



THE MOST ADVANCED SUBSTRUCTURE DESIGNS AVAILABLE IN AUSTRALIA

Building on nearly 60 years of Engineering excellence, we deliver the very best substructure designs in Australia. This brochure details benefits consistently delivered by our industry leading techniques on ground-breaking and award-winning projects. Our techniques were presented as 2019 Engineers Australia and Concrete Institute of Australia Masterclasses.

FASTER—CHEAPER—AVAILABLE SOONER

Accelerated project completion dates

Our top-down techniques enable above and below construction ground simultaneously, delivering projects consistently earlier than conventional building techniques - ready for tenancy, sale and trade

Reduced overall project costs

With substantial reduction in materials and formwork over conventional methods, we deliver great capital savings alongside substantial reductions in holding costs. These savings have made projects viable to construct

TECHNIQUE : TOP DOWN CONSTRUCTION EVOLVED

1

Identifying and designing retention structures depending on the individual site.

Level 1

Ground Floor

Upper
Basement

Lower
Basement



2

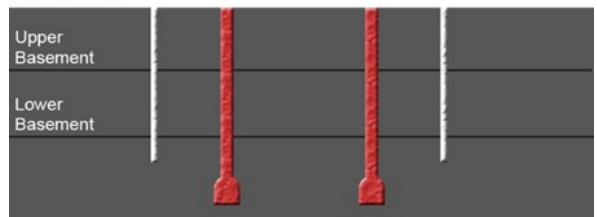
Installing the vertical load-bearing elements (columns and retaining walls)

Level 1

Ground Floor

Upper
Basement

Lower
Basement



3

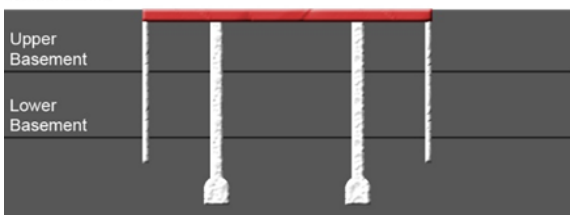
The future suspended ground floor is constructed in situ covering the area to be excavated (much like a lid)

Level 1

Ground Floor

Upper
Basement

Lower
Basement



4

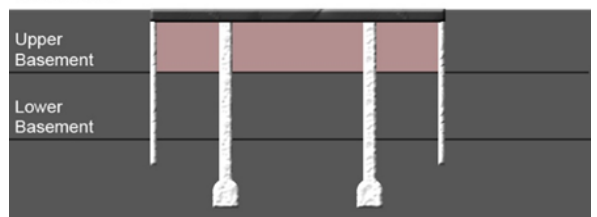
Excavations are conducted under the ground-floor slab whenever required.

Level 1

Ground Floor

Upper
Basement

Lower
Basement



5

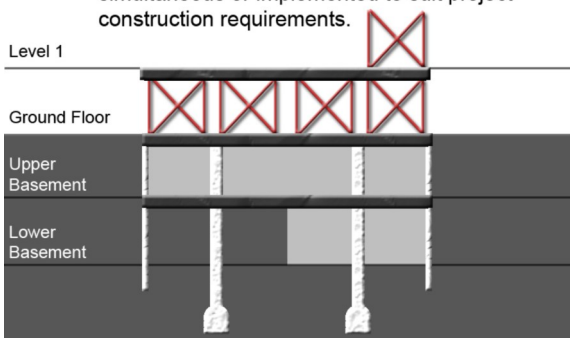
Construction of superstructure above slab proceeds. Building the substructure can be simultaneous or implemented to suit project construction requirements.

Level 1

Ground Floor

Upper
Basement

Lower
Basement



TESTIMONIAL

Cockburn Gateway Shopping City Stage 3 project

"Successful, in a word. It saved us probably 4 months in construction time hence that turned into several million dollars worth of savings, so that was very successful. The client was very happy."

Ken Musto
Partner, Buchan Group

CASE STUDY 1 SKYE ONE SEVEN APARTMENTS, EAST PERTH (2019)

Advanced Substructures was asked to redesign the substructures for this luxury 7 storey apartment building with 2 basement levels. Using top-down construction with a first-time build team, they were able to achieve **time savings of 15 weeks** on the projected build time (from an anticipated 60 to 75 weeks) and **cost savings of \$620,000** (on a built cost of \$13.6 million), even when the redesign fees were incorporated.



CASE STUDY 2 COCKBURN CENTRAL SHOPPING CITY STAGE 3, SUCCESS (2016)

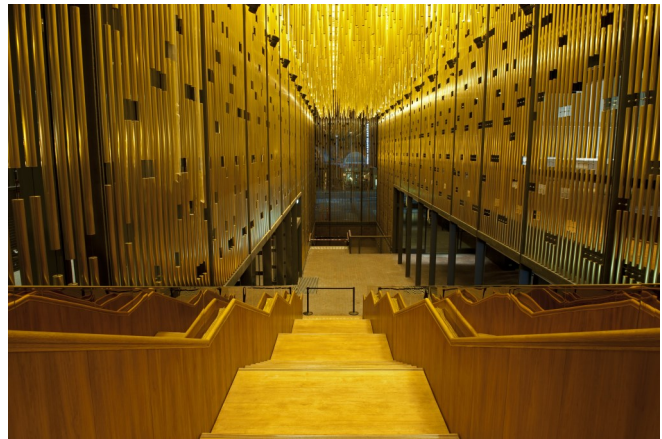
Our evolution of top-down construction delivered **cost savings of \$26 million** over traditional construction methods, which was a major reason for the authorisation of construction by the client. Advanced Substructures' pioneering design delivered the overall project to tenancy **4 months faster than anticipated**, enabling Christmas Trading at the expanded Centre. This project was the winner of the Master Builder's Excellence in Construction National Award for Best Commercial Centre under \$100 million in 2017.



BIGGER + BETTER SPACES

Maximised use of available space – our substructures can be built right up to the underground boundary creating optimum use of the available space, without intrusion above or below ground on neighbouring properties.

Innovative building potential – our system creates spaces suitable for purposes ranging from shops and cafes, sports and entertainment or other commercial purposes – making unique buildings that are highly attractive to clients.



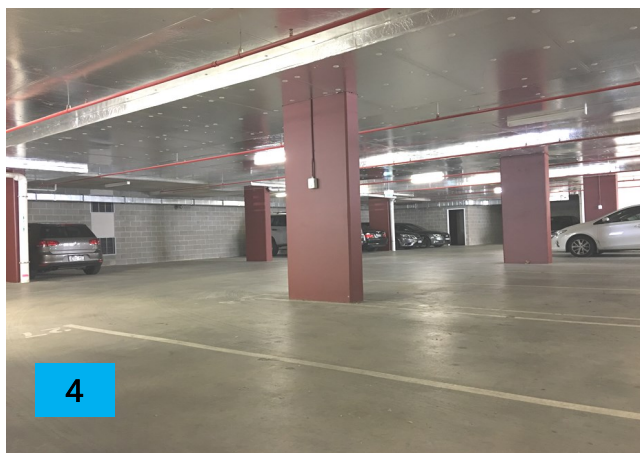
State Theatre Centre of WA (above) - Internal views of the theatre and Bronze Room; Advanced Substructures' designs overcame height restrictions in the area for the facility by providing complete theatre facilities underground in up to 8 metres of water. The facility was the first Public Building rated 100 years to first maintenance and won the National Award for Best Project in the Engineers Australia Excellence Awards of 2011.

TECHNIQUE : PILES TO PILLARS SYSTEM

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Our system consistently achieves perfectly straight, thinner pillars that maximise the usable space for parking (delivering more bays per column) or for any other application, while providing full structural support for both substructures and superstructures as full sized piles continue to extend beneath the bottom slab.

We achieve full load bearing pillars only 300 – 400 millimetres thick, optimised for fire protection without cladding.



1. A steel corseted Pillar is inserted into the initial Pile, which is then excavated while encased in concrete
2. When construction is complete, the excess concrete is debonded, revealing the completed Pillar
3. Final pillars can be square to enhance usable parking space, or circular to enhance capacity for expanded future building loads
4. Architectural cladding can also be applied if desired, while fireproof cladding is not required

SAFER + LOWER RISK

Detail design for all critical elements - Advanced Substructures provides all design and documentation for piling, footings, waterproofing, joints and other crucial and high risk elements that other Engineering firms leave to Builders or subcontractors; to a sufficient level of detail that construction can take place directly from the plans

Lessened major risks in substructure construction – Advanced Substructures take responsibility for risk reduction in substructure creation as part of our design service, including for environments with high water table and other dampness and water ingress risks

Minimised environmental impacts during construction – all substructure work can occur within the footprint of the building and chiefly under a sound concrete cover. This eliminates vibrations and reduces traffic, dust, noise and other disturbances during the creation of your project.

TECHNIQUE : WATERPROOFING WITHOUT MEMBRANE

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Waterproofing membranes are largely ineffective in the prevention of water ingress into substructures beneath the water table. Advanced Substructures create designs that enable waterproofing of the substructure without the use of a vapour barrier or a waterproofing membrane.

Our system efficiently uses a combination of unique joint design and available material technologies to create a waterproof seal, even far below the water table. We have signed an agreement with a National materials supplier to train builders in the use of this technique (as seen below, at Church House).



MAKING THE IMPOSSIBLE POSSIBLE

Substructure use in sensitive locations – with a proven track record of delivering on sites with Heritage buildings and other restrictions, we empower you to use innovative and effective designs others deem “unbuildable” or risk laden. Substructure use becomes possible in crowded urban locations without danger to surrounding buildings, roads and accessways.

Increased neighbourhood integration – Top Down construction creates efficient and affordable parking solutions that promote positive relations with surrounding stakeholders, reduce on-street congestion, give better dust control and reduce construction inconvenience

CASE STUDY 3 - THE “IMPOSSIBLE BUILD” CHURCH HOUSE, PIER STREET, PERTH (2017)

Surrounded by Heritage buildings, operating businesses, and council works with highly restrictive access while calling for two and a half levels of basements in three and a half meters of water - Advanced Substructures were asked to redesign the substructure elements after this challenging project was unable to be completed as originally designed.

Despite international best practice* indicating that construction of a diaphragm wall system required over one metre of space to the boundary, Advanced Substructures' systems enabled construction less than 100mm away from the oldest brick building in Perth (right).

Selection of a rigid retaining structure eliminated any impact on the adjoining Deanery and St George's Cathedral, a result not possible with a conventional build.

**Representatives from Arup Engineers (a global engineering group) indicated this standard in a seminar entitled Deep Foundation Systems at a Concrete Institute of Australia (WA) meeting in March 2018*



CHURCH HOUSE, PIER STREET (2017) CASE STUDY CONTINUED

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TESTIMONIAL

"Thank you for your design, guidance and contribution towards getting us through the first ever top down construction project completed by PACT Construction.

After walking through the project and seeing the results of your design and our delivery, it is fair to say that we have in fact worked very well together to achieve this result.."

Jason Kunkler, General Manager, PACT

8 PARKER STREET, SOUTH PERTH

Advanced Substructures' design for this 12 storey luxury redevelopment contained all parking and storage space in the two substructure levels so economically that the owner/tenants were able to add an additional two levels of superstructure to the site under their finance cap.

SKY HOMES, BEAUFORT STREET, INGLEWOOD

The design for the single level basement under four storey of apartments was expanded by fifteen parking bays and minimised dewatering and formwork on the site accelerating the construction schedule by an anticipated 10 weeks and integrating into both a Heritage feature on-site and local planning.

Site access was limited to an adjacent laneway, and half-width of this laneway (one car bay) access was required to be free during all construction for the use of the adjoining commercial buildings. Restoration of full laneway width access for the use of the Old Treasury Building (Como Treasury Hotel) was required within three months of commencement.

The solution of phased construction of the ground floor slab with full top-down construction opened full use of the laneway after only a month – while all construction was limited to the site footprint (left) with dust and other environmental hazards to the area from excavation contained under the top slab.

Despite seemingly impossible restrictions on space, access, and the wet sloping site - our design delivered the required substructure space and made the project viable to construct; winning Best in Class in National and State Master Builder's Excellence in Construction Awards.



CURRENT 2020 DESIGN PROJECTS

EAST PERTH GIRLS' SCHOOL REDEVELOPMENT STAGE 1

This groundbreaking development of a beloved Perth icon will place a skylit commercial level of substructure interfacing directly into Heritage listed undercroft of this Perth building beneath the public space courtyard, with a further two levels of parking beneath that. This degree of integration of new substructure into a sensitive historic site has not been attempted in Perth before. Our techniques make the precision possible.

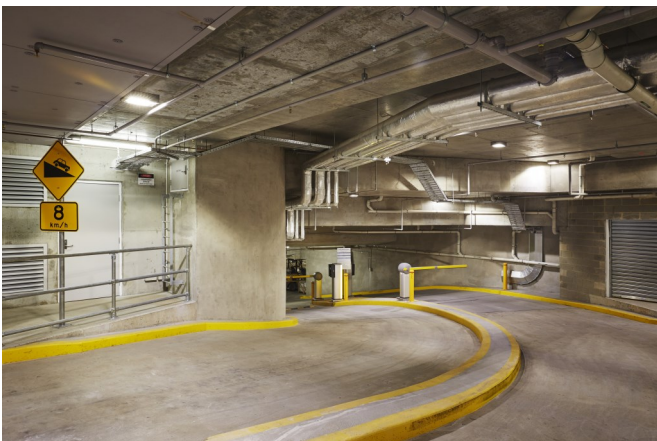


FASTER—CHEAPER—AVAILABLE SOONER

A proven track record of faster and cheaper underground spaces making overall projects profitable and viable to construct

BIGGER + BETTER SPACES

Thinner columns and underground spaces that extend boundary to boundary result in maximum usage for any function while freeing the use of land above

**SAFER + LOWER RISK**

Detailed design of post-tensioned concrete, innovative piling and retention systems, water-proofing without membranes and other systems lead to projects that have less risk of cracking or leakage even on difficult sites

MAKING THE IMPOSSIBLE POSSIBLE

Creating substructures in crowded urban areas, sites bounded by major arterial roads and rail, with adjoining heritage or sensitive sites, or problematic water and soil conditions

**CONTACT**

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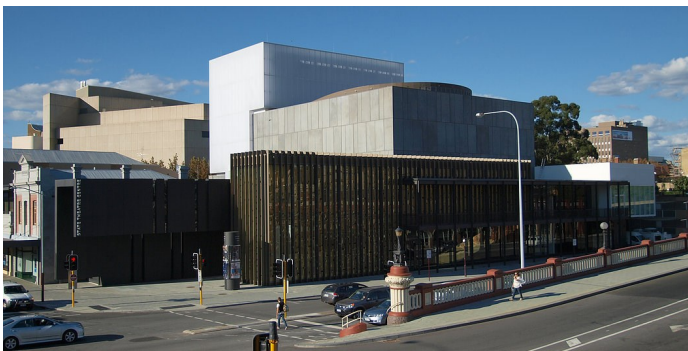
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With international capacity, Advanced Substructures are ready to bring our Award-winning techniques to your Projects of any scale anywhere in Australia or globally.