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ELLETT CONTRACTING

CRANBROOK GRAIN RECEIVAL SITE EXPANSION PROJECT SUBCONTRACT WORKS

Client/Principal: Georgiou Group, head contractor to CBH Group

This project was a major expansion to an existing CBH grain receival site in Cranbrook, 320km south of Perth. Ellett Contracting's scope of works included:

- Installation of 150,000 tonnes of new open storage
- Installation of four augur pits
- Removal of an existing elevator pit and bootpit
- Installation of three new 215m conveyor loading systems
- Refurbishment to three existing conveyor loading systems

Major challenges included the project's location and the time frame for construction. Crews, equipment and materials were mobilised out of Perth. As this was a drive-in drive-out project, fatigue management and reducing the number of mobilisations and demobilisations was a high priority in planning.

The project was run over a tight time frame as it needed to be completed outside of harvest season to prevent delays to CBH's operations. Delivering the project over the winter months created many challenges, including planning and preparing concrete pours around rain throughout the project.

As Ellett Contracting has worked on grain receival site upgrades in previous years, the company is well experienced in scheduling works to a tight timeframe and ensuring it works in with other contractors to keep the schedule in place.

The most technically complex aspect of the project was counteracting the high water table and associated drainage issues. This affected the earthworks, and the installation of the elevator pits.

Ellett Contracting worked with the head contractor, Georgiou, to improve drainage by installing additional culverts. The design and location of the additional culverts was a team effort between Georgiou's engineers and Ellett Contracting's project manager Mike Ellett.

The additional culverts that were installed by Ellett Contracting successfully addressed the drainage issues on site and were able to be installed around the existing construction works, ensuring that no delays were incurred.

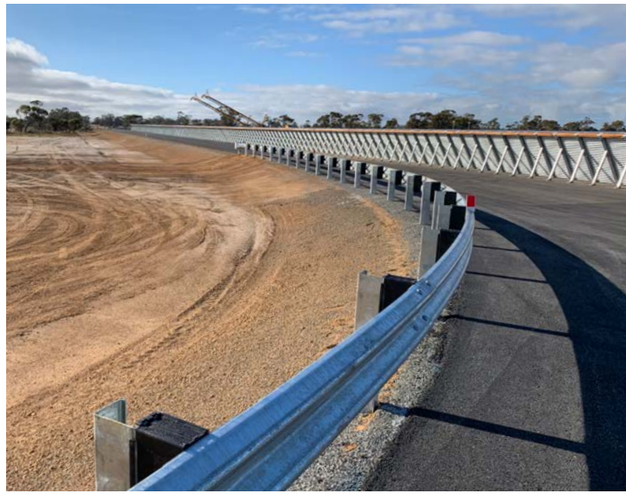
During the project, Ellett Contracting began the process of certification to AS/NZS ISO 9001:2016 Quality Management Systems and had engaged the assistance of a Quality Advisor to ensure all documentation and processes were aligned with the standard.

Regular, company-wide quality management systems were maintained during the life of the project, such as maintaining purchasing registers and lists from pre-approved suppliers; engaging only fully approved and trained employees and subcontractors; and maintaining all plant, equipment and assets to construction standards.

Ellett Contracting produced Inspection Test Plans for each of the major project scope items. The ITPs were developed using company knowledge of previous, similar works. These ITPs were maintained throughout the project with verifying documentation being completed through the iAuditor System. As the Cranbrook project was one of the first major construction projects where Ellett Contracting used iAuditor, all verification checks had to be transferred over to this format. As iAuditor is a web based platform, staff were able to update checks to include all site-specific information easily, attach photos and file documentation with no lag, and include information such as drawings and standards as part of the checklists to ensure the most relevant information was available at all times. These documents are also able to be signed off onsite and become instantly available to Perth-based admin teams for checking and filing.

Due to its understanding of how to operate in a remote location, and the planning that went into ensuring it could be reactive and flexible to changing site requirements, Ellett Contracting were able to complete its scope of work within the defined construction period to ensure harvest operations at the Cranbrook Grain Receival Site were not affected in any way.

Ellett Contracting worked in with the head contractor wherever possible to reschedule works, reuse existing materials or equipment, and cut labour costs so that variations to the original scope were the most cost-effective option available while still achieving the quality required of the site owner.



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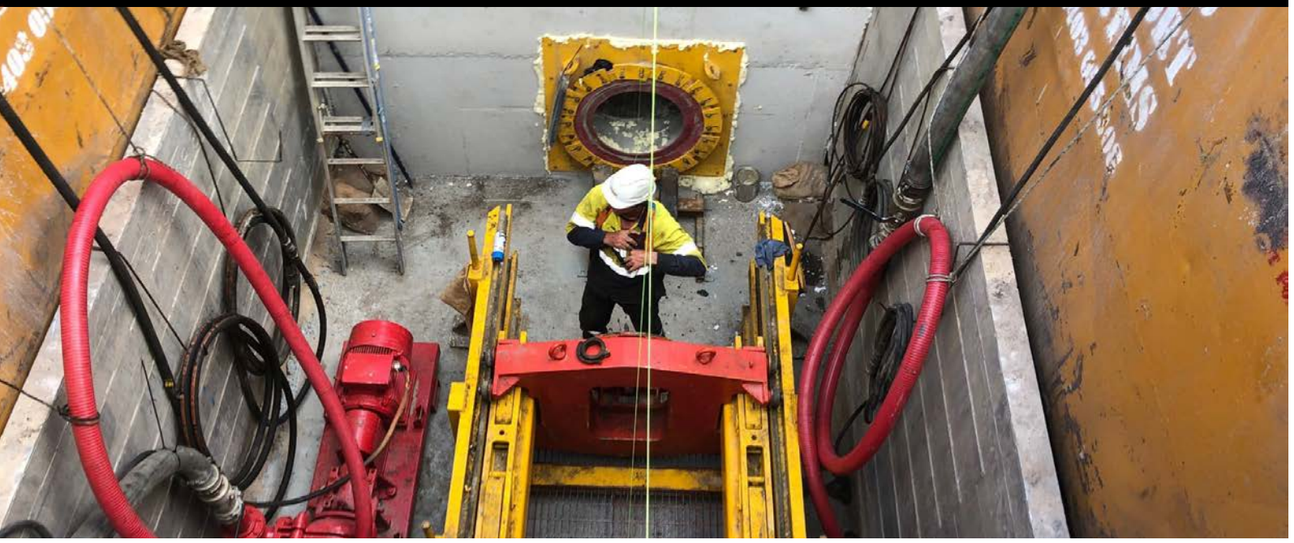


DJ MAC CORMICK CONTRACTORS

PIER ST, MILLIGAN STREET RAIL CROSSING MICROTUNNELS FOR WESTERN POWER CONDUITS

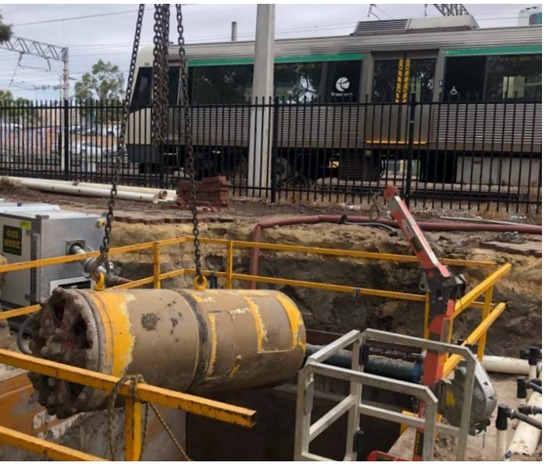
Client/Principal: Daly Contractors/Western Power

DJ Mac Cormick Contractors undertook specialist microtunnelling works under railway lines for head contractor Daly's Constructions, which was contracted by client Western Power to install a new high voltage underground cable between two Western Power substations. The cable went under the rail network at Milligan Street and Pier Street.

DJ Mac Cormick utilised a Herrenknecht AVN 600 tunnel boring machine (TBM) and control container.

With considerable experience tunnelling under rail in Perth, DJ Mac Cormick was closely involved in pre-planning prior to works commencing, including gaining the necessary approvals from the Public Transport Authority to work inside the rail corridor. Throughout the project, DJ Mac Cormick continually liaised with its client and with the PTA to update progress and ensure the construction windows provided were being met.

Detailed planning was critical to eliminate any risk of disruption



to rail services outside the scheduled rail shutdown periods (10PM-4AM). Due to the critical path requirements and risk level, only highly experienced personnel were assigned to this project. The tunnelling shafts were located outside the rail corridor to reduce risk in access.

Risk management initiatives included a contingency backup TBM operator to ensure strict shutdown dates would be met. Dayshift works were approved by PTA, which permitted tunnelling up to 3m before the first rail track without the need for a shutdown. This procedure also allowed DJ Mac Cormick to monitor for any unforeseen ground conditions prior to entering the high-risk area around rail.

A challenge was presented by the high groundwater table at shaft locations and the requirement to tanker water off the site, as sewer manhole flows were not suitable to cope with the amount of water flow.

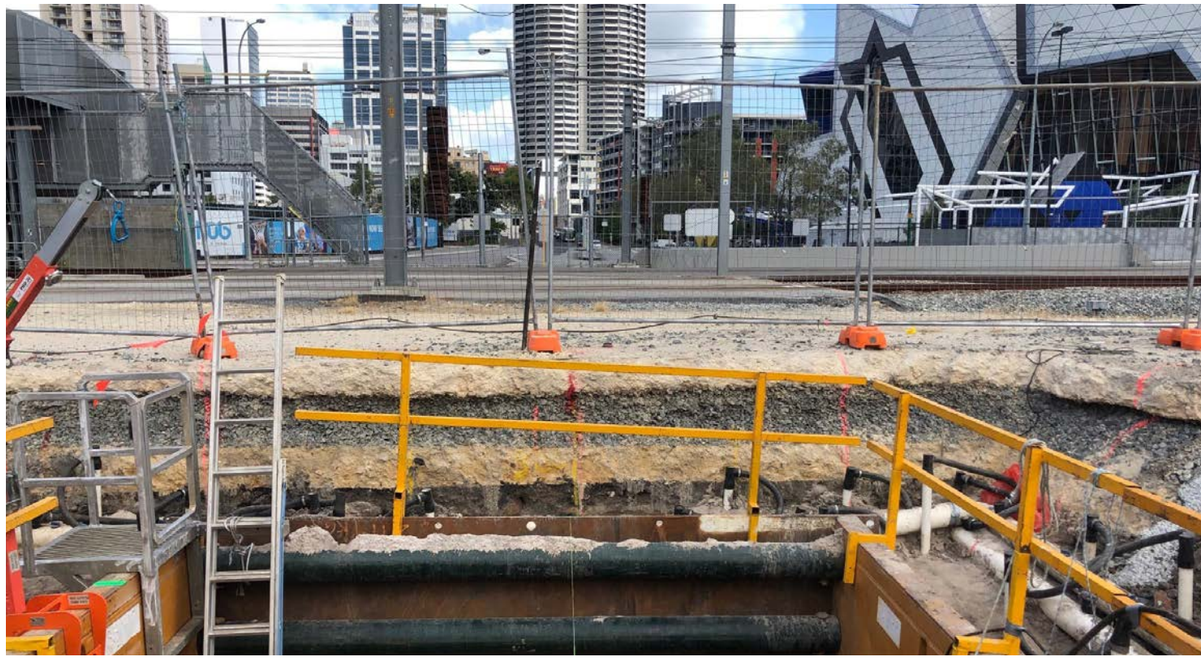
Humes Perth supplied the 600mm jacking pipe for project. Delivery of the pipe was timed to suit daily requirements to minimise the laydown area required.

A project-specific Quality Management Plan was developed and implemented. Inspection Test Plans were completed and signed off for each crossing, including as-constructed pick up and settlement monitoring.

Environmental requirements on the project included removal of potential Acid Sulphate soils to an approved nominated stockpile site for further treatment and testing. Only clean fill was used for backfill at shaft locations. All slurry material from tunnelling operations was removed off site to a licensed disposal location.

At the Pier St launch shaft, excavation was monitored by a heritage observer due to the presence of artefacts in the ground above pipe level.

DJ Mac Cormick undertook extensive settlement monitoring inside the rail corridor during and after construction. No settlement was detected and survey levels were all as per the pre-start.



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NEO CIVIL

MIDDLETON BEACH COASTAL PROTECTION CIVIL WORKS

Client/Principal: City of Albany

To facilitate a planned redevelopment at Middleton Beach, including a hotel, retail and commercial spaces and residential accommodation, the City of Albany identified the need for coastal protection works including a new seawall. Following a competitive public tender process, Neo was awarded the head contract.

Of major concern to the client was community access to the beach and other amenities. Neo met with the client and other key stakeholders and proposed a proactive approach to immediately accelerate the program and do a large body of the works prior to the Christmas shutdown. Meetings were held with stakeholders to plan and explain construction sequencing. Neo had a model of the works made and displayed at the surf club.

The original program anticipated works being carried out in four consecutive stages, with a large portion of the beach needing to be closed over the peak summer period. Neo accelerated the program and successfully completed the Stage 1 and Stage 2 works prior to Christmas, which allowed the City to open the beach up for the December-January period. Neo returned to complete Stages 3 and 4 in February.

The works had the potential to create significant sand drift due to the prevailing high winds. Six-inch dewatering pumps were used in conjunction with two-inch flex drive pumps to spray water onto the sand bunds created during excavation, to keep them wet. This minimised increased sand drift from the works, which assisted in maintaining the amenity of nearby businesses. The bund of damp material assisted in stopping sand drift in the high winds, which is typical for the time of year.

Core and armour rock was delivered to site in different weights (0.8t, 1.0t, 1.5t, 3.0t) and the supply of armour rock and core rock in the right ratios was essential. The site had to be reconfigured to take the only locally available trucks (end tippers and side tippers) and make space for stockpiling rock in a constrained site.

Neo and the client negotiated an alternate access to the site. Instead of traversing across the beach – enclosing the beach – a public car park was used as alternative access. This kept the beach open and avoided bogged machines and other potential hazards.

Sequencing had to be precise for each point of the works.

Placement of various size rock had to meet specification and design levels; and armour rock placement was subject to hold points and inspection by the coastal engineer.

The design of the seawall comprised the rock revetment, the limestone block wall and the reinforced in situ concrete curved capping beam. The curve was set on differing radii for the capping beam and it was very challenging to get the curves on the wall - which was comprised of 1m segments – to tie in with the in situ concrete. The capping beam was a continuous smooth curve on top of the wall and not in 1m segments.

Neo's solution to incorporate the curves was to set out the wall at 1m intervals and tie in the curve at the bottom of the concrete capping beam with the top of the wall. This took a lot of careful planning and hard work by the formworkers to get the required aesthetic finish.

One of the latent conditions in Area 3 and 4 was that rock was encountered up to the toe of the revetment, which meant the dewatering spears were becoming ineffective. Neo solved this by installing the spears with shorter screens (200mm instead of 1m) to catch water running along the rock.

Neo was also installing 50 MPa concrete in the middle of summer. The contract called for wet hessian and seven days water-curing. With a major risk of cracking, Neo set up a reticulation system that operated 24 hours a day to keep the hessian fully wet for seven days.

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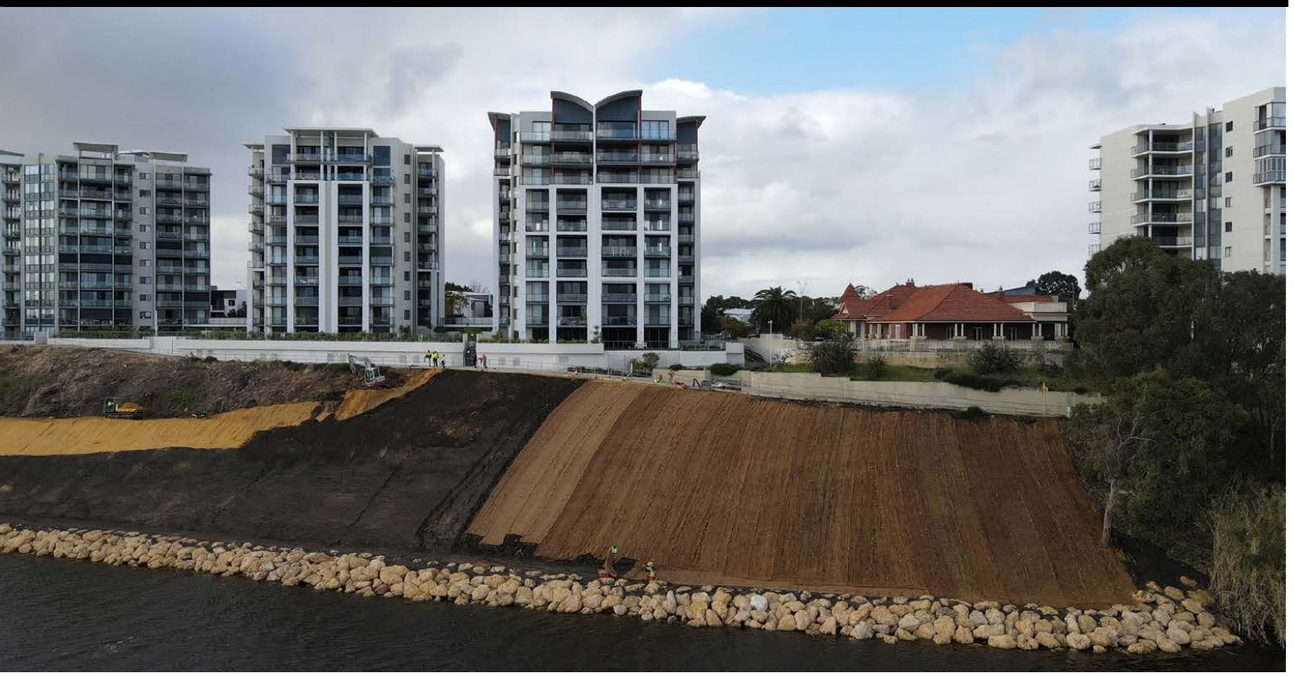


MMM (WA)

HILL60 BANK REMEDIATION

Client: Department of Planning, Lands & Heritage

Urgent major remediation and stabilisation works to the Swan River escarpment behind the Hill60 Apartment Buildings in Rivervale were required. Temporary remedial works had been undertaken following a landslide in 2012 however the slope continued to be affected, and a 60m section of dual-purpose path adjacent to the apartments had been heavily undermined.

The recommendation was an engineering solution involving the weighing down of the toe of the slope by constructing a rock revetment. A toe extending into the Swan River would create the structural integrity to achieve slope stability.

The urgent remediation works included:

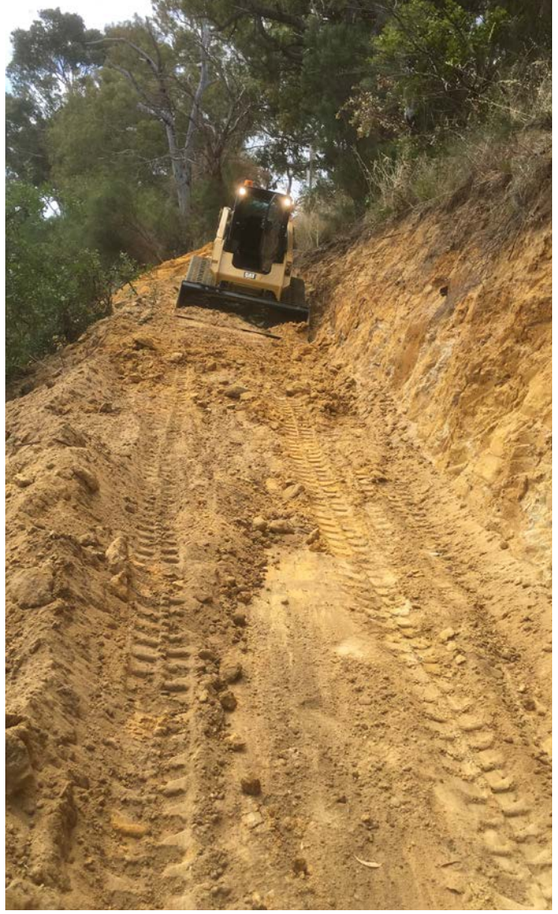
- Creating a temporary access track from the reserve to the foreshore
- Removal of all vegetation on the slope
- Construction of a 170m revetment, 12m into the river
- Stabilising 60m of undermined dual-purpose path
- Installation of soil to reduce slope steepness
- Revegetating the slope with native species

The Swan River, or Derbal Yerrigan in Nyoongar language, is the one of the most significant Aboriginal cultural sites in the Perth region. The project would require cultural monitors to be present during the excavation stages to look for uncovered artefacts and to ensure that the construction techniques would be conducted with minimal impact to the Swan River and its spiritual and environmental values.

The only available access to the site was through a recently refurbished park owned by the City of Belmont. The extremely steep trail was cleared of trees, to enable the access track to be cut. Initial earthworks to establish the track were carried out with a mini excavator. The lower side of the track was supported with steel sheet piling, and was continually monitored during construction and upgraded when necessary. During periods of heavy winter rain, the track was deemed too slippery and works were halted.

Due to the extremely limited laydown area – just 120 square metres – MMM had to ensure materials hauled into the stockpile were relocated and placed immediately along the embankment. Scheduling of deliveries was imperative and played a crucial role in the success of this project.

Scheduling the works due to tidal movements and weather conditions was paramount. Some elements of the works required staging around low tide, however due to the scope of the project and time constraints this was not always possible, and work carried on with varying tide levels.



Before any work commences on the Swan River a silt curtain is required to be installed and maintained during the entire duration of the works, to prevent blooming from construction demolition or materials entering the river. These works required a double silt curtain – one to contain the entire works and a second to contain the current work area. A professional dive team was required to maintain the silt curtain and reinstate it after tides and interference. Twenty anchors were installed to secure the curtain to the riverbed.

Accurate placement of filter rock is crucial for the revetment, as it provides a foundation for the overlaying armour rock. Due to the restraint and restrictions on site a solution was required to use the existing machinery to reach 8.4m. A 3m-wide blade "pusher arm" was fabricated to MMM's design and attached to a 13t excavator. This proved highly successful, enabling the riverbed to be lightly excavated and shaped to meet the design levels.

To enable the placement of 4t armour rock to reach the end of the toe design, a steel railway line was fabricated to place the rock onto so that it rolled down and out to the depth of the toe. This solution was necessary because the maximum sized machine that could be mobilised down the access track was a 20t excavator, which did not have the reach to place the furthest rock.

Two 5t dump trucks were purchased and shipped from Queensland, to enable the maximum material to be carted from the laydown without compromising the stability of the slope. The dump trucks had rotating seats so that they did not need to turn around on the embankment, which was not possible in the initial placement of blue metal and filter rock.

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ENVIRO INFRASTRUCTURE

BRIDGES 1203 & 1209 (BEACH ROAD OVER MITCHELL FREEWAY) GUARDRAIL AND EPS UPGRADES, HAMERSLEY

Principal: Main Roads WA

Enviro undertook critical safety improvement, utility asset relocation and structural refurbishment works to Bridges 1203 & 1209, which span the Mitchell Freeway and PTA Urban Rail Network at Beach Road in Hamersley.

The bridges, a concrete t-roff construction, were fitted with outdated guard rails and protection screens, presenting a significant risk to the motoring public, pedestrians and cyclists accessing the adjacent Warwick Station and PTA and Main Roads assets. Enviro's scope of work involved changing out the guard rail for a new Main Roads-compliant four-rail system, installing new electrification protection screens, footpath and kerbing upgrades and modification to existing utilities and services located in and off the bridge deck.

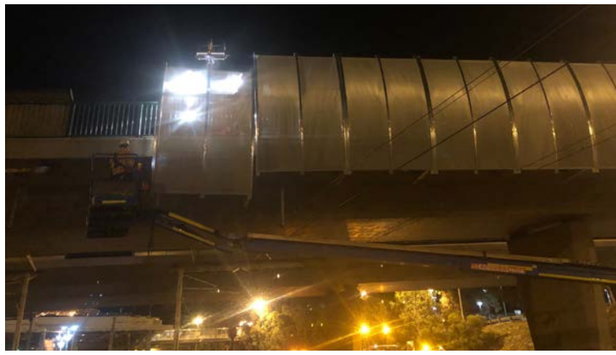
Due to the complexity of undertaking works spanning the PTA electrified rail and Mitchell Freeway under live rail and traffic conditions, the project required a contractor experienced in operating in high risk, high compliance rail environments, but adaptable enough to use innovative construction techniques to deliver the scope of works.

Enviro offered the principal a "one stop shop" for project delivery. Enviro's management experience and established relationships as a panel contractor to most of the main stakeholders meant that Enviro was able to engage early and effectively with all parties. Enviro's in depth understanding of Main Roads Specifications and PTA's EM4P (Engineering Management for Projects) Framework meant it could develop project management plans and QA/QC documentation to align to the requirements of both parties, minimizing cross over and expediting delivery.

Enviro (as PTA and Main Roads panel contractors) coordinated the design negotiations between the principal (Main Roads) and the designers (GHD) to ensure that all applicable engineering management requirements were met and both parties' assets and operations were protected for the duration of works.

Enviro analysed the concept design and proposed an innovative construction methodology, relying heavily on the company's experience and technical competence to assume much of the risk profile.

The first component of the project involved removing the existing guardrail posts and rails during single lane closures on night shift, ensuring that separable portions of the guardrail replacement undertaken each night were completed and reinstated to Main Roads standards by the following morning for normal traffic flow to resume. This meant tight timeframes and a complete mobilisation and demobilisation nightly for the guardrail crews. The supply of barrier components and posts, fabricated and treated offsite at Enviro's steel fabrication facility in Bibra Lake, were coordinated to minimise onsite storage and laydown requirements.



The second major scope was the installation of Electrification Protection Screens to the extent of the bridge decks, to provide safety and protection for both PTA electrified rail infrastructure and pedestrians. This scope was extremely complex involving coring through the bridge deck and bolting into the parapet and craning the large steel elements into place. The core locations in the bridge deck interfaced heavily with in situ utility service runs, requiring significant footpath removal to gain access to the conduit runs, realign or relocate these services and re install. Where redundant conduits remained in the bridge deck the engineering design meant these had to be grout filled, requiring Enviros team to seal all core holes and base plates before grout pumping and/or injecting. All of this work had to be undertaken as night shift over the PTA rail network and the Mitchell Freeway.

Enviro assisted Main Roads during negotiations with utility asset owners whose assets were located in the bridge deck or project footprint. These included Telstra, Western Power and NBN. Enviro then took over managing the interface and the required relocation and realignment scopes. Some service relocations required a minimum 12-week lead time and Enviro's project management team had to coordinate traffic and rail shutdown, with their own significant planning and lead time requirements, to align exactly to these utility shutdown periods.

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ITALIA STONE GROUP

BANDY CREEK WEIR REINSTATEMENT

Client: Department of Transport

The Bandy Creek Weir structure is located about 5km north-east of Esperance in the Bandy Creek Boat Harbour facility and managed by the Department of Transport. Bandy Creek is a major natural drainage for the lakes to the north. The lakes are an internationally recognised series of wetlands; highly valued for the migratory water birds which they support.

The weir structure was first constructed in 1981, prior to the development of Bandy Creek Harbour in 1983. The weir was destroyed in 2007 due to record-breaking rainfall and associated floodwaters. A new weir structure, constructed in 2010, was damaged during floods in 2017.

Advisian designed a new weir which was to be built on a new adjacent alignment. ISG, a Western Australian civil contractor with over 50 years' experience in the construction of marine civil works, managed all aspects of the project.

The project site was within a very small footprint in close proximity to areas where no clearing could take place, making the construction of the weir and bridge challenging. This meant that the project needed to be planned and managed onsite meticulously.

One of the most challenging issues was the discovery of the DN315 sewage pipe which was not in the location shown on the issued for construction drawings or the DBYD plans. This could have caused a significant delay to the project's schedule later in the project. Following detailed potholing and investigation of the pipe location, the data was sent to Advisian to redesign the layout of the sewage main.

ISG constructed a temporary construction bund including diversion culverts across the creek to successfully install the sheet piles, tubular piles, and weir rock work. Predicting and thus managing the flow required through the construction bund proved extremely difficult due to weather and tide changes.

ISG supplied and placed all the granite armour rock on the project. The armour rock was placed by using a GPS guided excavator on top of two layers of geotextile on all the revetments and the weir section.

ISG engaged PERMAcast to manufacture the headstock and road deck panels for the project. The headstocks, weighing 10t each, were installed on top of the tubular piles. The headstock had openings cast in them to provide an area for the in situ casting of the specially mixed concrete.

Vinyl sheet piling was an effective alternate to steel piling for the construction of the weir wall. The main advantage of vinyl sheet piles was the superior corrosion resistance when exposed

to seawater. Driving the 12m vinyl sheet piles to the required specified depth of 10 metres was identified as the highest project risk due to the erratic geotechnical conditions. ISG mitigated this risk by having a long reach excavator on standby to dig to the potential point of refusal.

ISG demonstrated its commitment to materials recycling and reuse by removing the existing granite armour rock from the revetments prior to the construction of the new weir. The armour rock was stockpiled, sorted, and used in the construction of the new weir and revetments.

The old existing weir was broken up utilising ISG's 20-tonne excavator and rock breaker attachment. More than 2000t of concrete was broken up into 300mm pieces and trucked to nearby Esperance Shire waste recycling works where the concrete was crushed for reuse as a base material for hard stands and drainage construction works.

ISG engaged Esperance Tjaltjraak Native Title Aboriginal Corporation (ETNTAC) to perform cultural heritage site management and cleaning services. Working with ETNTAC, ISG also created two trainee roles on the project. The trainees gained

valuable experience in different facets of civil construction. An Aboriginal employee mentor advised and assisted the trainees.

Approximately 30% of the final contract value works was awarded to regional subcontractors and suppliers during the execution of the project. ISG provided advice, support, and guidance to local businesses to help them comply with DoT requirements.

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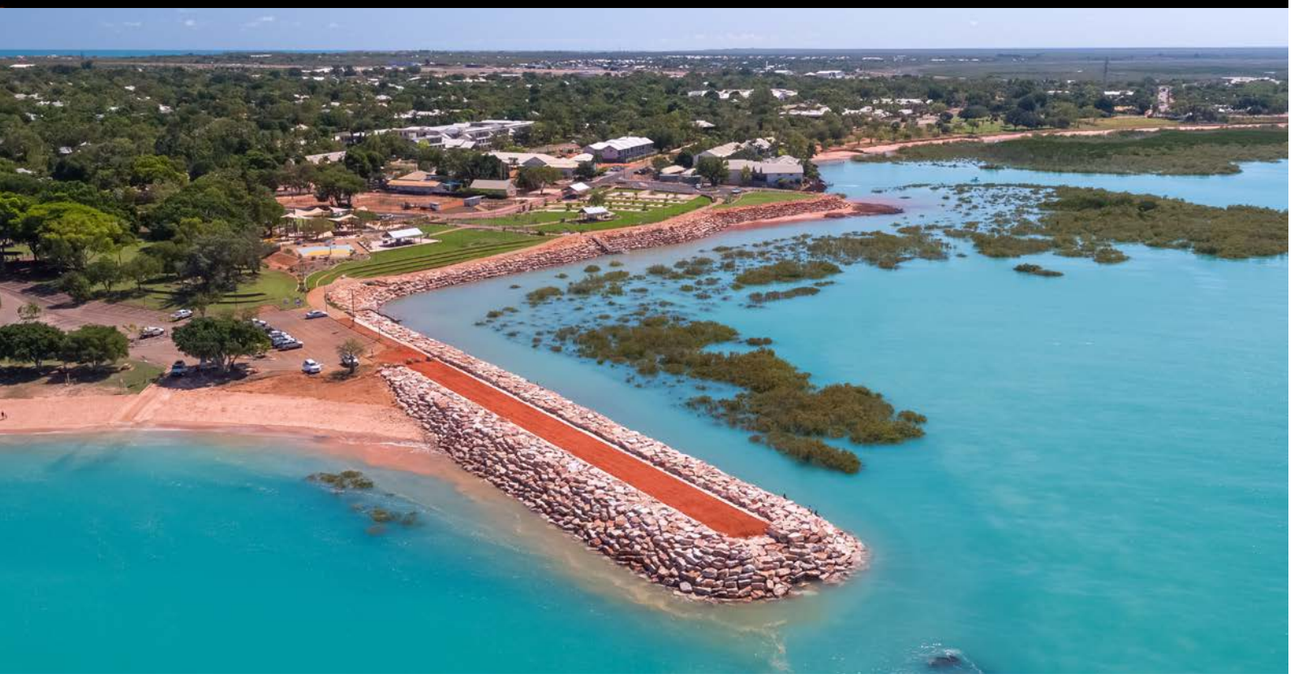

WA LIMESTONE CONTRACTING

BROOME TOWN BEACH GROYNE UPGRADE

Client: Shire of Broome

The Broome Town Beach Groyne Upgrade was the first stage of the development of a new jetty facility at Broome Town Beach, with WA Limestone Contracting (WALC) being awarded the Groyne Upgrade stage.

Prior planning and management certainly made a big contribution to the project achieving a successful outcome. Items identified in the Risk Assessment submitted prior to construction commencing, looked at the following issues:

- Rock supply issues meant that there was a possibility of requiring an additional quarry to be made available to supply rock for the project. However, this was identified early as a big risk factor for the project, so an early award of the rock supply contract meant that this additional supply source was not required.
- Weather and tidal conditions during the Broome wet season can be quite variable, so adjustments were made during construction to accommodate these fluctuations. Construction at lower wall heights was prioritised during favourable tidal conditions, and this enabled the construction programme to proceed as planned.
- Delays due to environmental approvals not being made available at the commencement of the project were factored into the timing of mobilisation to the site, which was considerable given that most of the plant and equipment was coming from Perth. However, approvals were officially received in early January 2020, and the plant was able to be mobilised to site by mid-January 2020, which then enabled the completion of the project prior to Easter 2020.

Broome's large tidal movements are well known and were always going to present a challenge. During certain times of the day, the tides prevented works at the lower levels of the groyne. However, the construction team sequenced the job by ensuring that low tide construction times were always taken advantage of, and geofabric/lower rock placement happened during suitable tidal times. When tides prevented lower level works from taking place, the rock placement excavator would reposition itself to the top of the groyne and continue with rock placement at the higher groyne levels. This sequencing prevented programme delays and ensured the project continued as scheduled.

The site was littered with concrete waste and construction debris prior to commencement, which was going to incur a large cost if it needed to be disposed of at a landfill facility. WALC sought agreement from the consultant and client to reuse the waste concrete on the site as part of the filter rock layer, provided that it met the sizing specifications. WALC then sorted and removed only the scrap steel and vegetation from the construction area, further saving time and costs for the project.

The ground conditions around the base of the existing groyne

proved quite challenging to work on. Soft clays as a result of daily inundation meant that excavators had to devise alternate methods to be able to work safely on the edge of the groyne without bogging the machine. This was achieved by carefully sitting the machine on top of rock material placed by the excavator and orienting the machine in a way that it would not sit too deeply in the soft material.

The installation of the pile sleeves for the future jetty installation was a major challenge. Six PVC pipes, each 3m long, had to be installed to a pinpoint location on the batter slope of the end point of the groyne. Once installed, the PVC pipes were then wrapped with geofabric, and had filter and armour rock placed around them. Careful placement of rock was required to ensure the pile sleeves stayed in position. To further increase the difficulty of this task, three of the pile sleeves were required to be installed on a 1-in-5 'rake', due to the pile design, so pinpointing and installing this sleeve position was a very challenging task. Survey points were taken at all stages of construction to ensure that the correct position of the pile sleeve was maintained.

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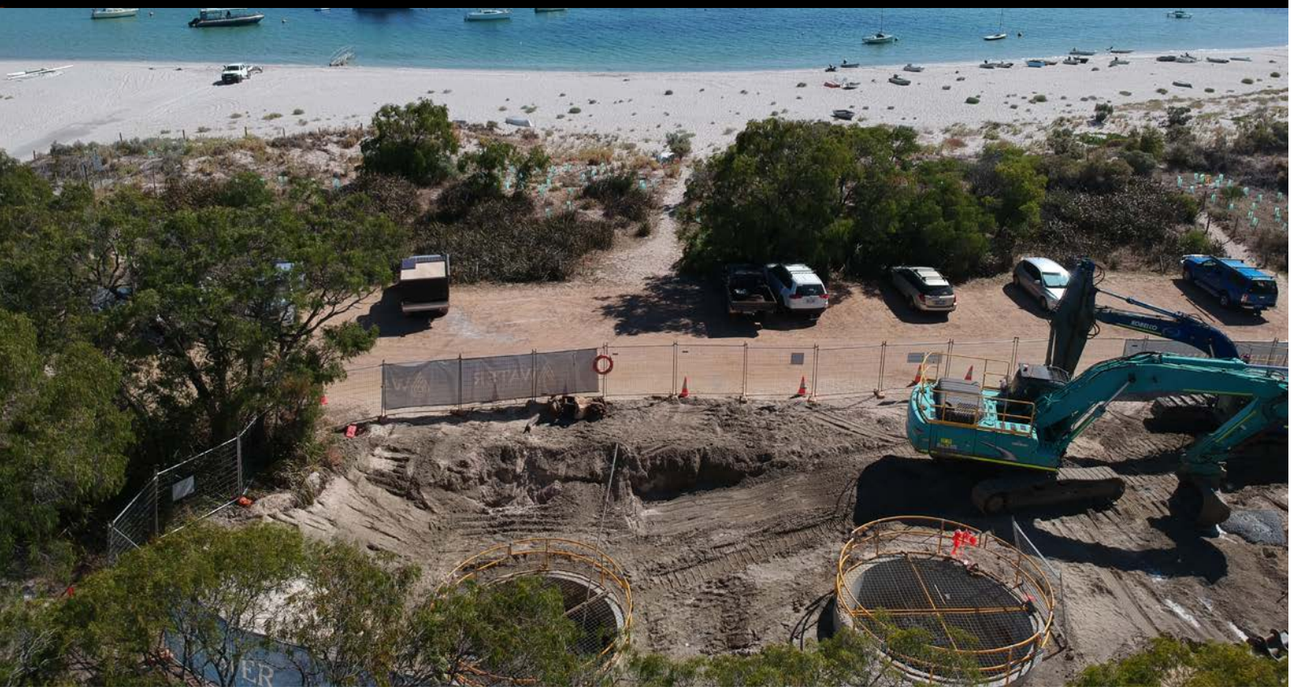

ROB CARR

QUINDALUP INFILL SEWERAGE PROJECT

Client: Water Corporation

The Burswood Public Jetty concept design, provided by the Department of Transport as part of the D&C tender, involved three individual 32m long by 4.8m wide floating pontoon berths connected to onshore concrete abutments by large structural steel members. Restraint could not be provided to the pontoons by driven piles, as would be the case normally for such jetties, due to environmental and heritage concerns.

Throughout the design phase, Maritime Constructions coordinated a number of specialist design engineers, the fabrication yard, the Principal and other stakeholders.

Construction was notably challenged with a site with essentially zero land-based footprint and laydown area, the presence of many sites and other contractors in the area with competing interests, and a mud 'bow wave' created by constructing the revetment prior to jetty works.

The Optus Stadium and Matagarup Bridge projects were already putting pressure on the limited land area available and the interface with the public as the adjacent public bike lane had to remain open. The constraint placed on Maritime Constructions included minimum impact to the public and other contractors occupying the pathway and access to multiple sites on the Burswood Peninsula.

Addressing this constraint was achieved by creating a pathway for all material delivery by water – using the 'Blue Highway'. This also required the design, planning and execution of the entire works to take in consideration this "minimum land impact" approach.

The three jetty floating pontoons were braced back to abutments on shore due to the "no piling" design approach. This no-piling method also allowed for a more mobile telescopic-boom type crawler crane to be placed on the main construction barge, rather than a heavier lattice boom type crane. This plant selection decreased mobilisation efforts and costs and increased barge mobility and work efficiency on site.

Controlling the forces being imparted on the abutments were a complicated part of this D&C contract. To overcome this constraint, the design of the interface between the bracing arms and the concrete abutment adopted a very low friction, high wear 'Orkot' brand bearing material. This type of bearing required the arm connections and pontoon lugs to be line-bored to achieve the 50-micron tolerance for installation. The Orkot bearings were cooled in liquid nitrogen to enable installation into the connection housing tubes.

Maritime Constructions also introduced adapter vertically adjustable plates cast into the abutment, where the pin connection

between the support arms and abutment meet. If extreme settlement is experienced, the Department of Transport will be able to move the connection elevation vertically up by a maximum of 400mm with no additional construction work and only minor lifting equipment required to make the adjustment.

The river re-profiling works required constant water quality monitoring to ensure marine flora and fauna were not adversely affected by these works. For example, a sustained plume of silt could drop oxygen levels in the river that may cause distress to marine life. A Water Quality Monitoring Program (WQMP) was developed by project environmental staff and independently audited by an external consultant, with trigger points for each parameter and actions to be taken in the event those trigger points were exceeded. The completed WQMP was forwarded to the Principal for final approval before work commenced.

Maritime Constructions follow a strict waste minimisation policy on all our sites. This policy extends to recycling materials as far as possible. Project crews implemented these guidelines strictly on site. Wooden crates and waste rubber matting were sent back to the yard to be re-used as packing materials and waste metal products were sold to a licenced recycling facility, for example.

The on-water pontoon installation and the riverbed re-profiling works were completed quickly with due environmental safeguards. No environmental incidents were reported, and, river water quality safe limits were not exceeded throughout the whole project.

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EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $5 - 10 MILLION

BOCOL CONSTRUCTIONS

KALBARRI SKYWALK LOOKOUT STRUCTURES

Client: Department of Biodiversity, Conservation and Attractions

Thanks to its stunning red sandstone cliffs and gorges, Western Australia's Kalbarri National Park is one of the Coral Coast region's biggest attractions. Visitors can now take in the gorgeous views from two skywalks perched 100m above ground level and on platforms that stretch out into thin air. The breathtaking and architecturally designed Kalbarri Skywalk provides visitors with stunning views of the park's gorges, rust-red cliffs, and the flowing Murchison River below.

Bocol was engaged as head contractor by the Department of Biodiversity, Conservation and Attractions (DBCA) to construct these two magnificent structures and connecting walkways.

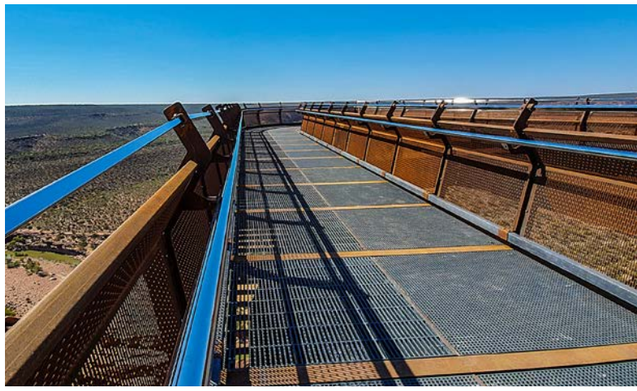
The engineering behind the Kalbarri Skywalk is as impressive as the attraction itself: Skywalk 1 extends 25m out over the edge of the gorge, while Skywalk 2 stretches 18m beyond the gorge's rim. The two skywalks form a horseshoe shape and have a connecting boardwalk between them. Both structures provide spectacular vantage points from a variety of angles. The two cantilevered steel structures are anchored deep into 400-million-year-old sandstone and support up to 85 tonnes of high grade red-oxide layered weathering steel, chosen to integrate the two viewing platforms seamlessly with the rust-red colours of the gorge. The deck of each skywalk is made from fibreglass reinforced plastic mesh that visitors can see through and feel the breeze rising from the gorge and river 100 metres beneath them.

Kalbarri is part of the traditional lands of the Nanda people, in the Yamatji region of Western Australia. The skywalks entry sign is named Kaju Yatka, the Nanda words for 'sky' and 'to walk'. Inspired by the region's Aboriginal heritage and beauty, several local indigenous artists created interpretative artwork as an important part of the skywalk experience.

When the initial skywalks design exceeded the client's budget, DBCA contracted Bocol to assist the architect and design engineers to develop cost-effective solutions to modify the original design. Ultimately, Bocol's innovations resulted in significant cost savings that enabled both skywalks and the linked walkway to be completed within DBCA's initial budget.

Bocol's project team initiated material changes to the skywalks brass balustrade by trialling alternative lightweight perforated weathering steel panels for the architects' subsequent approval. Bocol also developed a 3D BIM model of the entire skywalks precinct which facilitated further changes to the design, including: alternative weld types and details, revised structural steel detailing of the main spine beams, standardising plate thicknesses and stiffeners across both skywalks, altering structural detailing and spliced connection details from the large embedded sleeve plates to the skywalks spine beams, in addition to changes to the proposed construction methodologies.

Bocol's early decision to develop and manage a 3D BIM model was pivotal to the overall success of the project. This digital modelling allowed a medium for communicating accurate design

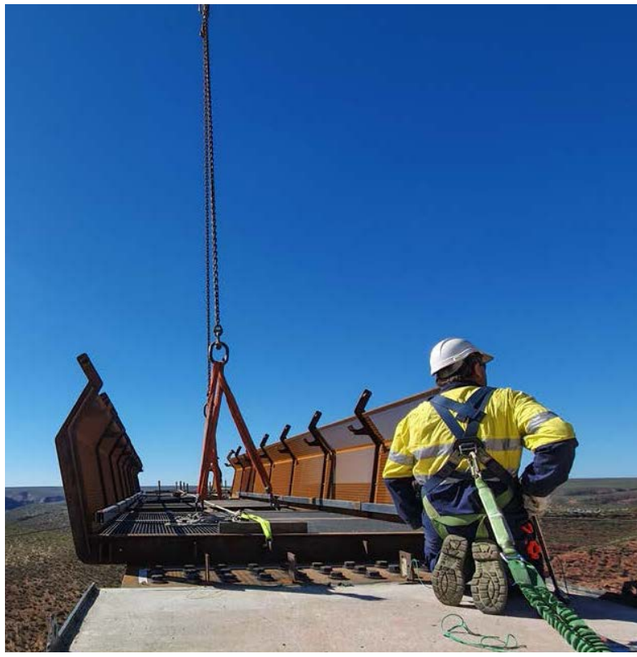


information within Bocol's project team, and to the client and key supply chain partners.

Working in an environmentally sensitive and Indigenous heritage National Park that is prone to extreme temperatures; dealing with strong and blustery winds that whipped around and through the base of each Skywalk during its construction, and effectively landing 85t of weathering steel 25m from the cliffs edge, all whilst working 100m above the Murchison River, were just some of the challenges Bocol's project team faced during construction.

With a number of critical materials being sourced from overseas with significant lead times, it was essential that Bocol's project team managed the procurement process with due diligence. From scouring the world to find weathering grade compatible high strength friction grip bolts to travelling to India to inspect and co-ordinate the timely delivery of the skywalks' fibre reinforced plastic grating, Bocol ensured the Skywalk project was delivered on time and budget.

Bocol was also responsible for the design and construction of the 100-year design life ground anchors that comprised permanent passive and active ground retention systems. Test anchors were installed and tested to failure to verify the anchor design. A specialised Comacchio MC-4D drilling rig was used for the work due to the confined constraints of 3m deep foundations.



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EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $5 - 10 MILLION

DOWNER GROUP

BROOME CHINATOWN REVITALISATION PROJECT

Client: Shire of Broome

The Broome Chinatown Revitalisation Project was a multimillion-dollar project to revitalise Chinatown's aging streetscape and facilitate the growth, rejuvenation, and diversification of the existing town centre. To meet the lifelong held aspirations of the Broome community, the revitalised town centre's redevelopment will preserve the town's rich history, celebrate its local culture and reinvigorate economic and development opportunities to make it a place of choice, to work, visit and live.

Stakeholder management was a key challenge. Weekly meetings were held with the client to discuss progress and community complaints. Advertising on the Town of Broome's Facebook page and local radio kept stakeholders up to date. Disruptions were advertised using variable message boards, Facebook, letter drops and local radio at least two weeks prior to any road closures.

Managing traffic through the town centre required detailed planning to minimise disruptions, and early engagement with stakeholders. Minimal disruptions to traffic flow were reported, and transport efficiency unaffected.

As Broome relies on tourism, works were planned around tourist cruise ships' arrival dates, ensuring less disruptive activities were carried out during these times. Significant sections of work were complete and handed over to allow the Chinatown Festival to take place. Critical path works were completed prior to the cyclone season, enabling the client to carry out public events during the festive season.

Downer established a strong working relationship with local subcontractors and suppliers. The client required 70% of the project to be delivered by local subcontractors/suppliers. Downer overachieved by attaining 88%. Utilising locals ensured packages were executed on time, while mobilisation costs were minimised, providing significant cost savings.

Working with its subcontractors, Downer achieved 37% Indigenous employment on the project. A great achievement compared to the industry average of around 15%.

Downer engaged an experienced local electrical subcontractor, who brought knowledge and experience in the implementation of Smart Cities equipment and how it should be housed to survive the high summer temperatures of Broome. This input brought about an improvement in the design.

An innovative artwork project on site was inspired by a dreamtime story about water holes. Yawuru artist Martha Lee designed a large-scale mosaic artwork named Jila, creatively identifying the location of some of the permanent freshwater soaks. The mosaic was to be located in front of the historic Sun Pictures site as part of the major street upgrade.

The artwork was converted into a digital design, scaled up with a position for each stone, and then set out by a surveyor and string lines on a concrete slab. More than 16,000 beautiful cobblestones were used to create the mosaic, with every cobblestone hand-sorted into colours and then hand-laid

by a team of ten labourers. The tolerance on laying was one millimetre, with checks done every five stones. Due to weather conditions, the majority of this work was completed between midnight and 10am, working in with the times movies were playing so as not to cause disruption.

While embracing the environmental needs of the Broome community, it became apparent that Downer could give back a 'piece of history' that locals could take home, while recycling original materials to make way for the new. This is an example of one of the 'no waste' initiatives that was adopted during the project.

During the demolition phase, the original pavers were raised intact and were palleted. These pavers were advertised and offered to the public for free. They were taken away and stored in a safe area away from the construction site for public collection.

After the pavers were removed, existing base course and asphalt were crushed and mixed together, then re-used as a subbase for construction of the new pavement. This new pavement created a new modern look, while using existing resources and minimising waste. Planning works around tides ensured the pavement was not compromised.

This recycling ethos was applied to other areas, such as the timber used for all the benches and shade structures was all made from recycled timber from Port Hedland and old bridges. Furthermore, excess material from landfill facilities was utilised on-site for construction.

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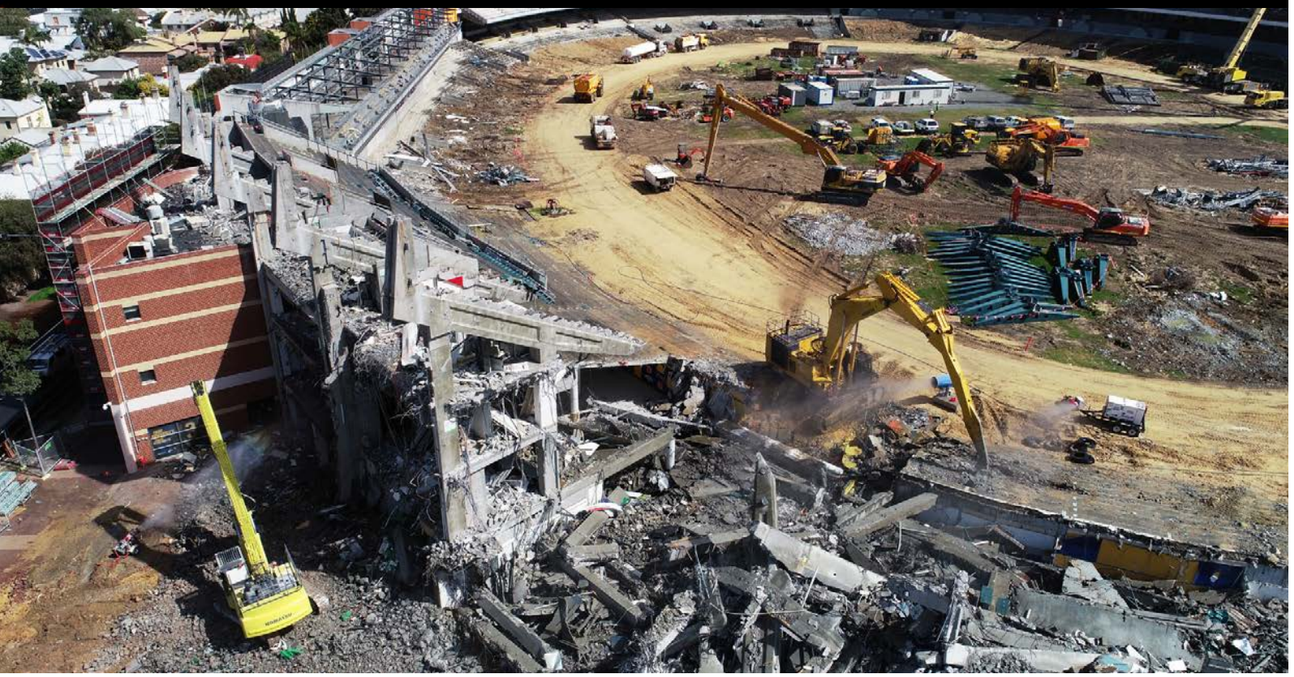
EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $10 - $30 MILLION



RJV CIVIL INFRASTRUCTURE

SUBIACO OVAL DEMOLITION AND RENEWAL

Client: DevelopmentWA

The demolition of Subiaco Oval was the largest such project ever undertaken in an urban setting in the State's history. It was also one of the most high-risk, requiring significant asbestos removal, innovation solutions for technically challenging location near residential areas, and sensitive treatment of a range of important heritage elements.

With more than 100,000t of concrete and bricks to be removed from the site, as well as 5,000t of steel and 200t of glass, many months of planning went into the careful management of the demolition process.

From the outset, minimising disruption to residents was identified as critical to the successful delivery of the project – and to this end, RJV dedicated considerable resources to program sequencing to allow for a smooth flow of traffic and to mitigate noise and dust impacts.

Three months of planning were undertaken to ensure the stringent development approval conditions were met. Full structural information for all surrounding buildings was not readily available, which necessitated a dedicated on-site structural review and analysis of all adjacent buildings, including Perth Modern School.

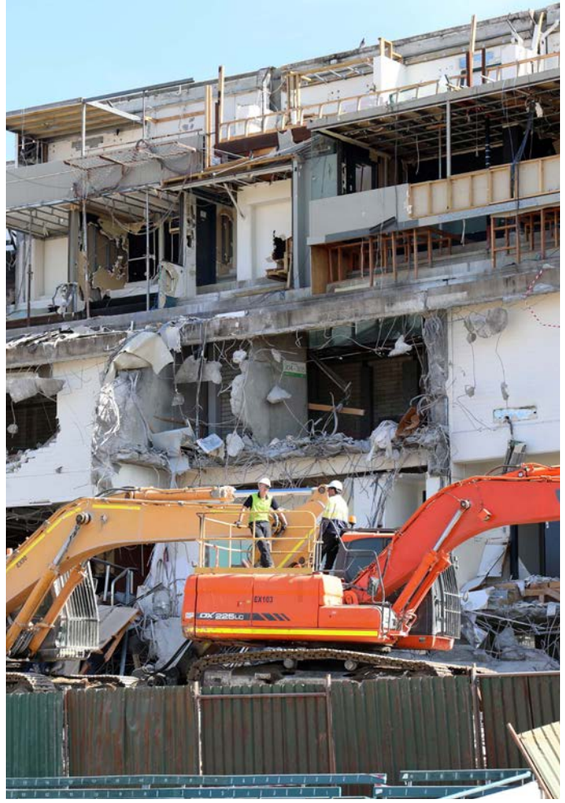
A high level of excellence was necessary to successfully manage heritage aspects within the stadium precinct and the surrounding areas of the historic suburb. At the west end of the site the heritage-listed gates, restored to their original 1935 condition, required protection, while the paving stones on the Sandover Medal walk, which celebrates the winners of WA football's highest individual honour, were carefully removed and retained in safe storage.

Significant heritage-listed buildings near the oval, such as Perth Modern School, were inspected and monitored throughout the works to ensure stability against the effects of vibrations.

The time constraints and sequencing of works required demolition on multiple fronts, with teams working simultaneously around the perimeter of the stadium.

Some 30 excavators, including high reach excavators, multiple cranes, elevated working platforms, skid steers, front end loaders and BROK remote control excavators worked in tandem to ensure timely delivery of the project. The close constraints of nearby housing and busy thoroughfares required an innovative demolition approach. The solution was to demolish the stadium infrastructure from the inside out.

A ring road was built within the site, meaning materials could be dragged in to be taken away rather than being pushed out,



which allowed footpaths and roads outside the ground to remain open. This inside out approach also meant Subiaco Oval's large grandstands were able to be employed as wind shields, reducing noise emissions and dust particles.

Managing dust was cited as a key concern for nearby residents early in the consultation process and special care was taken to limit the spread of dust using water and mesh. Materials were not crushed on-site, which allowed RJV's team to effectively manage demolition timeframes, maintain air quality and reduce noise and vibration. Instead, materials were broken up into large pieces and transported by truck to recycling facilities in Bullsbrook, Neerabup and Rockingham. All up, about 97% of salvaged materials were recycled.

Because of the size of the infrastructure being dismantled, work-related vibration and noise were key concerns. Work was limited to 7am to 7pm, Monday to Saturday to reduce the impact of noise on the nearby community. By placing vibration monitors at strategic residential locations around Subiaco Oval – some as far as several hundred metres away – the project team was also able to regularly monitor vibration levels and stay abreast of potential issues related to rock-breaking work.

As well as serving the community, the new Subiaco Oval also provides open space for the Bob Hawke College to the east of the site. An integral part of the project was to deliver landscaped open space in time for the College's opening in February 2020. This necessitated additional planning that resulted in the project being split into two phases, with a deadline on the first phase delivering open space that was essential to meet student needs. The deadline was met, allowing the new College to use the open space from day one of the school year.

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FINALIST

EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $10 - $30 MILLION

BMD CONSTRUCTIONS

PORT HEDLAND INTERNATIONAL AIRPORT UPGRADE

Client: Port Hedland International Airport

BMD Constructions was contracted by Port Hedland International Airport to construct new aircraft strength pavements for taxiway golf and undertake pavement improvement works to a section of the existing apron, as well as asphalt overlay works on the main runway. BMD's project was the first part of the wider redevelopment works for Port Hedland International Airport, which plans to significantly upgrade the airport's infrastructure over the next five years.

BMD overcame significant engineering challenges associated with building on pindan sands, working in a live airside environment over day and night shift operations, and a high groundwater table.

Unique to BMD's tender approach, was to combine airfield management knowledge with the local market to utilise knowledge of working with pindan sands present in the airfield location. A first for BMD was stabilising the pindan sand in a pugmill, with BMD ultimately delivering cement stabilised fine crushed rock over cement stabilised pindan sand with a code 4E foundation strength requirement, with the taxiway capable of handling all aircraft types.

The largest challenge overcome was managing airside works, with the PHIA acting as the gateway to Western Australia's North West and the Pilbara region, handling circa 70 flights a week, with flights daily to Perth and weekly to Brisbane and Bali. Key to the project's success was detailed planning across day and night shift operations. BMD initiated daily planning meetings and handovers between the day and night crews, ensuring all were aware of the proposed access routes in and out of the work area, permitted areas to access, restricted areas and any planned airside activity.

Over the duration of the project, BMD paved approximately 100 metres and 1000 tonnes per night over 90 nights, producing 100 tonnes of asphalt per hour through the onsite mobile asphalt plant, totalling 24,000 tonnes of asphalt over approximately 150,000 square metres.

The six-month works program culminated in approximately 100 nights of works, a daily workforce of 100 contractors and 39,000 manhours, successfully delivering a quality apron with no disruptions to scheduled flights.

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FINALIST

EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $10 - $30 MILLION

WBHO INFRASTRUCTURE AND MAIN ROADS WA

GREAT NORTHERN HIGHWAY - MUCHEA NORTH

Client: Main Roads WA

WBHO-I, on behalf of Main Roads, and with Aboriginal Partner Dadaru-Garli JV, delivered the Great Northern Highway Muchea North project. The project scope consisted of:

- construction of three kilometres of dual carriageway;
- construction of ten kilometres of new wider single carriageway from Muchea through to the Chittering Roadhouse;
- realignment of intersections at Old Gingin Road, Reserve Road, Wandena Road and Maddern South Road;
- realignment of Sugar Gum Drive; and
- repurposing of the existing highway for local property access to provide controlled and safer access points to the highway.

The project faced a number of technical and programming challenges which were addressed and overcome through collaborative teamwork, ensuring successful delivery of the project.

Most significantly, the project presented an opportunity for Main Roads to further its commitment to driving sustainable Aboriginal participation, whilst also providing continuity for WBHO-I in the implementation of its three-stage, three-year Aboriginal Participation Strategy. The overarching objective of the strategy is for WBHO-I to mentor and develop Dadaru and Garli's capability and capacity, with a view to them becoming an independent Main Roads accredited contractor capable of delivering projects utilising their own Aboriginal workforce.

This strategy has recently entered its third year and has thus far achieved tremendous success with Dadaru having submitted their R1 Pre-Qualification application to Main Roads.

WBHO-I and Main Roads jointly identified an opportunity to set a new benchmark outcome for Aboriginal engagement on a metropolitan project through an innovative approach to subcontracting. The incentivised Aboriginal subcontract delivered a discrete, non-critical component of the project that resulted in all Aboriginal participation targets on the GNH Muchea North project being well and truly exceeded.

It was agreed by all that this collaborative, incentivised approach was the most effective way to transfer knowledge, mentor and assist in the development and growth of both Dadaru and Garli and their people, systems, and delivery capability, whilst meeting the Aboriginal participation targets set by the client.

Overall, the project achieved the following outcomes:

- 48 - Full-time Aboriginal employees
- 11 - Local Aboriginal business participation
- 36% - Local Aboriginal business spend
- 64 - Nationally accredited tickets

- 23% Aboriginal employment (total labour hours)

The GNH Muchea North Project is located within the Swan Coastal Plain and Northern Jarrah Forest Bioregions. Three main areas of environmental concern were noted, and carefully managed by the head contractor in accordance with the Client's Environmental plan and assessments.

Dieback was identified in around 9.2% of the proposed action area. A Dieback management plan was developed in order to manage and mitigate potential spread of the disease.

A total of 2,369 potential breeding trees for Carnaby's Black Cockatoo identified within the approval boundary with ultimately nine trees showing evidence of use by Carnaby's Black Cockatoo impacted by the project construction. Impacts to native vegetation, conservation significant flora and habitat for Carnaby's Black Cockatoo were minimised through areas of offline works and avoided where possible.

WBHO-I investigated and ultimately implemented several additional initiatives to ensure the project environmental targets and requirements were achieved. These included:

- considering the vehicle/equipment types to be used for material transport and personnel movements during construction to improve energy efficiency through efficient vehicle, plant, fuels or practices;
- use of recycled glass in roadworks; and
- water recycling and treatment.

WBHO-I developed a comprehensive community and stakeholder engagement plan to:

- provide timely and accurate information to stakeholders and community about project progress and benefits;
- provide advance notice to road users of project works that may impact on journey times;
- document all enquiries and complaints, and respond within five days;
- promote the overall benefits of the project to stakeholders and community; and
- manage reputational risks to the client.

Compliance with the plan was exemplary, with information disseminated to allow traffic to flow without incident. All enquiries were promptly responded to in short timeframes to the satisfaction of the initiator.

The project provided excellent economic outcomes, including improved freight efficiency resulting in less wear and tear on vehicles and pavement, and a safer road environment leading to less accidents.

CIVIL CONTRACTORS FEDERATION
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WINNER

EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $30 - $75 MILLION

WBHO INFRASTRUCTURE AND MAIN ROADS WA

GREAT NORTHERN HIGHWAY UPGRADE MAGGIE CREEK TO WYNDHAM

Client: Main Roads WA

The design and construction of the GNH Upgrade – Maggie Creek to Wyndham Project by WBHO-I for client Main Roads required exceptional engineering and construction expertise, underscored by WBHO-I's capability and relevant qualifications. The project, located within the Shire of Wyndham-East Kimberley, involved the investigation, design and construction of 27 km of the existing highway, with the following scope:

- widening, reconstruction and overlay;
- replacement and extension of culverts;
- construction of floodways and off-road drainage;
- reconstruction and realignment of the steep section known as Maggie's Jump-Up; and
- construction of a passing lane at Maggie's Jump-Up.

The Great Northern Highway is a critical piece of road infrastructure stretching from Perth to Wyndham. It provides a vital link for the communities along its route and allows movement of often critical heavy loads to the resource projects in the Pilbara and Kimberley. The GNH Maggies Creek to Wyndham project, known locally as 'Maggie's Jump Up', joins the Buntine and Victoria Highways and part of the Wyndham Spur. Widening and overlay were undertaken on 22km of the Wyndham Spur section and over 5km of road pavement was reconstructed at Maggie's Jump Up, including the construction of a northbound overtaking lane.

The primary objectives of the project focussed on providing improved access and efficiency for freight vehicles to and from Wyndham Port whilst improving safety for all road users. In addition to these objectives, Main Roads' drive to enhance the social benefits for local residents, and specifically Aboriginal peoples in areas where they deliver infrastructure projects resonated with WBHO-I and aligned well with its strategy of meaningful, sustainable Aboriginal engagement.

Both Main Roads and WBHO-I recognised that upon completion, regardless of its performance against traditional KPIs such as quality, safety and schedule, this project would ultimately be measured against the success of its Aboriginal engagement outcomes.

WBHO-I's Aboriginal participation strategy focussed on supporting the development of Aboriginal business, so that they can ultimately become independent and sustainable employers of Aboriginal people. The contractor saw this project as a real opportunity to deliver meaningful and sustainable Aboriginal engagement and, in collaboration with the client was able to implement a range of Aboriginal engagement strategies and innovations that provided measurable and meaningful Aboriginal engagement outcomes, with certainty of delivery of the Aboriginal engagement targets.

WBHO-I identified specific challenges to quality performance as a result of a significant number of relatively inexperienced Aboriginal employees and Aboriginal subcontractors on site. To mitigate these risks, WBHO-I involved its Aboriginal partners and drew on their local knowledge and expertise to implement innovative and practical solutions to avoid any non-

conformances. These initiatives focussed on:

- improved supervision - additional supervisors were employed on the project with a specific focus on mentoring, coaching and training of the Aboriginal workforce;
- project specific and ongoing on-the-job training - focussed on specific areas of works such as stone pitching, drainage and culverts; and
- regular sharing of information at pre-start and toolbox meetings.

WBHO-I's quality systems and procedures were well and truly tested on this project, and were proven to be robust and dependable.

This project was located within the Parry Lagoons Nature Reserve and the Ord River Floodplain Ramsar Wetland. Delivery of the project required specific management of many environmental aspects including:

- clearing of flora and vegetation - approximately 60ha permanent and 20ha temporary native vegetation clearing was approved;
- weed and hygiene control - no 'weeds of national significance' were identified and the project area was treated as dieback free;
- fauna protection - two conservation significant fauna species were identified, being the orange leaf-nosed bat and the freshwater crocodile;
- heritage management - two registered Aboriginal heritage sites were located within the project area, being Grotto Pool and Mugg's Lagoon. In addition, a number of artefacts / scatter areas were located at site 27;

Through the careful management of all aspects of the environmental plan, and in close collaboration with the project and design teams, WBHO-I managed to save several old Boab trees, originally earmarked for clearing, by refining alignment of the road.

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HIGHLY COMMENDED

EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $30 - $75 MILLION

ALTONA PLUMBING AND CIVIL

HMAS STIRLING REDEVELOPMENT STAGE 3A – HY1

Client: Doric Contractors/Department of Defence

Altona's scope of works comprised a major upgrade of the water, fire and wastewater infrastructure on Garden Island, delivered in 16 stages and involving the installation of more than 65 kilometres of HDPE pipe, two complete fire systems and the replacement and or refurbishment of 14 wastewater pumping stations.

The success of this project was pivotal upon delicate planning, effective risk aversion strategies, precise execution, and the careful management of stakeholders, in order to overcome a series of unique and intricate construction constraints and latent conditions.

Before project execution could commence, thorough planning and sequencing was crucial to ensure the Royal Australian Navy base remained fully operational at all times, with inevitable disturbance kept to an absolute minimum. Careful consideration of the impact caused by road closures, service isolations and decant of Military personnel was required with works planned and sequenced accordingly. To assist in minimising disruption cause by open excavations, horizontal directional drilling (HDD) and pilot microtunnelling techniques were utilised

Early investigation works undertaken by Altona's inhouse ground penetrating radar (GPR)scanning team uncovered a multitude of unidentified existing services, which threatened to delay the entire construction program. Together with the complexities of ensuring known live existing services remained fully operational until replacement infrastructure had been completed, it was evident that a substantial redesign of all services, hydraulic and otherwise, was required if project milestones were to be realised. To facilitate this redesign, three-dimensional modelling was produced collaboratively by Altona's surveyor and inhouse draftsperson, providing all service trades with realignment opportunities previously overlooked and in turn, mitigating immediate threats to program milestones.

The wastewater elements included the replacement or refurbishment of 14 pumping stations, some of which were up to 4 metres in diameter and 8 metres deep. Careful planning was required to successfully manage the bypass pumping of incoming effluent to eliminate catastrophic environmental release. The procurement of GSM(4G) controlled sewer bypass pumps allowed for 24/7 remote operation and monitoring via mobile phone, which proved invaluable during critical bypass pumping. In instances where bypass pumping was not possible , tanker trucks were utilised to transfer the waste to the on-base Wastewater Treatment Plant.

Approximately 65,205 square metres of verge and native bushland was cleared to facilitate the HY1 scope, much of which

was revegetated using tubestock from the Base nursery. Cleared vegetation, where suitable, was mulched, stockpiled and spread in completed areas to prevent erosion.

Site investigation found that the existing gravity sewer contained friable asbestos. Traditional construction methods would require suspension of live HV services running parallel to the sewer line, as well as an excavation footprint that would impact critical Defence assets for up to eight weeks, an undesirable outcome.

To minimise intrusion to the adjacent Department of Defence facilities and to alleviate risks associated with deep excavations, live HV services and friable ACM, Altona proposed to reline the existing sewer.

Each of the four circular steel fire tanks erected were constructed from top to bottom, with the roof jacked up progressively, eliminating all working at heights risks.

A concrete crushing plant and soil screen were utilised to divert over 12000m3 of cement stabilised roadbase, concrete, asphalt and reinforcement from landfill and instead reused on-site or recycled.

Cantilevered platforms and containment zones were designed and installed to facilitate the replacement of pipework within the operational wharves, requiring careful planning with Defence to mitigate interference with berthing vessels.

The management of pipe weld traceability, given the large quantity of HDPE fusion welds to be performed, presented as a colossal task. By utilising the Microsoft Office suite and a dash of code, Altona developed a tablet friendly solution, capable of calculating weld parameters for weld personnel and providing live weld updates from the field, all at the push of a button.

Through the use of innovative design, stakeholder engagement and the management of quality, safety and environmental outcomes, execution of the works was effective and methodical. New and unique challenges specific to the Royal Australian Navy base were progressively overcome, to the satisfaction of Defence.

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FINALIST

EXCELLENCE IN CIVIL CONSTRUCTION: PROJECT VALUE $30M TO $75M

MONFORD GROUP

MERREDIN SOLAR FARM

Client: Risen Energy

Located about 260km east of Perth in the Central Wheatbelt, Merredin Solar Farm is the largest solar farm in Western Australia. It was physically constructed – from start to finish – in just three months, a significant achievement for any project, let alone one of this size, scale and location.

The farm consists of approximately 360,000 solar panels mounted on a single-axis tracking system and has an output of 281G watt-hours of electricity annually, generating enough energy to power approximately 42,000 Western Australian homes.

Twenty-two inverter stations convert the power from the solar panels to alternating current (AC) before entering an onsite substation, where a transformer increases the voltage for injection to the Merredin Terminal Substation.

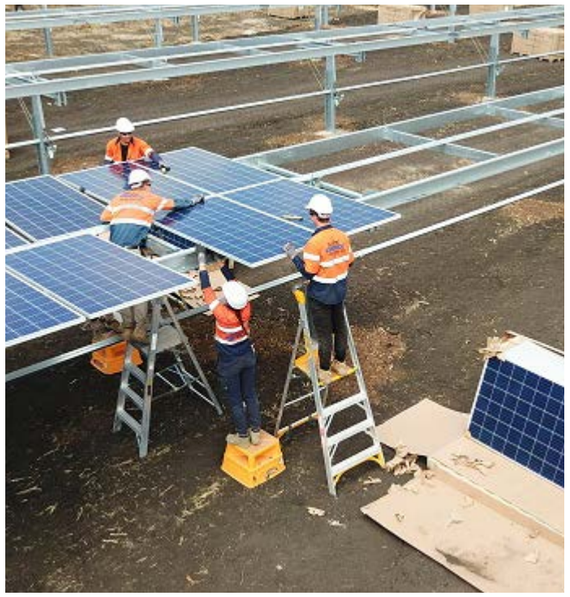
Monford was awarded this project following its exemplary performance on Queensland's Yarranlea Solar Farm, built during 2019. Monford completed both projects safely and ahead of schedule.

Monford bucked the "wait and see" approach implemented on most solar farms, which would have had detrimental impacts on project timelines. The Merredin Solar Farm had no such time delays due to the collaborative approach implemented through the predrill process, delivering a substantial cost saving and reducing installation lead times.

Monford invested heavily in the early stages of the project to ensure that the design, program, constructability, machine, and material selection was rationalised as much as possible to allow the most streamlined on-site delivery possible.

To achieve this construction outcome, Monford was heavily involved from the award of the project as principal contractor, utilising its unique project construction process and working with the project design team to deliver a world-class solar PV energy project on time and on budget.

Through this hands-on approach, owner/operator of the farm Risen Energy fully supported any design amendment request the Monford team put forward. This level of confidence in a construction partner was developed through a strong working



relationship and an understanding that the Monford team understood both the scale and the scope of the project and was committed to delivering a world-class renewable energy project.

Due to the diversified nature of the land on which the project was constructed, Monford was able to implement up to six separate work fronts simultaneously, bucking the industry standard of starting at the furthest point and building back out the gate. Whilst this led to a heightened requirement for logistics and supervision, it enabled the team to successfully plan, manage and share the workforce across the entire project.

Wherever possible, Monford utilised local contractors for logistics and transport, as well as local mechanics and local companies for on-site catering, refuse disposal, IT support. A number of the locals were integrated into the multi-disciplined workforce.