

**A**bigroup and Seymour Whyte formed a joint venture to construct the Townsville Port Access Road.

The Department of Transport and Main Roads selected Early Contractor Involvement (ECI) as their preferred delivery model.

This meant the project was awarded based on the proposed project team, the companies' track record, their commitment to safety, their capacity to deliver the project and value for money, rather than a traditional tender process which looks primarily at cost criteria. There is a strong cultural alignment between the two companies which helped to build a unified project team.

The Townsville Port Access Road Project is being delivered in three sections. The first section, which opened in January 2010, is the Stuart Bypass, a 2.5-kilometre link between the Flinders and Bruce Highways, allowing the heavy traffic from western Queensland to bypass the

residential suburbs of Wulguru and Stuart. Stuart Bypass included a four span road and rail overpass and a two span crossing of Stuart creek.

The Eastern Access Corridor (EAC) forms the second section and links the Bruce Highway to the Port of Townsville. The EAC consists of about 7.5 kilometres of greenfield construction over an area of soft soils making up the tidal flats in South Townsville. There are two bridges over creeks, a further two flood way bridges and a series of multi barrel drainage structures designed primarily for flood mitigation. The road works embankments included surcharging and settlement monitoring to cater for the soft soils and high water table.

The third section is the Ross River Bridge. This six-span bridge is 200 metres long and links EAC in the south to the Port of Townsville. Due to its location at the mouth of the Ross River and next to Ross Island Army Base, the bridge design needs to accommodate a high number of vessel movements and possible ship impact. Deep alluvial soils also

provided challenges for the design team, with bedrock not found until a depth of 73 metres. A foundation design solution of pipe piles using skin friction between the soil and steel pipes was developed. The load is transferred to the reinforced concrete piles through a series of internal shear keys in the steel pipes.

The area is environmentally significant as a home to the endangered snub fin dolphin and migratory birds. Exclusion periods were established restricting construction activities between October and January when the birds migrate. Exclusion zones and air curtains were used to protect the dolphins.

As a legacy item to the Townsville region, a 500ha plus environmental park has been established surrounding the EAC section of the project. This area is a significant fish breeding ground for the Great Barrier Reef and its protection will ensure the sustainability of local marine ecologies. Fish passage features were incorporated into the road design. Fish-friendly

features include baffles in culverts identified as key fish passageways, allowance for fish passage at all temporary waterway crossings during construction, and selection of fish passage friendly surface treatments for abutment protection works at bridge crossing sites.

Before work started over the tidal mudflat areas, the project team safely relocated 59 mud crabs to a suitable environment near the work site.

The team also undertook a mangrove regeneration trial on mudflats adjacent to the Ross River Bridge site. The team has collected and planted mangrove seeds adjacent to the abutments, with early indications that a strike success rate of 80-90 per cent has been achieved.

Spill containment ponds have been built on both sides of the road to provide environmental protection from the risk of fuel or chemicals spills from heavy freight haulage along the route. The ponds ensure spills will not discharge into the surrounding sensitive environmental areas.

# TOWNSVILLE PORT ACCESS ROAD

**MAIN CONSTRUCTION COMPANIES : Abigroup  
and Seymour Whyte**  
**CLIENT : Department of Transport and Main Roads**  
**COMPLETION : Late 2012**  
**DESIGN : Aecom**  
**LENGTH : 10 km**  
**PROJECT END VALUE : \$190 Million**



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**SEYMOUR WHYTE**





## READING THE EARTH

Coffey Geotechnics were commissioned to provide geotechnical and potential acid sulphate soils (PASS) investigations along the route of the Townsville Port Access Road – including subsurface investigations, chemical testing and geotechnical reporting. Coffey provided advice on slope and pile design parameters for the overpass and several bridges and the design of preloading required where the embankments crossed soft ground.

Ground conditions vary along the route – from stiff clay and weathered rock at Stuart to sand dunes near Ross River and soft marine clays along several kilometres of the Eastern Access Corridor. A variety of investigation techniques were used, including drilling with conventional sampling and SPT testing, deep over-water drilling and rock coring for the Ross River Bridge site, piezocone penetrometer (CPTU) testing, and shallow drilling and test pit excavation.

A critical issue for embankment design was undrained shear strength and consolidation properties for the soft clay. T-bar testing (by IGS) was used to provide a continuous profile, together with vane shear testing in the

boreholes at discrete depths. CPTU dissipation testing was performed in soft clay along the route. In the very soft to soft clay fill placement could have resulted in slope failures. Geotechnical investigation and design therefore formed a crucial part of the project design.

By making good use of the construction schedule and varying height and duration of preload along the route, the need for wick drains or other ground improvement was avoided. This contributed significantly to cost-effective design and construction of the \$190m project.

Coffey Geotechnics is a specialist ground engineering consultancy providing site investigation, analysis, design, and construction monitoring of ground conditions for major infrastructure, buildings and mines. They have offices in Australia, New Zealand, the United Kingdom and Canada, with over 600 staff comprising geotechnical engineers, engineering geologists, geophysicists and hydrogeologists.

Coffey has won many national and international awards for its technical excellence.

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SPECIALISTS MANAGING THE EARTH

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## SCIENCE PAVING THE WAY FOR GROWTH



Biodiversity Assessment and Management (BAAM) was engaged to examine land on the southern bank of the Ross River during route investigations for the proposed access road to Townsville Port. BAAM were specifically searching for evidence of the vulnerable Water Mouse (*Xeromys myoides*). The results of their investigation were incorporated in the final environmental impact report.

Formed in 2001, the company fields a team of highly skilled ecologists. They have specialist knowledge of vegetation communities and species, terrestrial and aquatic vertebrate and invertebrate fauna, and of habitats throughout Australia, South East Asia and the Pacific. Their services are available to all levels of government and private enterprise, in fact to anyone who needs unbiased independent ecological advice.

BAAM specialises in carrying out baseline surveys, targeted surveys, research and ecosystem monitoring. The company's strength lies in its ability to interpret survey results, specify their relevance to current legislation and then spell out clearly the implications of these results in planning and management terms.

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