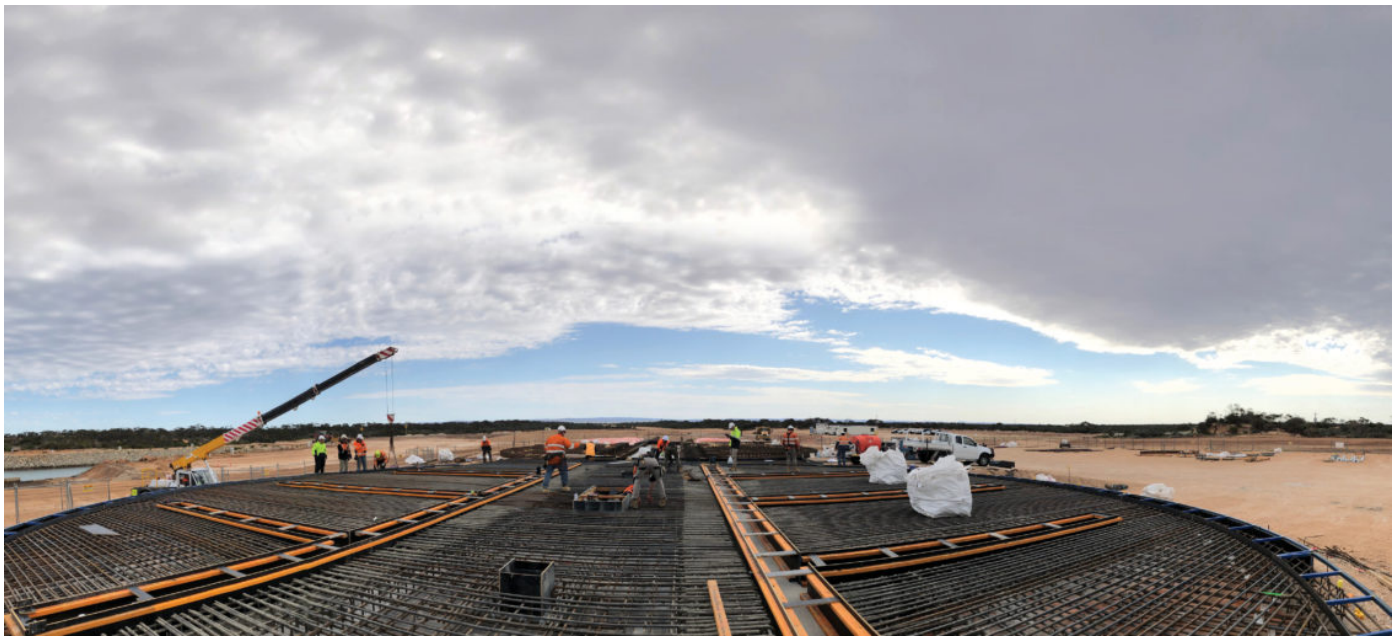
# Lucky Bay Grain Storage Facility



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| **Client** | T-Ports |
| **Location** | Lucky Bay, South Aus |
| **Value** | $3.1 million |
| **Duration** | May 2019 to October |

## Project Overview

Lucky Bay Grain Storage Facility is part of a $130-million project by T-Ports that includes a port at Lucky Bay that features 25,000t of steel silo storage, 360,000t of grain storage in ten bunkers, and a state-of-the-art transhipment vessel with a loading capacity of up to 13,800t/day.

The Grain Storage Facility compliments the evolving grain supply chain in South Australia. The location of the Lucky Bay site on the Eyre Peninsula has been stated as a long time coming for many growers who welcome the choice and supply chain competition. The benefits will not only profit a lot of growers in the area, but the benefits will flow through to farming families and their local communities.

## Scope of Work

T-Ports initially engaged Ballestrin for the construction of 1600m2 concrete foundation required to be built above a 75m concrete tunnel 4m wide and 2m tall.

The scope included both the earthworks and concrete works:

- 1700m3 of detailed excavation was required for the tunnel
- Formwork included design, supply and install of the wall shutters, soffits for the tunnel roof, and steel circular formwork for ring beams
- Reinforcement included supply and install of 270t of steel
- Set out and install of cast in grates, steel fumigation ducts, and hold down bolts for building
- Concrete included supply and install of over 1300m3 of S50 in-situ concrete

T-Ports then awarded further works to Ballestrin that included installation of a 100m precast retaining wall and additional 850m3 of concrete foundation works. The scope included earthworks, concrete, structural steel, and panel installation:

- 600m3 of detailed excavation and bored piers
- Supply and install of 27 structural steel columns for retaining wall
- Supply and install of 30 precast panels, panel size up to 8.6m by 3.4m, 15t per panel for the retaining wall
- Supply and install of formwork, reinforcement and concrete pour for eight concrete foundations, the largest being a 160m3 tower foundation
- Supply and install of over 1400m2 of concrete pavement.

## Innovations

#### Vertical blinding to excavated tunnel

The tunnel underneath the silo foundations was a 2.5m excavation into engineered fill. Ballestrin noted the integrity of the earth during inspection and developed a vertical wall blinding methodology that would eliminate the need for battering or shoring. An independent Geotechnical Engineer was then mobilized to site to confirm the earth conditions and suitability of the methodology.

Rather than battering the excavation that would then require controlled low strength material (CLSM) backfill, the tunnel was able to be excavated with a 2.5m vertical face with daily monitoring and additional safety controls in place. The process involved vertical excavation followed quickly by a 50mm layer of vertical concrete blinding to the face of excavation, formed and poured in specific custom-built wall shutters.

The outcome to the project was a faster and safer construction process. The benefit to the design was less earth would be disturbed and structural ingenuity of the engineered fill maintained.

#### Precision formwork and staged pour for tight concrete tolerances

The project specified very tight horizontal and vertical tolerances for the ring beams, ±5mm and ±2mm respectively. To achieve this, Ballestrin developed a staged pour methodology and custom-built curved metal formwork for compliance.

Each silo slab foundation contained 260 to 320m3 of quick setting S50 concrete. A pour of this size and complexity would be challenging and to mitigate any potential issues, Ballestrin in combination with the designers proposed suitable vertical and horizontal construction joints to allow greater control during construction.

# Project Profile

A local metal fabrication company was engaged for the 24m diameter circular formwork that was a custom design and build. The steel formwork was delivered in 12 pieces and bolted together on site. The formwork was anchored into the ground to avoid movement, and had continuous radius checks throughout the pour.