

CASE STUDY: NELSON IRRIGATION AUSTRALIA

BIG GUNS DELIVER BIG SAVINGS FOR UNIVERSITY OF SYDNEY

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A complete overhaul of the irrigation system at the University of Sydney's Corstrophine Dairy, near Camden NSW, is expected to realise enormous savings in energy and labour, in addition to reducing water use and improving crop yields.

The dairy, which is part of the University's Camden Campus, is 65km south west of Sydney and occupies 33 hectares of fertile flood plain on the banks of the Nepean River. Half of the site is split into feeding lanes for the cattle while the other half is used to grow Lucerne, kikuyu and maize.

The five travelling irrigators which had been in use at the dairy were well past their used-by dates and had become a burden on operations. Inefficiencies in water and power added to a hefty labour demand and mounting repair bills.

To avoid breakages all five irrigators had to be operated together, regardless of need, in order to minimise the water pressure running through the old and brittle pipes. Running them independently frequently resulted in leaks and breakages. The waste incurred by irrigating in this fashion was compounded further by the fact that the dairy was an odd shape, which required some irrigators to travel further than others.

A combination of skill and experience had taught farm operators the right amount of time to set their pumps running to ensure that the irrigators on longer runs reached their destinations. While this method was developed and learned over time, it was grossly inefficient and unpractical.

With some parts of the dairy considerably shorter than others, several irrigators would sit idly watering one area while waiting for the longer runs to finish. This made it impossible for operators at the dairy to apply any measures of uniformity to their watering, with a trade-off between under and over watering the inevitable consequence.

The inflexibility of the system also impacted on their ability to trial new crops, or trial watering levels suited to the soil profile of particular areas. It was a one-size-fits-all approach and it was costing time, labour, efficiency, and serious dollars.

With funding available through the Nepean-Hawkesbury River Recovery Program, Catchment Management Authority, and the NSW Smart Farms Project, the University sought the expertise of independent consultants Total Irrigation Designers to audit the existing systems

and conceive and design a new fully automated and highly efficient irrigation solution.

Total Irrigation Designers sought additional technical support and advice from Nelson Irrigation Australia to develop the design which was then tendered and installed by Hydro Technics Irrigation.

The project involved replacing the five travelling irrigators with a fixed fully automated irrigation system comprised of 104 Nelson Irrigation F100 21 degree Big Guns and 104 2" Nelson 800 Series Control valves spread evenly across the site in a grid of 60m x 40m cells.

The new system is expected to relieve the dairy of countless hours in labour and maintenance, and allows watering of specific areas, at specific times, with just the touch of a button. It can be adjusted to suit soil profiles, crop types, undulations, and areas of high wind.

The real key to the greater efficiencies achieved is the renowned uniformity of the F100 Nelson Big Guns. The Big Guns will deliver an impressive 85% (DU) over their throw radius, meaning the wasted costs associated with under and over watering are now be a thing of the past for the dairy.



One of the 104 F100 Nelson Big Guns used in the project

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While the full benefits of the new system won't be known until the end of the next growing season, it's expected labour will be reduced by over 60% and water efficiency will be increased by 89%. While not yet at the quantifiable stage, these proposed savings are remarkable.

Kim McKean, Dairy Manager at the University, is excited about what the project can deliver.

"The main advantage for us will be in the saving of labour and the running costs of a tractor, as depending on the areas we were trying to cover, it was taking five hours a

day or more to move, check and set up irrigators around the dairy.

"The time and hassle trying to keep the irrigators running had become a real burden on our operations."

Matthew Wilson of Total Irrigation Designers sees the project as an ideal test case for any irrigators battling with ailing equipment.

"The University was very restricted in what they could achieve with their old irrigation system and odd property shape," Wilson stated.



An F100 Nelson Big Gun in action, showing it's legendary uniform application rate

"There is always so much wastage with old systems and they were having to adjust their watering practices to suit the frailties of their equipment.

"The lack of control they had over uniformity, and the inflexibility of having to run all five travelling irrigators at once to avoid breakages and leaks meant that their water and power usage were astronomical.

"With our design and the expertise of Nelson Irrigation Australia, the dairy will now use less water, less power, and less labour. With the greater control and uniformity of the Big Guns they're also likely to see greater crop yields.

"They now have an irrigation system that can be tailored and operated according to their needs, rather than the other way around, and the benefits of this are already becoming apparent."

Manual labour, which previously involved moving and repairing the travelling irrigators and averaged four to five hours a day, has been reduced to a mere 20 minutes which primarily consists of operators simply checking that what is being displayed on the control panel screen is being replicated in the field.



Wide view of the dairy with one section of the grid in action

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The reductions in water usage won't be as immediately obvious but an analysis at the end of the current season is expected to be impressive. The burden of hundreds of thousands of litres being wasted through leaks, breakages, and irrigators watering pointlessly to reduce pressure is no longer an issue.

The efficiency of the Nelson Big Guns combined with the Nelson 800 series valves and automated control system will now allow the whole area to be irrigated in just over 12 hours at night for a cycle which used to take more than 24hrs previously.

Running pumps less often and for shorter periods of time will also see significant savings in energy costs, allowing funds to be redirected towards the vital research and development being conducted on the campus.

"The past 12 months have been kind to the dairy with regular rain and good growing conditions, and while we know this won't last forever, they now have an irrigation system that will perform in all conditions to an optimum level," Wilson added.

"The project is a real investment in the dairy's future," he concluded.

TECHNICAL SPECIFICATIONS

Area Irrigated	33ha
Pump Capacity	55kw VFD - 11-45l/sec@750kPa to new 250mm MDPE mains.
Equipment	Big Guns - 104 x F100 Nelson Big Guns Nozzle - 104 x F100 21° Taper Nozzles Control Valve - 104 x Nelson 800 Control Valves

For more information on this project, please contact Nelson Australia on 1300 856 368 or visit www.nelsonirrigation.com.au

For high resolution images, please contact Andrew Doak at Major League Corporate Marketing on 07 3217 9347 or andrew@majorleague.com.au