

Lindsay Pivots and Pumps Provide for City's Wastewater Needs

SUMMARY

How do you successfully complete one of the largest wastewater treatment projects of its kind in Australia?

With a full arsenal of Lindsay products, including pivots, pumps and remote telemetry.

With the city's population expected to grow to nearly 50,000 by 2020, the Tamworth City Council, Australia, decided to decommission one of its two existing wastewater treatment plants, and augment the other to treat all of the town's wastewater.

Today, instead of being dumped into the nearby Peel River, the town's treated wastewater is pumped through Zimmatic® by Lindsay pivots and used to irrigate local crops, which then are sold to local dairies and feedlots.

CHALLENGE

Tamworth was looking for a solution to better manage wastewater and conserve land and water resources.

The Tamworth City wastewater reuse project needed a customized, integrated system that would move the effluent from holding ponds onto grain and alfalfa (lucerne) crops.

The project, licensed by the NSW Environmental Protection Authority, required significant environmental monitoring, including soil, groundwater, hydraulic and nutrient balance monitoring.

In addition, the project required accurate recording of the volume of wastewater applied through the pivots, high rainfall shutdown capabilities and "burst pipe" alarms.



To conserve land and water resources, a Watertronics pump station (above) and 13 new Zimmatic center pivots were installed to irrigate local crops with the town's treated wastewater.

Tamworth City officials also needed a single-source supplier for this customized system. They especially wanted to avoid a hodge-podge of various technologies being cobbled together and requiring considerable time, management and expenses.

SOLUTION

The Tamworth City wastewater reuse project was 10 years in the making and designed to secure the city's effluent disposal volume through to 2025, forecast to be approximately

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"FieldNET and the DDC controls really tie the entire system together into one integrated, easy-to-use platform."

– Richard Hall, Lindsay Regional Manager



Trenching the nearly 8 miles (13km) of pipe that moves the effluent from holding ponds onto area crops.



Zimmatic poly-lined pipes, perfect for corrosive water conditions, were used for the project.



One of the 13 new Zimmatic poly-lined center pivots at Tamworth.

1,585 million gallons per year (6,000 ML/year), with future expansion capabilities built into the system if needed.

Lindsay's local Zimmatic dealer and regional manager Richard Hall in Dubbo, NSW, Australia, spearheaded the project, which took approximately 12 months to complete.

This multi-million-dollar project was unique in that it involved numerous Lindsay products, including the pivots, pumps and all of the controls.

It was a total team effort involving Realm Agribusiness, which served as the principal contractor on the project, and manages the irrigation system and nearby farming operation.

The following arsenal of Lindsay products were deployed to solve the

city's wastewater treatment needs.

ZIMMATIC PIVOTS

The town's treated water is pumped through 13 new Zimmatic poly-lined center pivots, ranging in length from 1,772 feet (540 m) to 778 feet (237 m). They are designed to apply .36 inches (9 mm) of water over the fields in a 24-hour period.

Top-of-the-line Zimmatic poly-lined pipes, perfect for corrosive water conditions, were used for the project. The poly-lined pipes are designed for long life and harsh environments, including wastewater applications.

WATERTRONICS PUMP STATION

Key to the innovative wastewater treatment project is a fully-integrated Watertronics® pump

station that is used to move the effluent from holding ponds through the Zimmatic pivots and ultimately onto 1,581 acres (640 ha) of grain and alfalfa (lucerne) crops.

According to John Atkinson, Watertronics a Lindsay company agricultural sales manager, the Tamworth pumping station consists of five 215 horsepower (160 kw) centrifugal pumps, each capable of pumping 2,400 gallons (9,085 liters) per minute.

The pump station was custom-engineered and performance-tested at the Watertronics manufacturing facility in Hartland, Wisconsin, and then delivered to Tamworth as a factory-assembled unit for fast, easy installation.

"The pump station design was a combined effort of Realm



The pump station was custom-engineered and performance-tested, as shown above, at the Watertronics facility in Hartland, Wisconsin, USA.



FieldNET™ Wireless Irrigation Management

Agribusiness, the local Zimmatic dealer, and Watertronics,” Atkinson says. “The result is a sophisticated yet practical degree of automation, management and monitoring.”

The pumps are equipped with variable frequency drives (VFDs) to specifically tune pressure and flow characteristics to each pump, ensuring near perfect pressure regulation.

Electronic butterfly valves complement the VFD controls, regulating the pressure of each pump and providing backup pressure regulation in the event of a VFD failure.

FIELDNET WIRELESS CONTROL TECHNOLOGY

Lindsay’s FieldNET with pump control and Dynamic Demand Control (DDC) are used to integrate, monitor and automate

the entire Tamworth wastewater reuse project. Pumps and pivots are operated at the most energy-efficient level. The result: maximum

“All of the irrigation system components worked according to design.”

– Ian Cross,
Tamworth Regional Council

performance, substantial energy savings and minimum management and labor required to operate the system.

DDC allows the Tamworth pivots to be grouped with the pump station for powerful information-sharing which reduces energy costs. The pumps are operated at the most energy-efficient setpoint and then automatically sequence to effectively meet demand.

“FieldNET is critical as far as monitoring and controlling all of the system components, including text message alerts. With an effluent project like this, there is no room for accidents and a broken pipe would spell disaster if it was allowed to go unchecked,” Hall says. “FieldNET and the DDC controls really tie the entire system together into one integrated, easy-to-use platform.”

RESULTS

The Tamworth wastewater reuse project allows for a maximum daily effluent discharge of 14.2 million gallons (54 ML). It irrigates 1,581 acres (640 ha) of local crops such as grain and alfalfa (lucerne), which are then sold locally.

The alfalfa (lucerne) crop yields approximately 6,000 dry matter



Aerial view of the Tamworth City wastewater reuse project in Australia. The wastewater storage pond can hold up to 396 million gallons (1,500 ML) of water, which is then pumped onto local crops through 13 new Zimmatic center pivots.

tons of hay and silage. Other crops include cereal and canola seed production in the winter and grain sorghum and seed corn production in the summer.

Approximately 25 percent of the fodder produced is used to feed a 600-cow dairy located close by, with the balance sold on the open market.

Ian Cross, Water Construction & Contracts Engineer at the Tamworth Regional Council, noted that the Tamworth wastewater management project was 10 years in the making and is probably the largest project of its kind in Australia.

“All of the irrigation system components worked according to design,” Cross says. “We’re basically

taking 1,585 million gallons per year (6,000 ML/year) of wastewater and keeping it from going into the river and applying it to crops instead. This means less salt and nutrient loads in the river stream. The system is designed to operate to year 2025 at predicted flow rates, with future expansion if needed.”



Alfalfa (lucerne) (foreground) and flowering canola (background) are among several crops irrigated at Tamworth.

THE LINDSAY ADVANTAGE HOW IT WORKS FOR TAMWORTH CITY

- 13 durable and long-lasting poly-lined pivots designed for harsh water environments
- Strong and reliable, factory-tested Watertronics pump station
- Easy-to-use integrated controls that tie the entire project together, including FieldNET pivot and pump wireless remote control technology
- Treated wastewater irrigates local crops, which are then sold to local livestock producers

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