Water Management Plan 2023

Executive Summary

This water management plan reviews the current performance against the University target to reduce water consumption and sets out a plan for water management for the current year and up to 2025. The University environmental target for water is to reduce Cranfield University Estate water consumption by 50% by the end of 2030 from a 2010 baseline by floor area.

A number of large steps have been made towards reducing consumption, such as improving our pipe work, resolving leaks, finding alternatives to tap water for irrigation, reducing flows in some urinals and encouraging behaviour change. Unfortunately, our ability to properly quantify our progress is currently hampered by constraints in metering and monitoring.

There are significant opportunities for improving water efficiency and reducing water consumption within the university estate even though the main campus continues to grow. To achieve our target, however, significant financial investment in the installation of a robust metering and monitoring system and water saving technologies is essential. The relationship with third party users of our network and with Anglian Water needs further clarification and an effective leak detection system needs to be established.

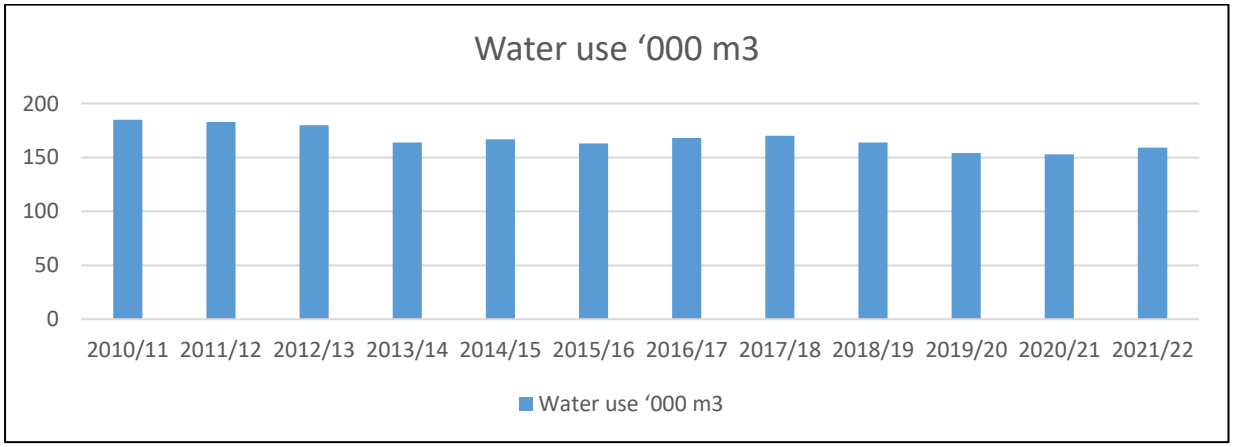
Objectives

1. Encourage better use of water through behaviour change campaigns.
2. Improve efficiency of water usage, reducing wastage.
3. Improve metering, data collection and analysis to provide targeted action.
4. Reduce water leakage.
5. Find alternatives to tap water where appropriate.

Scope

The objective for saving water covers Cranfield University campus and also COTEC. It does not include operations on the Shrivenham campus.

Current progress



Whilst the general trend in consumption is down, there are some concerns about the accuracy of the data. There are issues with the reliability of Anglian Water meters registering the supply to the Cranfield Campus. The consumption figures in the graph above are based on our own internal meters, which have also had issues. So, there is a certain amount of estimation in the most recent numbers which could be as much as a 10% underestimate. There are also outstanding metering issues with tenants and third parties on our network some of which are charged for water use by the University and some by Anglian Water. The accuracy of what can be attributed to the University use of water is affected to a degree.

Work is underway to resolve issues with the main supply meter for the site and to transfer all the Medway Court meters to our account. Medway 2 and Medway 4 have now been transferred to us. Work is also underway to add the new fire station meter to our account. Action has been taken to prevent a local road sweeping company from filling their tanks using our private supply and investigations are underway as to how best to resolve the issues with third parties connected to our network.

Issues and time delays encountered with our service provider press home the importance for us to have a robust metering and monitoring system for our private network. If we are unable to measure how much water is being used on our sites and where, then we are unable to determine if we've met our target, or to monitor the effectiveness of changes we implement. A good monitoring system will also aid in identification of water saving opportunities. Work is currently underway to develop a metering and monitoring strategy and discussions have taken place with some potential service providers.

A large investment was made in 20012/13 in the Cranfield Campus water pipe network. This reduced leaks and had a noticeable impact on consumption of water on the campus. The increase in 2017 coincides with a very hot, dry summer. During this period there was a greater use of irrigation and the pond at Martell House was topped up with mains water on a regular basis.

There have been several consecutive hot summers where irrigation of trees has been necessary, including the relocated orchard and the trees along the northern cycle path. Mains water was used on a regular basis for this, however, in summer 2022, enabling works were undertaken to facilitate the use of collected rainwater from B54 and treated water from the sewerage works. These alternative water sources will be used from 2023 onwards.

In the hot summers of 2020/21 and 2021/22, as an emergency measure, mains cold water was run over air conditioning cooling units on the main Cranfield site, to try and prevent breakdowns and spaces such as the server room in B52 from overheating. A significant quantity of water may have been wasted and potential alternatives need to be explored.

There were several big leaks up at 2 Medway Court in 2022. If we had automatic metering and monitoring in place with trigger limits, the leaks would have been detected much more swiftly. A large leak in the pump room behind B44 knocked out the power to one of our key water meters for several months. This was restored in late January 2023. There were a number of additional leaks in buildings across the campus shortly before Christmas 2022, due to frost damage. Improvements in pipe lagging and loft insulation are being explored.

Trial of prototype “Waterfall” meters in 4 buildings on the tech site between December 2021 and November 2022 has shown that substantial water savings could be made if we employed smart monitoring in our buildings and acted on findings. In B44, which has just one urinal, the Waterfall meter helped us detect and stop unnecessary usage equating to 4.7 m3 / month.

Work is ongoing with Heather Smith in SWEE and a PhD student to pilot shower time indicators. Results so far indicate that behaviour change is challenging with the university’s population dynamics and there should be greater emphasis on implementing physical changes.

Additional metering is being installed on the downstream side of our buffer tanks, so we will be able to better understand usage on site.

A Canvas module has been produced for students and researchers, which includes a section on ways to save water through behaviour change.

Several large halls of residence, including a laundry, and new technical buildings have come on-line since the target was set. These will have had a knock-on impact on site demand for water.

a) Relocated orchard which required irrigation.
b) Recent issue with fire hydrant being left open by road sweeper near Medway Court – fortunately, not on our network!
c) Signage on building cooling systems explaining that water is deliberately being run over them to aid cooling.

Action Plan

Task	Description	Who	When
Water supply	Review option to change supplier	GE/CD	Ongoing
Water supply	Tender for new water supplier	CD/GE	July 2024
Water supply	Repair main incomer to the Cranfield site and restore AMR for this meter	CD	Ongoing
Water supply	Transfer remaining Medway Court meters to our account	CD	Ongoing
Water supply	Transfer new fire station to our account	CD	Ongoing
Water supply	Seek to resolve issues with private connections	CD	Ongoing
Water supply	Update water main plan for Cranfield campus, as this was last done in 2017	CD/BS/PM	Jul 2023
Targeting and monitoring	Review the levels and fill routines in main water tank, when suitable data available. This may help with maximum demand charges	GE	Sep 2023
Targeting and monitoring	Install new water meter for supply to main tank	PM/MR	May 2023
Targeting and monitoring	Develop metering strategy and seek funds to resource implementation	GE/CD	Ongoing
Targeting and monitoring	Review meter numbering and organisation in SystemsLink database	BS/CD	May 2023
Targeting and monitoring	Monitor zonal meters on monthly basis and establish targets for each zone	GE/MB	Ongoing
Targeting and monitoring	Procure new AMR for Zone meters	GE/CD	Jun 2023
Targeting and monitoring	Review requirements for building metering	CD	Jun 2023
Targeting and monitoring	Identify heavy users with the aid of FMs and existing meter records and install additional metering where appropriate	CD	Aug 2023
Targeting and monitoring	Procure AMR for building meters	GE/CD	Sep 2023
Targeting and monitoring	Establish targets for existing meters and buildings where possible	GE	Sep 2023

Targeting and monitoring	Develop plan to introduce AMR to tenant meters	GE/CD	Sep 2023
Targeting and monitoring	Review system for monitoring for leaks and update once AMR available	GE	Jul 2023
Water saving	Develop promotional messages for saving water	BS	May 2023
Water saving	Conduct a survey of existing water saving devices / equipment currently in use on the estate	CD/BS	Ongoing
Water saving	Explore alternatives to mains water for keeping building cooling equipment operational in hot summers	MR/CD	May 2023
Water saving within buildings	Conduct a survey of toilet and bathroom facilities across the estate, with a view to converting to dual flush toilets and potentially, waterless urinals. Also consider fitting of aeration taps.	CD/Facilities Managers/Residential Services	Sep 2023
Water saving within buildings	Develop guidance in CU design guide for use of water saving technologies	CD	Jul 2023
Water saving within buildings	Work with technical teams to identify water saving opportunities in labs	CD	Sep 2024
Water saving - grounds	Develop guidance in CU Design Guide for Future plantings to be more drought resistant and done at the most appropriate time of the year	GE	Jul 2023
Water saving - grounds	Ensure grounds contractors prioritise use of rainwater and treated wastewater for irrigation	GE/KB	May 2023
Water saving - grounds	Identify buildings where meaningful rainwater harvesting can be installed – relatively low cost, close to point of use, easy to access.	GE/KB	May 2024
Water saving - grounds	Investigate rainwater options for Cayley lodge, Conference Hotel gardens and Martell pond	CD/GE/SS	May 2023
Secure funding	Develop list of potential projects with costs and then business case for implementation. Include funding for maintenance	CD	Sep 2023

As part of a long-term water use strategy for the university, it would be good to explore the possibility of aiming for “water neutrality” in new builds on site. i.e any new addition to our footprint would not add to our potable water consumption. If the new build required potable water, this could be off-set by a reduction in other buildings within the estate.

To achieve this ambitious target, benchmarking would be essential, and metering is fundamental to this. The target would also call for even stronger collaborations with our research community and drive innovation and feasibility projects in which our students could be actively involved.

Technologies such as package treatment plants could be explored as a means of facilitating re-use of water within buildings, for toilet flushing and laundry, or for activities outside such as irrigation, window cleaning and bus washing. As houses are re-furbished, we could implement water efficiency measures, including flow restrictors once boilers have been replaced with heat pumps.

Recommendations

1. It is essential that an invest to save fund be established for water saving measures and campaigns.
2. The relationship with other users of our network and with Anglian Water needs further clarification.
3. An effective leak detection system and strategy needs to be established.

Document Control

Document title	Water Management Plan
Document number	CU-SHE-PLAN-05
Version number	1.1
Originator name/document owner	Ceri Dawson – Energy Advisor
Professional Service Unit/Department	Facilities/Energy and Environment Team
Implementation/effective date	March 2023
Date of last review and version number	June 2019 (2019/2020) V1
Date of this version	March 2023
Date of next review	March 2024
Standards reference	
Signature	
Name	Professor Phil Longhurst
Title	Professor of Environment and Energy Technology and Chair of Energy & Environment Committee

Document Review			
Version	**Amendment**	**By**	**Date**
1	Initial draft version of original Water Management Plan	Gareth Ellis and Angus Murchie	June 2019
1.1	New format as Water Management Plan	Ceri Dawson and Gareth Ellis	March 2023