

## SUNDROP FARMS PORT AUGUSTA PROJECT

# A REVOLUTIONARY CRANAGE SOLUTION FOR A GROUND-BREAKING SUSTAINABLE AGRICULTURAL PROJECT

### AT A GLANCE

CLIENT	JOHN HOLLAND
PROJECT	SUNDROP FARMS PORT AUGUSTA EXPANSION PROJECT
LOCATION	PORT AUGUSTA, SOUTH AUSTRALIA
SECTOR	AGRICULTURE
DATE	OCTOBER 2015-FEBRUARY 2016

CRANES	1 X M1280D, 1 X LEIBHERR LR 1280
ENGINEERS	3
INSTALLATION CREW	4
RIGGING CREW	3

In 2015 John Holland contracted Marr to do the heavy lifting on a revolutionary sustainable agriculture project for Sundrop Farms in Port Augusta, South Australia.

#### THE CLIENT

A world leader in sustainable horticulture for arid environments, Sundrop Farms is re-inventing agriculture by using groundbreaking technology and renewable energy to grow high-value crops in locations that have little or no access to arable land, fresh water or grid energy.

In Port Augusta South Australia, Sundrop Farms found the ideal location to build its first commercial greenhouse facility. Using Sundrop Farms' proprietary technologies, the vast state-of-the-art greenhouse is powered by solar energy – turning seawater into a fresh, nutrient-rich source of irrigation with the capacity to grow 15 million kilograms of fruit and vegetables every year.

It was a revolutionary agricultural concept that would also require some heavy lifting in the construction phase.

#### THE CHALLENGE

Like us, Sundrop Farms are passionate about solving problems. In 2012, the company had recruited a team of water and engineering experts from around the world with a passion to change the way agriculture is done. Their job was to find a solution for irrigating a crop of 775,000 of tomato plants that will supply Coles supermarkets across Australia for the next decade.

The resulting AU\$200 million project includes a 20-hectare greenhouse, a 115-metre high solar tower and a complex system of 23,000 concaved mirrors to power the cutting edge thermal desalination plant that draws seawater from the Spencer Gulf to feed the crop.

In 2014, the construction company appointed to the job, John Holland, contacted us to review some crantage solutions they were developing. At the time they were considering bringing a CC6800 (1,250 tonne capacity Demag lattice boom crawler crane) with superlift onto the site. The problem was that as a really big machine, the CC6800 left no room on the ground for it to be assembled and do the work concurrently. The CC6800 was an expensive and less productive option because it was slow to operate, required extensive ground preparation and was dependent on favourable wind conditions.

#### OUR SOLUTION

After reviewing the overall height of the structure and component weights supplied by John Holland, we developed and priced a basic scheme with a couple of different options for the craneage. One was using a M1280D (lifting 120 tonnes) and the other using an M2480D (lifting 300 tonnes). To comply with the engineering brief from John Holland, both were freestanding tower cranes with superior lifting speed and the ability to make a wide range of lifts from pre-assembled works, to general lifting and final installation.

During the engineering and design phase we established that the overall height of the structure was 116 metres and the heaviest lift we had to perform would be just over 100 tonnes. We ended up putting the M1280D on 77-metres of tower with a 64-metre boom. The crane was rigged for a maximum lift capacity of 150 tonnes.

The underhook height was 141 metres with a tip height of about 146 metres. Knowing the height of the final structure, it was important that we understood how the crane would interact with installation of the final lift. We built the final design into a 3D model and used that as a fly-through to check our clearances and methodology for installing the crane. We also consulted with the rigging team to identify any potential pinch points and clash points.

We also had to look at how to install the crane at full height with the available craneage that John Holland would have onsite. We developed a series of critical lift plans and introduced our lightweight pendant system to allow us to install the boom in two halves. Part of our crane install rigging team stayed onsite to operate the crane, complete all the critical lifts and the rigging works associated with installation of the solar tower.

The highlight of the project was the final lift – putting the steam drum on top of the tower. The fact that the top section of tower had a protrusion and wasn't round, combined with the limited clearance, meant that we had to find a way to hold the orientation of the load so it didn't spin as it was lifted more than 100 metres high. In conjunction with the John Holland site team, our onsite rigging team developed a tag line system attached to winches to hold the drum as it was lifted.

#### THE RESULT

Our solution meant that the set up time was shorter, the cost was lower and the area required to set up the tower crane was minimal in comparison to alternative crane options.

After months of planning, work commenced on the project in November 2015 with the final lift successfully completed by February 2016.





01 / START ▾

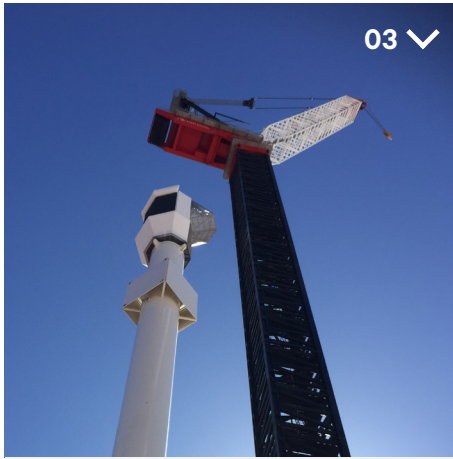
Located in remote, arid lands in South Australia, Sundrop Farms Port Augusta uses revolutionary technology to draw seawater from the Spencer Gulf – turning it into fresh water to irrigate a vast greenhouse system with the capacity to grow 15 million kilograms of fruit and vegetables every year.

In 2014, John Holland contacted Marr to review proposed craning solutions for construction of the AU\$200 million project. Our recommendation was to use a tower crane solution instead of the proposed crawler crane.



02 ▾

We used 3D computer modelling to check our solution and assist with the development of the install methodology and critical lift plans. (Image of 3D modelling against final lift).



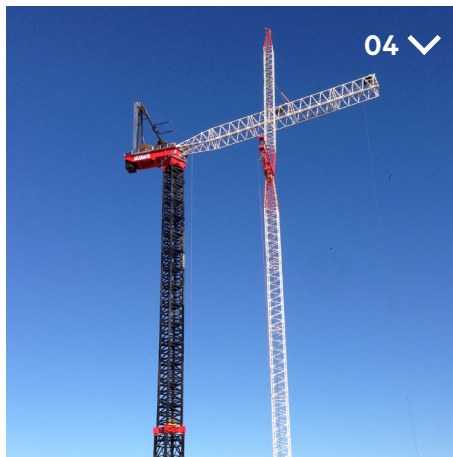
03 ▾

We engineered a solution that allowed the crane to free-stand without the need for counter-weight ballast at the base of the crane. This solution saved the client the expense of having to transport any counter-weight ballast to and from site.



05 ▾

Part of our crane install rigging team stayed onsite to operate the crane, complete all the critical lifts and the rigging works associated with installation of the solar tower.



04 ▾



Capacity of the Liebherr LR 1280 erection crane meant that the boom had to be lifted in two pieces. The first half was hung off the erection pendants with the second half lifted into position and held while the crane luffing system was reeved.



06 / FINISH —

For the final lift to install the drum on the top of the tower, John Holland and our rigging team developed a system of taglines attached to winches to prevent the load from spinning as it was lifted 100-metres off the ground.