Automation of furrow irrigation

Information Sheet #1: Russell Jordan

Site details

- Location: Black Road, Upper Haughton
- Water source: SunWater channel, all supply is under gravity, there is no pumping
- No recycling
- Five irrigation sets automated, covering approximately 82 hectares

Infrastructure installed

- 5 actuator control radios, one per outlet
- 5 actuators and brackets; all the outlets on this farm only have one valve
- 1 pressure transducer (inside cylinder)
- 3 advance detection (end of field) radios
- 5 advance sensors (positioned within field)

System costs (approximate)

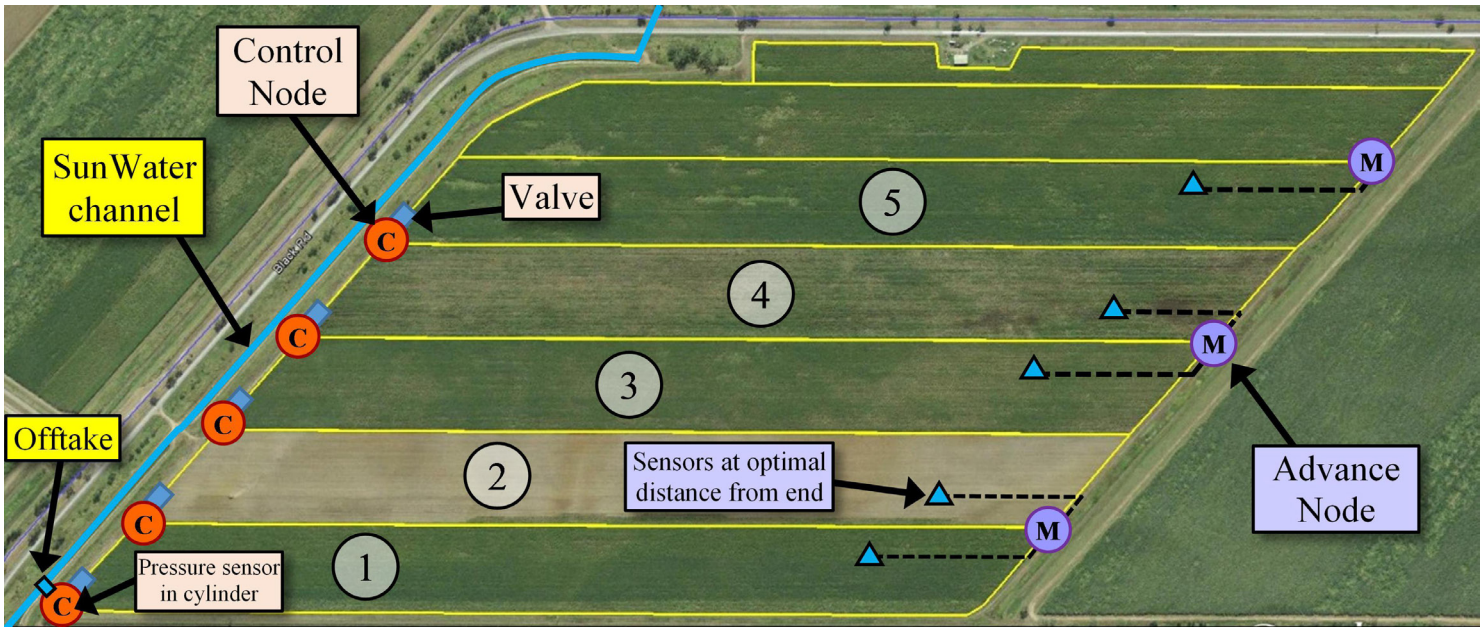
Area automated	82 hectares
Total cost	$49,700
Cost per hectare	$606
Base station, computer & software	$6,900
Pump controller & installation[1]	N/A
Pressure transducer	$800
Water meter[2]	N/A
Actuator control radios x 5	$15,000
Actuators x 5	$2,500
Actuator brackets & fitting	$2,000
End of field radios x 3	$9,000
Advance sensors x 5	$2,500
Advance sensor installation[3]	$6,000
System commissioning[4]	$5,000

(1) Gravity fed system, pump controller not required

(2) Water meter not required

(3) Advance sensor installation costs cover: trenching 150 m, conduit and cabling for each sensor

(4) System commission costs cover installation of base station and field radios and checking that all are working correctly.



Automation of furrow irrigation

Information Sheet #1: Russell Jordan (continued)

Notes

This farm is representative of a typical BRIA farm. There are no pumps with all the water being delivered under gravity from the SunWater channel. There is also no tail water recycling and one of the challenges is to manage the system to ensure effective irrigation while minimising runoff.

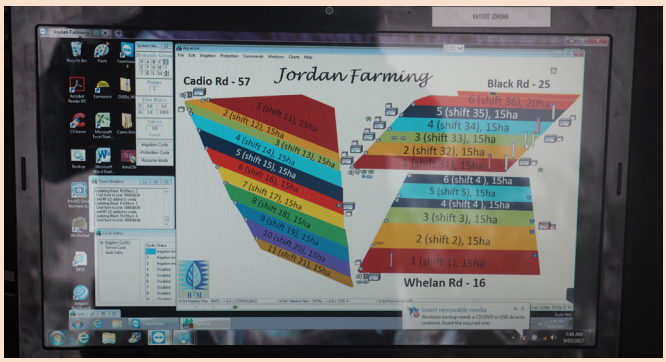
A pressure transducer is installed in the first cylinder from the channel outlet. This transducer provides a fail safe by notifying Russell when the water pressure gets too high (valves haven't opened) or drops too low (channel grate is blocked; a valve has remained open when it should have closed; fluming has blown off).

Five irrigation sets have been automated. Each cylinder has only one outlet which means each radio controls just one actuator. This increases the cost of the overall system. If there were two outlets per cylinder, each radio could control two actuators which would reduce the cost.

Russell has configured his system to run for 2 hours after the sensor registers that water has reached that point. To minimise runoff and to allow the automatic changeover of sets buried advance sensors have been installed towards the bottom end of each block. These sensors are located between 100-150 m up from the tail drain, approximately 20 drills across from the edge of the block and are connected to radios on the bottom headland (each radio is connected to 2 sensors).

The sensors were originally placed closer to the end but have now been positioned so that water reaches the end of the block, while minimising the volume that runs off. Now a suitable point has been identified they will be trenched in as a permanent installation at a depth sufficient to avoid damage from in-field cultivation. The trenching requirement and long cabling runs for these sensors increases the costs compared to the other sites where the advance sensors are placed in drains close to the radio.

Russell now has enough confidence in the system to use it to automatically switch sets. As one set completes, the valve for the next set opens; when it is fully open the first valve closes. The automation is also saving him considerable time and fuel because he doesn't have to physically visit the farm to check how the irrigation is progressing.



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