



CASE STUDY

Somersby Culvert Replacement

Somersby, NSW Australia

TechSpan® culvert
TerraPlus® wing walls

Owner: Gosford City Council
Consultants: Cardno
Contractor: Gosford City Council
Construction: Start July 2008

Background

The Mooney Mooney Creek sub-catchment of the Hawkesbury Estuary is dominated by bushland; the upper reaches are impacted by agricultural and peri-urban development. This results in perennial stream issues and bank erosion.

During the heavy rain in June 2007 there was a failure of the road embankment at Piles Creek where a steel pipe culvert goes under the Pacific Highway.

Challenge

The severity of the consequences of the failure and surrounding media attention resulted in the Gosford City Council needing an urgent, durable solution to replace the culvert at Piles Creek.

Inspection of similar structures in the catchment identified the need to also replace the steel culvert at Leask Creek.

Gosford City Council required concrete culverts, with matching concrete headwalls that could be tailored to their needs.

Solution

The Reinforced Earth Company (RECO) was appointed to design and supply the replacement culverts. RECO was awarded the work as based on previous experience, the client was

confident that RECO could offer an efficient precast arch solution that could be rapidly installed. Having a local company on the ground, with precast facilities nearby was an added benefit.

RECO's was able to quickly provide quality, durable, precast concrete culverts using TechSpan® precast arches from existing TechSpan® moulds from a previous project. The existing moulds were cleaned and altered slightly to meet with the design requirements for this project.

Although in this case the culvert was on a straight alignment, one of the major benefits of TechSpan® is that it can be used to easily construct culverts which are curved or skewed. TechSpan® is highly customisable.

RECO's Technical Manager, Chris Lawson states that "the TechSpan® culvert solution can be viewed as a 'bridge in a box'. The TechSpan® precast culvert along with headwalls is readily transportable, simple to construct and can easily be designed to suit specific project requirements. Furthermore, the design of TechSpan® combined with the properties of concrete give unrivalled durability".

The TechSpan® precast arch system can be combined with Reinforced Earth concrete faced



Main Picture: Installation of final TechSpan® unit.

Top: Note TechSpan® unit offset for increased stability.

Middle: Construction of TechSpan® crown beam.

Bottom: REhas® test strips are installed for analysis in the years to come.

Transport infrastructure



Left: Installation of REHas® soil reinforcing strips for the Reinforced Earth® wing walls.

Above: Construction of TechSpan® culvert and wing walls nears completion.

retaining walls which are adaptable to special finishes if an aesthetic appearance is required. The interface of these two systems is accomplished through accurate arch and panel fabrication, which marry each panel to the shape of the arch and ensure a precise fit between units.

Another challenge on this project was scheduling. The time limits between precasting and delivery were of concern due to the sensitivity of the project and the public's interest. This was complicated by the involved amount of site preparation that needed to be conducted to adjust rock levels and ensure water would flow as per design.

The RECO Project Manager visited site regularly for construction start-ups and client relations, whilst RECO's Patrick Webb was based on site permanently giving full time construction supervision.

The Leask Creek arches and Reinforced Earth® headwalls were completed in November 2008, and the road above was re-opened in December 2008.

Work commenced on the Piles Creek site in late February 2009.

Advantages over steel culverts

- Lower life cycle cost
- Improved aesthetics
- Faster erection
- Greater durability and longer life
- Easier to backfill
- Easier to waterproof
- Minimal installation deflection.

Project specifications

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|--------------------|----------------------|---------------------|
| System | TechSpan® | |
| Arch Type | TS | |
| Creek | Leask | Piles |
| Span | 6.65m | 8.29m |
| Height | 4.35m | 5.36m |
| Length | 16.78m | 18.64m |
| Thickness | 250mm | 300mm |
| No. Units | 15 full, 2 halves | 19 full 2 halves |
| System | TerraPlus® | |
| Finish | Plain | |
| Structure | Head / Wing Walls | |
| Area | 550m ² | |
| Max. Height | 9.6m | |
| Design load | 20kPa | |
| Design life | 100 years | |