

GALLIPOLI UNDERPASS

DEVELOPER : AdelaideConnect
MAIN CONSTRUCTION COMPANY : Leed Engineering and Construction, Thiess
PROJECT END VALUE : \$117 Million
COMPLETION : October 2009
HEAD DESIGNER : Parsons Brinckerhoff
STRUCTURAL ENGINEER : BECA
URBAN DESIGN : HASSELL
COMMUNITY RELATIONS : Kath Moore + Associates

TEAMWORK PUTS UNDERPASS PROJECT AHEAD OF THE GAME

South Australia's Gallipoli Underpass on South Road is an outstanding example of teamwork in action. Not only did AdelaideConnect bring the project in early, under budget and with no days lost due to workplace injury, they won an Earth Award from the Civil Construction Federation this year, and the Engineers Australia Malcolm Kinnaird Engineering Excellence Award in 2007 for the process adopted in developing the design and construction.

AdelaideConnect brought together the talents of Thiess and Leed Engineering and Construction in a joint venture, working as part of a consortium with Parsons Brinckerhoff, HASSELL, and Kath Moore and Associates alongside the SA Department for Transport, Energy and Infrastructure, to deliver a design and construct contract utilising

Early Contractor Involvement (ECI). The task was constructing an underpass on ANZAC Highway, to improve traffic flow on this main transport link between the industry of the south and the port in the north. It is Adelaide's busiest arterial road for both freight and commuters. Construction had to take place while maintaining traffic flows of up to 40,000 vehicles a day, and without disrupting adjoining community facilities, including a medical centre.

Thiess and Leed provided project management during the ECI phase, and engineering support and project supervision during construction, including managing the construction of concrete structures, earthworks and pavement construction. The project commenced in March 2006 and was completed late 2009.



from the start in order to reach "Best for Project" outcomes. Working together in a collocated office promoted good communication amongst the team and meant that each party developed a good understanding of all of the issues and drivers for the project. Strong relationships and a cooperative "one team" approach based on collaboration was developed during the early stages of the ECI process. These relationships and behaviours continued throughout the construction phase resulting in a successful project for all parties," he said.

"As a contractor, being involved during the early stages of the project meant that we could have more constructability and planning input in the design. The large amount of time and effort that went into detailed constructability and programming reviews resulted in a project that ran to plan without any major unforeseen issues. The project was completed ahead of programme and under budget."

"The intersection is one of the busiest in Adelaide and it was vital that we maintained traffic flow throughout the construction period. We achieved this through the use of an innovative design and a staged delivery programme. In stage 1 the Southern half of the bridge and underpass were constructed leaving the existing traffic on ANZAC Highway just North of the construction work. The Southern half of the bridge was designed to accommodate live loading prior to the entire bridge being completed. This allowed the ANZAC Highway traffic to be diverted onto the new Southern half of the bridge whilst the new Northern half was built where the traffic had previously been running. In addition to this the underpass was positioned to the West of the existing South Road alignment, further reducing potential traffic impacts."

One of the core values of the project team was the development of our staff and succession planning. This was seen as Leed's George Constantinides was promoted to Project Manager for the final stages of construction. "We all sat down as a consortium to develop the design," he said. "Everyone worked in the one office, which streamlined the design process and allowed every aspect of the concept design to be challenged in terms of constructability and value for money. The ECI process reduced the costs and gave the client the best result."

There's no rest for the excellent – Thiess is currently working on Adelaide's Coast to Coast Light Rail Project which is extending the existing tramline from North Terrace, down Port Road to the Entertainment Centre. Leed, building on their relationship contracting capability, are busy with the Glenelg to Adelaide Parklands Project which is the first Alliance Contract with the South Australian Government.

Developing a design that would meet the projected future traffic flows along South Road was the main challenge, according to Leed Engineering and Construction Director, Andrew Millar. "We involved both the urban designer and public consultation teams from the beginning. The design was developed to cater for construction staging, not the other way round," he said. "An excellent relationship has been achieved between all partners in this project to clearly demonstrate a commitment to the successful outcome for the project and the companies involved".

Thiess Project Manager for the early construction stages, Paul Teakle, found many positives in the teamwork approach. "The ECI process allowed the Client, Designer and Contractor to work together right

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DRIVING THE SENSE OF PLACE

As part of the Adelaide Connect ECI team, HASSELL made urban design one of the drivers of the Gallipoli Underpass project. The outcome has been recognised with three State Awards and has been nominated for a national CCF Award.

“Generally (although less so now) infrastructure was the often the poor cousin in architecture. The components of the underpass; the bridges, abutments, walls, roads, kerbs, gutters, noise walls are often designed alone and not as a ‘kit of parts’,” said HASSELL Principal Daniel Bennett. “We provided design advice on seemingly unrelated objects such as traffic barrier profiles, retaining wall locations, light pole shape and colour, and many other elements with the sole aim of ensuring the right things ‘disappeared’ into the landscape, whilst highlighting interesting forms such as the profile of the underpass itself.

“Our biggest influence was the appreciation of ANZAC Highway as an ‘ANZAC Remembrance’ drive. We decided early on that the design had to reflect and acknowledge the importance of ANZAC history and tradition as well as remembrance. There are several aspects to the Remembrance: the ANZAC Memorial Garden, the four ANZAC Memorial Walls, the Feature Walls and the Bridge Memorial.” The landscape design created enhanced vistas along the very linear site. The water-sensitive design included selecting plant species adapted to the local climatic conditions as well as several different kinds of mulches to reduce evaporation.

“Working to very tight timeframes – often only a month apart – created a spirited working environment. The ECI process allowed a real ‘best for project’ approach from all involved. Whilst we were all part of ‘AdelaideConnect’ – the company ‘hats’ came off making it a

truly collaborative shared office with urban design at the forefront,” said Daniel. “As a landscape architect, I have become accustomed to having to challenge ‘norms’ and to consider the engineering solutions put forward constructively. The ECI process, despite the tight timeframes, allowed time to think and align the different perspectives and approaches. One of the great project outcomes is the fact that despite overall project savings achieved of over 35%, the urban design elements were not scaled back or reduced in quality.”

HASSELL was founded in 1938 and is one of Australia’s largest multidisciplinary practices in the disciplines of Architecture, Landscape Architecture, Interior Design and Planning. HASSELL has 800 staff across studios in Australia, China, Thailand and Hong Kong servicing those regions as well as New Zealand and Europe. HASSELL’s vision is to be a global leader in designing a sustainable future. Among the Adelaide office’s diverse current projects are Adelaide Zoo’s Giant Panda Exhibit, Adelaide Oval redevelopment, Bowden Urban Village Masterplan, an upgrade to one of Adelaide’s prime eating Streets (Rundle Street) and working with the same Gallipoli Underpass team on another ECI-structured project, the Coast to Coast Light Rail extension.

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FACILITATORS OF THE BUILT FORM

Axis Constructions (SA) Pty Ltd (Axis) is part of the Axis Building Group, a multi disciplined national construction organisation with focus directed primarily to Government Departments. Axis Constructions (SA) has recently completed the refurbishment of Glenelg’s Iconic Holdfast Hotel as well as one of the South Australian Government’s first Low Affordable Housing Developments in the Adelaide CBD.

Axis Building Group operates a Quality Management System that complies with the requirements of AS/NZS ISO 9001:2000 (Quality) and AS/NZS 4801:2001 (Safety). Axis is proud to have been associated with the Anzac Highway Underpass providing Acoustic Attenuation Services to a number of properties affected by road noise adjacent to the underpass.

Axis has demonstrated capabilities and experience in noise attenuation of buildings such as schools, homes, offices, churches and public buildings. We have been and are engaged in noise attenuation schemes and projects such as

- Adelaide Airport Noise Insulation Project (AANIP)
- Sydney Airport Noise Insulation Project (SANIP)
- Anzac Highway/South Rd Underpass (DTEI)
- Northern Expressway Road Noise Attenuation Project (NExy – DTEI)
- Sturt Highway Upgrade Road Noise Attenuation Project (DTEI)
- Port River Expressway Road Noise Attenuation Project (PRExy – DTEI)
- Roads & Traffic Authority (RTA) NSW Road Noise Architectural Acoustic Treatment Program

Axis Building Group’s Head Office is located in Sydney with Axis Constructions Pty Ltd and Axis Metal Roofing Pty Ltd servicing the Sydney and NSW Construction Industry.

Axis Constructions Pty Ltd is an award winning Master Builder with prequalification with The NSW Department of Commerce, NSW State Rail, Federal Transport for Aircraft Noise Insulation Works in Sydney and Adelaide, NSW RTA Architectural Acoustic Treatment Works and NSW Department of Housing to name just a few. Axis Constructions strong association with leading Architects and Engineers is the perfect platform for Design and Construct projects and developments.

Axis Metal Roofing Pty Ltd is recognized as one of the Metal Roofing Industry’s leaders having completed numerous iconic projects in Sydney and NSW such as the Stadium Australia, the Olympic Aquatic Centre, IMAX Theatre, the Olympic Velodrome and the Blacktown Athletic Centre where the roof sheeting was a continuous length of 110 metres. Axis Metal Roofing is a Quality and Safety Endorsed company.

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Beca has assisted with cost effective design solutions to give one of Adelaide's most congested bottlenecks a substantial makeover. A major arterial route into Adelaide, ANZAC Highway intersects with South Road, Adelaide's busiest and most critical arterial freight route. South Road carries much of the road traffic from the southern suburbs towards the city centre. Growth and development in these suburbs has seen South Road users suffering the effects of extreme traffic congestion in recent years, and the intersection with ANZAC Highway was a particular hotspot.

The South Road underpass is part of the South Australian Government's plan to transform all of South Road into a continuous non-stop route, reducing congestion and improving safety. In keeping with the theme of ANZAC Highway, it features five memorials including a memorial plaza dedicated to the ANZAC's. The underpass was lauded by South Australia's Premier Mike Rann as "a successful project, on time and on budget, with a very strong urban design focus".

The Project Scope

The challenge was to produce a cost effective solution for achieving major improvements to both roads, constructed with minimum disruption to the community and traffic and within the Department for Transport, Energy and Infrastructure's (DTEI) budget. The DTEI appointed the AdelaideConnect consortium under an 'Early Contractor Involvement' (ECI) contract, which allowed detailed interaction between the client, designers and constructors at the planning and preliminary design stage. The project scope included the underpass, extensive retaining walls, a new intersection layout and urban design enhancements.

Beca's Contribution

Assisting the principal design consultant, Parsons Brinckerhoff (PB), Beca provided significant inputs to the selection of the agreed solution and the development of the selected design. These inputs included early stage investigation of alternatives, development of several structural solution options and value-for-money design to suit the final layout. When the preferred solution was approved, Beca undertook the detailed design of the underpass bridge, seconding its lead structural engineer to the project. According to Beca's General Manager of Infrastructure in Australia, Robert Jamieson, his team continued to provide support throughout the construction and, when unforeseen ground conditions led to difficulties on site, worked closely with the construction team and PB to develop cost effective, practical solutions to overcome the difficulties and allow construction to continue. "We are proud to have contributed to this major improvement in the Adelaide road network, and to work closely with the DTEI staff and the design and construction team to find solutions together and meet the project goals," he says.

An active Roads and Bridges Team

Beca's Australian Roads and Bridges team, based in Melbourne, is pre-qualified for most of the professional services for civil, transportation, and planning work associated with projects for Vic Roads. The team is actively building market presence in the region, positioning itself in the local government, contractors and consultants, and state government markets. Australian transportation clients can also benefit from the capabilities and experience of the broader Beca



group. Beca is the largest transportation provider in New Zealand, with expertise in transportation infrastructure and intelligent transport systems. The Roads and Bridges team also recently did detailed design for the Melbourne Airport APAC Drive on and off ramps, a project nearing completion. The AUS\$20 million project provides a new connection to the Melbourne's motorway network with better terminal access. Beca's full detailed design scope on the project included civil and structural engineering services, traffic engineering, lighting, cost management and stakeholder management.

Global Multidisciplinary Support

Beca is one of the largest employee-owned engineering and related consultancy services companies in the Asia-Pacific. The company offers a variety of engineering consultancy services as well as cost management, project management, planning, architecture, land information, valuations and software development. Beca provides these services to clients in many markets including water, airports, defence, mining and metals, oil and gas, transportation and power. Beca's ability to bring multidisciplinary teams together from locations around the globe, to bring the right skills onto a particular project, is a key differentiator.

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GLENNGRC® MAKES 'BIG THINGS' POSSIBLE

The Big Prawn in NSW, London's Millennium Dome, the Equatorial Hotel in Ho Chi Minh City, the Australian Pavilion at Japan's World Expo, Melbourne's Underground Tunnel and Brisbane's 'Aquativity' Waterplay Park are all diverse structures, and are all prime examples of how Glenn Industries can make 'big things' possible.

Glenn Industries is a leading manufacturer of lightweight engineered building systems and products servicing commercial, industrial, civil engineering, agricultural and domestic projects globally. The company has the capability to design, engineer, manufacture and install their trademarked GlennGRC® (Glass Reinforced Cement) to exacting requirements, and replicate the most intricate design detail which is critical with historic restoration works.

This versatile Adelaide-based company has most recently applied this expertise in the fabrication of GlennGRC® to supply and install detailed panels for the South Road 'Gallipoli' Underpass in Adelaide. The project required the product to be aesthetically pleasing, durable, impact resistant, lightweight, as well as fast and easy to install to avoid undue disruption to the busy thoroughfare during construction.

GlennGRC® panels cover both the entrance and exit walls of the Underpass, with 240 panels measuring approximately 2.5 metres wide and varying from 1m to 9m high.

"The panels feature an artistic lineal relief pattern which transects across multiple panels. As the entry and exit walls taper, in order to match the pattern with zero tolerance, 3-D drafting and design detailing was critical", Sasha Grosset, Glenn Industries' Business Development Manager explained.

"GlennGRC® met all the project criteria in terms of quality of finish, strength and longevity and, at approximately 1/10th the weight of precast concrete, also provided a lightweight solution with exceptional erection speed," Sasha said.

The Underpass project clearly demonstrated the speed and simplicity of installing GlennGRC® panels with Glenn Industries utilising their own trucks, crew and access equipment for the staged installation procedure.

GlennGRC® panels are formed with an integrally cast-in steel sub-frame to the rear of the panel, which was custom engineered for the Underpass project to withstand the buffeting and suction wind loads associated with vehicular traffic, while providing an aesthetically pleasing finish with no exposed fixings. Installation requires no secondary steel work, as the panels are a completely finished product which can be fixed directly to structural steel or form-work.

Builders and Architects can further maximise the benefits of GlennGRC® by utilising Glenn Industries' consulting services at the

initial design phase. GlennGRC® has been proven to be an extremely cost-effective solution in a wide range of applications, with optimum results achieved when the product is specified at the design stage.

GlennGRC® has been utilised as a cladding product on projects including the new Newcastle Council Chambers, the Australian Taxation Office in Adelaide, the Equatorial Hotel in Ho Chi Minh City in Vietnam, and as the main element in recreational facilities such as the 'Aquativity Waterplay Park' in Brisbane, and the whimsical sculptures in the 'Backyard Playscape' in Adelaide's Hindmarsh Square.

Versatile GlennGRC® also forms the basis of Floor Tiles created for the Sydney Opera House Western Foyer upgrade, is featured as undulating panels for the Chatswood Transport Interchange, and appears as high-gloss coated Ticket Booths in Spencer Street Station.

Public artworks are an ideal application for GlennGRC®, and the product's versatility is showcased on 'The Body Zone' in London's Millennium Dome, which won the Australian Institute of Building's 'Professional Excellence in Building' Award in 2000.

Glenn Industries utilise their proprietary 'Dots in Space' technology to sculpt artworks to exact dimensions, and create to scale well-known icons such as Australia's Big Merino and Big Prawn, and the Merlion on Singapore's Sentosa Island.

The internal walls of the Australian Pavilion at the World Expo in Japan also featured GlennGRC® panels, providing excellent acoustic qualities and the mandatory four hour fire safety rating. The high gloss feature on these panels, and the similar finish on the ticket booths at Spencer Street Station and the Melbourne Underground Tunnel, are just a few of the many finishes which Glenn Industries can create to suit individual projects.

With GlennGRC®, you are only limited by your imagination!


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JAMTEK STRUCTURAL PTY LTD - SOLID EXPERTISE FOR CIVIL CONSTRUCTIONS

Having a multi-skilled workforce is one of Jamtek Structural's greatest strengths. When it comes to a major job like the South Road Underpass project, they are able to construct the formwork and also do the steel fixing, as well as place in-situ concrete.

"I employ carpenters and then multiskill them," explained company Founder and Managing Director Steve Plamenac. "Tony Falzon looks after the construction side and is our senior general foreman, his 35 years plus experience in the industry makes it easier to take on the challenges in order to create the ongoing quality standards we are trying to achieve. "We do the majority of the work on any job ourselves, only occasionally and when required or where there are larger work scopes do we use known and reliable subcontractors, as we did on the Gallipoli underpass. "For the South Road Underpass project we did all the Formwork, in-situ concrete and reo for the abutments, bridge deck and roadside barriers, and also did the culvert replacement at Brown Hill Creek. We also built quite a large storage tank underneath the road."

The task involved up to 12-20 Jamtek workers and or sub-contractors at any one time, working from September 2007 through to September 2009. "There were stringent quality controls, the design mixes had to be approved, concrete testing had to be approved on site on an above normal sequence, there was no margin for error with the quality control," said Steve. "The roadside barriers were a challenge with the shape, which changed in size, they grew and changed shape as they got bigger. It was also a challenge working with existing infrastructure around the site, a lot of areas were a bit confined."

Since Jamtek began operating in 2003, they have undertaken some extremely significant civil projects. They include providing all the formwork on the Bakewell Underpass for McConnell Dowell; supplying concrete, reo and formwork for the shiplifter at Larges Bay Marina for Bardavcol; contracting for York Civil on Berth 7 and Pt River express way and currently working on the Coast 2 Coast for Thiess and Downer EDI performing the insitu works for the tramway extension through the city of Adelaide.

They also did the formwork on the biodiesel facility for Leed Engineering and Leightons; assisted with a bridge in Robinvale NSW for Boulderstone Hornibrook, a spillway in Victoria for Leed Engineering, and spent six months involved with the City Green Alliance Pipeline GAP Project, also a Leed Engineering Alliance project. They also did the formwork on some quite large temporary works bridges on the new desalination plant for Leed.

Green Star work is also part of their repertoire, with Jamtek brought in by Hansen Yuncken on the Six Green Star SA Water Offices project to do a small service trench and install plywood and particle board decking. "It was only a small part, however it was interesting having to use and ensuring all glues and other materials met Green Star requirements," said Steve.

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SOUTH ROAD - NAILED

Geovert were contracted to undertake the ground engineering package of work for Adelaide Connect on the South Road / Anzac Highway Underpass which involved the drilling and installation of soil nails, permanent post tensioned anchors, bored drainage and extensive shotcrete works.

Geovert is a specialised Construction Company that has developed a reputation for providing innovative construction solutions in the field of Ground Engineering, Slope Stabilisation and Rockfall Protection. They're able to provide clients' value engineering on projects at an early stage in their design process by using innovative construction techniques and turn key solutions. The technical team draw on their vast amounts of experience working on foundation engineering projects locally and internationally, managing the design and construction of geotechnical works on civil, mining and infrastructure projects.

The South Road project used the largest quantity of soil nailing in South Australian infrastructure to date, comprising of over 19,000 linear meters of soil nails in just 300 meters of new road. Utilising newly imported specialist drilling and anchoring plant, Geovert completed the works within the programme, exceeded the client's high level of quality and safety expectations, and illustrated the advantages of this type of ground support to all contract parties.

Geovert is an Australian owned business that has been operating for 10 years with offices in Sydney, Brisbane and New Zealand and has worked on projects through out Asia and the Pacific. Being driven by innovation and quality, the company also understands their clients' requirements in terms of OHS management and traceability and have the resources to assist in developing look-ahead programmes and detailed methodologies to allow multiple areas or projects to work simultaneously.

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TRAFFIC MANAGEMENT AND SECURITY SERVICES

TRAFFIC UNDER CONTROL



It is a credit to the skills of Filcon Safety Group (SA) that they managed traffic flows of up to 40,000 vehicles a day for a working civil construction site without a single major incident. There was the complex job of planning and implementing all the traffic management requirements throughout every stage of the Gallipoli Underpass project, working to project-wide safety standards set by Leed and Thies which resulted in over 750 days of construction with no Lost Time Injuries (LTIs).

“Our involvement stretched from the very first surveyors being on site, through to the finishing touches to the landscaping and final layers of asphalt. We also provided onsite security guards to guard and keep secure the entire one kilometre long site,” said Filcon SA’s Managing Director, Dean Van Kempen.

“The daily requirement for staffing was intense, at times needing up to 20 personnel on site at once and at other times requiring coordination of 10 to 15 traffic controllers for 4 to 5 days of around the clock works. On average I believe we would have had 6 to 8 traffic controllers on site for the entire duration of the project. The constant flow of traffic on South Road, being the main north south corridor was a huge challenge, and in general the overall traffic flow on Anzac and South rd was a continuous issue.

“The relationship we have developed with Thies and Leed, the two members of the Adelaide Connect joint venture, has become a solid one as we have moved onto various other projects with Leed, and are also currently working with Thies on the Coast to Coast Tram Line extension project in Adelaide. Both Thies and Leed have very high safety standards so it has been great for Filcon to align ourselves with such highly professional companies.”

Filcon SA have been in operation since 2007 and provide contracting Road Traffic Management solutions and security services for both construction and film industry projects throughout South Australia. They have over 60 employees forming experienced teams who can implement safe and efficient lane closures, diversions/detours, total street/road closures and effective systems for pedestrian flow through construction work sites. The company offers a 24 hours a day, 7 days a week Traffic Management Service, also Client Liaison and Work Site Assessments; Traffic Management Plan Survey and Consultation; Council and DTEI permits, applications and liaison; Long term site Traffic Management signage implementation and maintenance; and equipment hire including but not limited to Arrow and VMS boards, Water Barriers, Temporary Fencing and General Signage.

Their focus is on supplying state of the art services, with a commitment to efficient and safety conscious work sites. All Filcon’s traffic controllers have the construction industry OH&S White Card and Workzone Traffic Management Qualifications.

The Filcon Safety Group’s Head Office in Melbourne actively services every state in Australia, providing specialist traffic and security solutions for clients including Hansen Yuncken, Probuild Constructions, Sergi Cranes, Abigroup, Paramount Pictures International, Sony Pictures International and Channels 10, 9 and 7.

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