leeds. Improved water efficiency will help Leeds fulfil its requirements under the Water Framework Directive. Yorkshire Water is the primary water provider for Leeds and is one of the ten largest water management businesses in the world, providing clean water to 4.5 million people and 140,000 businesses in the Yorkshire region (Kelda Group 2003).
- 10.6** Yorkshire Water are responsible for the collection, treatment, distribution and supply of water to Leeds. A grid system is in operation in the Yorkshire Water supply area connecting the region's rivers and 120 reservoirs to enable water to be moved to wherever it is needed. Leeds is part of a much larger 'Grid Surface Water Zone' (SWZ) which covers most of Yorkshire (Yorkshire Water 2010).
- 10.7** More efficient appliances often cost the same as less efficient models, while rainwater harvesting and grey water recycling can produce further water savings. Introducing basic water efficiencies into metered homes could save homeowners money in water bills without changing their lifestyles.



10.8 With the demand for water in the UK reaching unprecedented levels, businesses are likely to see tighter restrictions on their use of water and further increases in metered water in the future. As businesses become more aware of the water they are using and the consequent cost, demand will rise for offices designed to use less water. Over two-thirds of water use in the average office takes place in the toilets, where significant water savings may often be made.

the emphasis upon reducing consumption and carefully planning how all future activities and developments impact drainage and flooding.



10.10 The CSH includes two issues in this category whose aims are:

Internal potable water use	To reduce the consumption of potable water in the home
External water use	To encourage the recycling of rainwater and reduce the amount of mains potable water used for external water uses

10.9 The analysis of the evidence in the Natural Resources and Waste DPD Resource Flow Analysis (Leeds City Council 2008d) draws the following conclusions:

- Water shortage is not an issue for Leeds. However, the gross water consumption is higher than the national average, potentially putting pressure on reserves and in turn generating significantly more waste water;
- As this could put further pressure on the already strained drainage system, increasing efficiency of use would be recommended, with



The inlet at Eccup Reservoir

10.11 Internal water use

10.12 Measures that can be taken to reduce the consumption of potable water in buildings include:

- ✓ Providing water efficient appliances, low water use showers and aerated taps;
- ✓ Providing facilities for heat exchange from waste water;
- ✓ Considering the use of a reed bed system for foul water treatment;
- ✓ Composting toilets may also be appropriate for some schemes;
- ✓ Undertaking a rainwater and grey water (waste water from sinks, baths and showers) use feasibility study. Where collecting and reusing water is feasible, it should be included in the proposed development;
- ✓ Installing a system for recycling grey water for toilet flushing and for

watering plants and garden/ green space irrigation; more advanced systems will require a back-up supply of mains water, safety systems to avoid storage of grey water for more than two days, treatment systems, clear pipe identification, storage tanks and overflow systems, light elimination to limit algae growth;

- ✓ Advanced rainwater systems incorporate treatment (UV

microbiological or biological) and can be used for flushing toilets and to supply showers;

- ✓ All major non-residential developments should use building type standards if available. CIRIA has published key performance indicators for water use in hotels and offices. Proposals should demonstrate that water consumption is 'below average' against these benchmarks:



- Install water meters in existing properties when they are redeveloped (water meters are compulsory in new development);
- Install efficient appliances that enable reduced water consumption;
- Fit low volume or dual flush WCs, low water showers and aerated/spray taps;
- In non-residential buildings measures such as infra-red sensor controls, door beams or magnetic door switches can be used to help control water flows for urinals and basins or waterless urinals (where installed). Leak detection systems and water metering should also be included for major water consumers.



CASE STUDY: St Margaret's Church Hall

A community based development with clear aims to improve and support community activities and cohesion through the building (in keeping with the listed church) of an environmentally friendly community hall, including ground

source heat pump, insulation made from recycled glass, heat recovery ventilation and rainwater collection for WCs. Made from locally sourced materials, this is a very commendable community based low impact development.

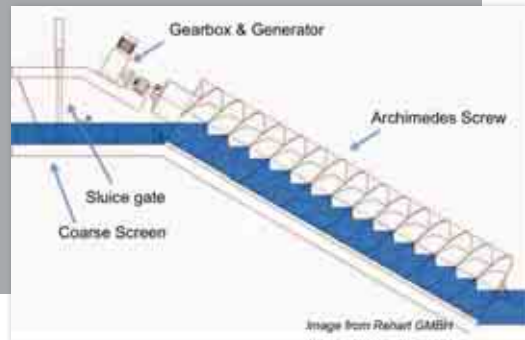
Designed by Richard Crooks Partnership for St Margaret's Church



Existing Water Wheel at Armley Mills



Artists impression of Archimedes Screw



CASE STUDY: Thwaite Mills and Armley Mills

A hydropower scheme using an Archimedes Screw Turbine is proposed at the Grade II listed mill building. A multiple helix shaped set of blades mounted on a central shaft is put into

a trough and rests at an angle with the bottom in the water. As water flows down the Archimedes Screw the main shaft turns, driving the generator.

10.13 External water use

10.14 Measures that can be taken to recycle rainwater and reduce the amount of mains potable water used for external water uses include:

- ☑ Undertaking a rainwater and grey water use feasibility study. Where collecting and reusing water is feasible, it should be included in the proposed development;
- ☑ Water butts and other community storage facilities are a simple way of collecting rainwater which can be used for watering plants and garden/green space irrigation;
- ☑ Green roofs can reduce levels of roof water run-off. Where possible use extensive, low maintenance systems.



- ▣ Arranging gardens down a slope means that any water can be used several times over as in many Italian and Spanish garden styles.

Other Case Studies to refer to:
 – Carnegie Pavillion p52
 – Epicentre p73
 – Northern Ballet p88

10.15 Further information

- CIRIA (2006) 'Water key performance indicators and benchmarks for offices and hotels'. Available: www.ciria.org
- Environment Agency(2001) 'Conserve Water in Buildings' fact sheets. Available: www.environment-agency.gov.uk
- Envirowise: www.envirowise.gov.uk
- Waterwise: www.waterwise.org.uk
- For information on green roofs: www.thegreenroofcentre.co.uk or <http://livingroofs.org/>