Contents

Foreword

1.0 The Decision
1.1 Introduction
1.2 Design and Construct
1.3 Why Design and Construct?
1.4 Success Criteria

2.0 Preparing for D&C
2.1 Introduction
2.2 Criteria and Objectives
2.3 Contract Conditions
2.4 Intellectual Property

3.0 Pre-qualification and Tender
3.1 Introduction
3.2 Pre-qualification Process
3.3 Tender Process

4.0 Finalisation
4.1 Contract Finalisation

5.0 Administration
5.1 Contract Administration

6.0 Conclusion

Case studies

Colonial Stadium, Vic
Baulderstone Hornibrook Pty Ltd

Museum of Tropical Queensland, Qld
Leighton Contractors Pty Limited

Buladelah Deviation, NSW
Thiess Pty Ltd

The Hudson, Alexandria, NSW
Barclay Mowlem Construction Limited

Graham Farmer Freeway, WA
Baulderstone Hornibrook Clough Joint Venture

Esperence Grain Terminal, WA
Transfield Pty Limited

Rockdale Gardens Project, NSW
Barclay Mowlem Construction Limited

Brisbane Inner City Bypass, Qld
Leighton Contractors Pty Limited

Brisbane Airport Rail Link, Qld
Transfield Pty Limited

The Landmark Resort, NSW
Leighton Contractors Pty Limited
A key objective of the Australian Constructors Association (ACA) is to make the construction industry more efficient and more competitive through positive leadership and open communication.

Design and Construct (D&C) is a well accepted delivery option for major construction projects. The contractual merger of design and construction activities, particularly in complex projects, has improved project time and cost delivery. But for contractors it involves significant additional costs arising from the initial work required by design consultants and subcontractors in preparing performance specifications upon which the contractor prices the work. These costs form a significant component of every D&C bid.

For some time ACA members have been concerned at the level of costs accruing to the industry arising from the practice by many clients of allowing an unlimited number of tenders on D&C projects. Those concerns provided the impetus for this publication, D&C Projects - A Model Procurement Process.

In the following pages the ACA has endeavoured to set out a number of principles and guidelines designed to improve the effectiveness of the D&C procurement strategy. Its emphasis is on the pre-award behaviour of clients and their contractors. How pre-qualification for a D&C project occurs and how short lists for these projects are established varies from client to client. Some processes are objective and transparent, others less so. We believe there is room for improvement.

Whilst D&C Projects - A Model Procurement Process, presents a contractor’s view, we believe clients will find in its pages a set of well-reasoned and responsible principles and practices based on the experience of successful projects.

Our objective is to inform, to identify issues and to propose strategies to improve the performance of D&C projects and ultimately, the efficiency and effectiveness of the Australian construction industry.

Wal King AM
President
Australian Constructors Association
1.1 Introduction
These model guidelines for the procurement of Design and Construct (D&C) projects have been developed to satisfy the Owner’s objectives and success criteria for its project, and to allow the construction industry to respond efficiently and economically to the D&C procurement process.

1.2 Design and Construct
This is a project delivery method whereby the Contractor takes responsibility for both the design and construction of the project based on a concept and requirements specified by the Owner.

The D&C process commences when the Owner causes a project brief to be developed. This will determine the Owner’s project requirements and will typically include the functional, performance, quality and design life requirements. The project requirements will also include any constraints on the design, such as land acquisition, environmental approvals and the like. The Owner will call for tenders and enter into a contract with the accepted tenderer on a fixed price basis, where the Contractor carries out the design using its own designer.

Constructing a world-class sports and entertainment stadium is always going to be a demanding task. When that stadium features one of the world’s largest retractable roofs and movable lower tier seating, the task is even more challenging. Utilising D&C methods Baulderstone Hornibrook was able to fast track all aspects of the project enabling it to deliver the completed facility to the client 12 months sooner than first planned. The D&C method enabled design changes to be made on-the-fly, keeping costs down and allowing all parties to address quickly any necessary enhancements to the Stadium’s overall design and construction process.
1.3 Why Design and Construct?
Owners and their advisors have a number of alternative delivery strategies, ranging from, at one end of the spectrum, a traditional process whereby an Owner causes a detailed design to be prepared and then allows a construct-only contract, through to, at the other end of the spectrum, a relationship process leading to Alliance contracts. The question may be asked – why then has D&C become so popular? There are a number of reasons why Owners choose D&C, these are:

**Shorten Program**
A decrease in the overall duration of the project when compared to other procurement methods.

**Fix Cost**
To secure a total project ‘final estimate’ cost before the design is detailed.

**Innovation**
Introduce construction knowledge, buildability and innovation (design and construction methods) while the design is being detailed and during the construction process.

**Improve Value**
A decrease in the total project cost when compared to other procurement methods or enhanced performance.

**Establish Program**
To secure a project completion date before the design is detailed.

**Reduce Claims**
Decrease opportunities for claims compared to separate design and construct responsibilities.

---

**Museum of Tropical Queensland, Queensland**

Designed and constructed by Leighton Contractors, the Museum of Tropical Queensland is a stand-out success for the company — and one where the client’s initial wishes were more than exceeded thanks to the flexibility of the D&C process. Leighton’s engineers and design consultants were able to focus their attention on delivering the best possible outcome to the client, while at the same time maintaining a strong sense of control over the project’s development. This seamless approach allowed Leighton to provide an extra service to the client — a 700 square metre feature gallery which was constructed as an additional facet of the project brief, within the original contract budget. The client was also able to highlight its specific needs and wants during the construction phase, and Leighton was able to respond to this quickly and effortlessly delivering a completed job where everything provided is of value to the operating museum. Having the ability to manage the job more exclusively enabled Leighton to respond to the client’s immediate needs during the two-stage construction process. This allowed the client to relocate to the new building at the end of stage one works, thus saving it the cost of moving staff and assets to another location.
1.4 Success Criteria
There appear to be three primary criteria used by Owners for measuring success of their projects following completion, particularly in regard to D&C projects. They are:

On Budget
The project is completed at or under the contracted cost.

On Program
The project is completed on or before the contracted finish date.

Meets Expectations
The completed project meets the Owner’s and user’s envisioned functional goals (fit for purpose).

Other criteria are often used to judge success (such as meets specifications, quality of workmanship, ease of contract administration, lessening of aggravation), but none of these ranks closely with the three criteria detailed above.

Utilising the core principles of D&C to the fullest helped Thiess overcome the worst that Mother Nature could throw at it during the construction of the Buladelah Deviation in NSW. With no room for extensions of time and a tight price to deliver the project’s design and construction, the Thiess team tackled the job using a D&C framework that proved its worth from day one. What the team didn’t know at the tender stage was that 45 percent of the project’s available work days would be lost due to bad weather. Thankfully the D&C process enabled the design phase to be accelerated. A close working relationship with the client facilitated the process, allowing early and progressive approvals to the design to be made. A concentrated focus on shortening the average length of haul for the earthworks and minimising the amount of earthworks volumes also helped ensure that the State’s first design, construct and maintain project was a significant success.
2.0 Preparing for D&C

2.1 Introduction
Once the owner has chosen D&C as it’s favoured procurement method, and having determined the criteria that may be used to judge the success of that decision, it is clear that a procurement process should be adopted that will ensure a successful outcome.

2.2 Criteria and Objectives
The Owner should prepare clear, concise and well-documented performance and technical criteria for the project.

These are to set minimum standards to be achieved in the design, construction and, if relevant, subsequent operation of the project. In addition, the Owner should provide criteria and objectives for durability, community standards, environmental standards, design life and any other significant issues.

It is a clear pre-requisite of a Contractor in accepting a risk that there is sufficient information of a suitable quality to enable it to understand and sensibly price that risk. Appropriate preparation of criteria by the Owner will provide such information.

The Hudson, Alexandria, New South Wales

Saving time and money whilst providing a value added service to the client is a key priority for contractors. Barclay Mowlem achieved this while constructing The Hudson residential project. The company was one of six initial tenders for the job, but when tender prices were found to be in excess of the client’s budget, the company was asked to provide a solution to get the job going. The solution given was to undertake the project on a D&C basis. This decision paid off. Over a four-week period Barclay Mowlem worked in close contact with the client and its consultants to review the design program for the job. Stage 1 works for the project were budgeted at $36 million. After producing its D&C program, Barclay Mowlem saved the client some $4 million and the job was begun in earnest. Minimising risks associated with the design by having the ability to constantly review and finetune the overall scope of works for the project produced knock-on gains. This flexibility afforded by the D&C process resulted in an 11 percent saving in total cost to the client and the overall construction program being reduced by eight weeks.
2.3 Contract Conditions

The Owner should prepare conditions of contract that:

- clearly and appropriately allocate risks;
- avoid uncertainty;
- remove the potential for dispute;
- create contractual arrangements that can accommodate a likely range of events and circumstances without requiring legal interpretation and without inviting subjective interpretation or valuation; and
- have clarity of drafting.

An area of particular importance for consideration by the Owner when drafting contract conditions for D&C projects is that of the Project Verifier. This is a key role, sometimes called the Independent Certifier, Independent Verifier, Audit Engineer or the like, and is usually required for D&C projects. The Owner should prepare contract conditions incorporating this role, having regard to the following:

- the Project Verifier must be independent of the Owner, Contractor and any subcontractors;
- the Project Verifier must be suitably qualified and experienced in both the role of verifier and the type of design and construction;
- the role of the Project Verifier should be clearly defined, and include:
  - its status under the contract and its authority, responsibility and accountability;
  - observation, monitoring, auditing and testing all aspects (including design, construction and durability) of compliance of the Contractor’s work with the requirements of the contract;
  - verification of the Contractor’s compliance to the Owner; and
- the responsibility for payment of the Project Verifier (generally the Contractor).
2.4 Intellectual Property

A further area of particular significance in D&C tender and contract conditions is that of Intellectual Property.

Tender and Contract conditions should be prepared that:

• assure the Owner that the Contractor has the right to use any intellectual property for the preparation of its detailed design;
• transfer the intellectual property rights inherent in the winning Contractor’s design to the Owner;
• allow unsuccessful Tenderers to retain any intellectual property rights contained in their designs; and
• allow the Owner to purchase (at the discretion of the Tenderer) any intellectual property rights contained in an unsuccessful tender through an agreed contribution to tendering costs.

Notwithstanding any payment made by the Owner, for a failure to proceed (see section 3.3), the Owner has no right to retain or use any intellectual property contained in any tender where the Owner chooses not to proceed with the project.

Graham Farmer Freeway, Western Australia

Delivering a project on time and within budget is one of the major goals of any organisation. The D&C process enables contractors to do this, easing the entire delivery process of a project, no matter what its size. In a $230 million joint venture Baulderstone Hornibrook and Clough used the D&C process when constructing a 1.6km, six-lane road tunnel section for Perth’s Graham Farmer Freeway. Continual review of the section’s design details and how they affected the construction process was afforded by the process, resulting in a faster overall build time. Design and construction teams were able to work closely together to develop a project plan that kept disruption in the area to a minimum. This close working relationship also facilitated effective life-cycle costs for the project, ensuring the right balance between up-front capital expenditure and facility maintenance costs for the duration of the project.
3.0 Pre-qualification and Tender

3.1 Introduction
There should be a two-stage procurement process which will flow from one stage to another and not require duplication of data.

3.2 Pre-qualification Process
Stage one is the pre-qualification process, with the objectives of:

- limiting tendering to Contractors with the necessary skills and experience to successfully complete the project;
- avoiding unnecessary cost to industry in the preparation of expensive tenders that have limited chance of success; and
- ensuring a competitive tender process, leading to a best value for money outcome for the Owner.

To achieve this, a six-stage process is necessary:

1. Preparation of pre-qualification documents, including a project brief to detail the requirements of the project.
2. Advertisement and issue of pre-qualification documents to interested parties. The documents will require parties to demonstrate various financial, managerial and technical skills in addition to an appreciation for the project. The documents will contain the evaluation criteria, the evaluation procedures and the proposed timing of the evaluation process. Evaluation criteria will be chosen to allow the evaluation team to determine the most suitable parties to be invited to tender.
Criteria may typically include:

- financial status;
- legal status (entity);
- relevant experience;
- available resources (staff, plant, subcontractor and supplier relationships);
- performance history, including safety, quality, claims; and
- demonstrated understanding of the project and associated significant issues including technical, environmental and community.

Unnecessary and/or irrelevant information and unnecessary copies should not be sought from parties seeking to pre-qualify and should not be supplied.

3. A briefing will be held, at which interested parties will be briefed on the particulars of the project and where parties may ask questions.

4. After receipt of pre-qualifications, submissions should be comparatively assessed in accordance with the evaluation criteria.

5. The evaluation team may seek clarification of any issues from applicants, verbally or in writing, but may not solicit additional information.

6. A list of pre-qualified tenderers is published. Successful and unsuccessful parties should be invited to an individual debrief.

When establishing the number of tenderers to be included within the select list, Owners should consider the competing aims of:

- the cost to industry of the preparation of the tender and the possibility of success for any particular tenderer; and
- ensuring a competitive tender field.

On a major or complex infrastructure project the tender list should be restricted to three tenderers. In some circumstances there may be valid reasons to extend the tender list up to a maximum of five tenderers, but in this event the Owner should contribute to the cost of tendering as discussed in Section 3.3.
3.3 Tender Process

The second stage of the procurement process is the tender, which will be put in place with the objectives of:

- allowing each tenderer to develop a design to a sufficiently advanced stage such that it may tender a firm lump sum offer;
- allowing resolution of general issues requiring clarification to all tenderers; and
- allowing resolution of specific matters only relevant to a particular tenderer’s scheme (which require handling with care and strict attention to security).

Information already provided by the tenderer in the pre-qualification process should not have to be provided again in the tender process.

The tender process should be put in place, in eight stages:

1. Tender documents will be prepared by the Owner, taking cognisance of the issues raised in earlier sections of this model process. The documents will contain the evaluation criteria, the evaluation procedures and the proposed timing of the evaluation process.

2. After issue, an appropriate period will be allowed for the preparation of tenders. It is to the benefit of the Owner that this period be sufficient to allow tenderers time for the preparation of quality designs, to allow time for innovation and to allow tenderers to minimise risk allowances by finding appropriate alternative solutions.

For a relatively simple mid-range project (say $50 million) a period of not less than eight weeks should be allowed; for a major project (say >$100 million) a period of not less than 13 weeks should be allowed.

3. A site visit and a briefing will be conducted, at which tenderers will be briefed on the particulars of the project and may ask questions.
4. If appropriate, a workshop will be held with proponents to discuss particular issues of general interest. For example, a geotechnical workshop may be held, at which tenderers may ask questions of the Owner’s expert and agree on further geotechnical investigations to be carried out by the Owner.

5. Individual briefing sessions may be held. The objectives of these briefings will be to maintain the confidentiality of the tenderers’ intended proposals, whilst at the same time ensuring that the proposals remain within the Owner’s parameters for the project.

6. After receipt of tenders, submissions are comparatively assessed in accordance with the published evaluation criteria. Tenders are likely to contain significant differences, particularly in the areas of design, time, cost, risk allocation, durability, operation and the like. Tenders may also differ in terms of certainty of delivery and clarity of content.

7. The evaluation team may seek clarification of any issues from applicants, verbally or in writing, but may not solicit new information.

8. A preferred tenderer and a reserve tenderer will be established. Unsuccessful tenderers will be advised as soon as possible. Debriefing meetings will be held with all tenderers.

Rockdale Gardens, New South Wales

Delivering innovative solutions at the initial design phase of the project is one of the many bonuses associated with the D&C procurement process. Barclay Mowlem employed D&C principles while working on the Rockdale Gardens project, a residential development featuring three 10-storey towers sitting on top of a three-level car park in the heart of Sydney’s south. The company was awarded the contract for the job following its submission of a groundbreaking tender that offered substantial time and cost savings for the project. Close analysis of the client’s wishes at the design stage enabled the project team to offer the most cost effective structural and internal walling design possible for the entire job. New design solutions were sought and worked upon, a list of minimum standards was drawn up and the company was able to guarantee cost certainty and delivery of the project on time and budget. Another significant benefit of using the D&C method was that during the entire project the Barclay Mowlem team was able to manage risk on the job as it controlled the design, thereby fulfilling all of its promises and delivering a successful outcome.
Due to the considerable expense incurred in the preparation of D&C tenders, Owners should give serious consideration to making a contributory payment to tenderers as part compensation for this expense.

In circumstances where there are more than three tenderers the Owner should always contribute to the cost of tendering in an amount payable to each bona fide tenderer of 0.5 percent of the winning tender sum.

Where the Owner chooses not to proceed with the contract after tenders have been substantially prepared an amount of 1.0 percent of the value of the engineer’s estimate is appropriate as a payment to each tenderer.

By its very nature the D&C procurement process encourages innovation. Its use on a project often results in new methods of construction being utilised and developed. The Inner City Bypass in the heart of Brisbane is one major project where D&C methods have provided a solid foundation for innovative practices. This new 4.5km long road consists of four tunnels, 14 bridges and two major interchanges. The D&C process employed by the Leighton Contractors team, working closely with a selected team of design consultants, has allowed it to have more control than normal over the design process, enabling it to fully account for all construction constraints associated with the project. The integration of design and construction planning meant that Leighton engineers soundly overcame potential problems that would otherwise have derailed the project’s progress. Using D&C allowed the company to rearrange the configuration of two tunnels which were to be constructed under a major inner-city intersection. The new program considerably reduced traffic disruption and provided a more efficient construction process. In addition the flexibility of the D&C process allowed new innovative construction techniques to be adopted during the $228 million project. These included a cost effective means of slip-forming a slotted pavement drain using an inflated tube technique — the first time such a technique had been used in Australia.
4.0 Finalisation

4.1 Contract Finalisation
The key objectives of the contract finalisation stage are to:

• document the contract in the technical, commercial and legal terms of the preferred tender;

• include in the contract any known changes which have arisen during the tender period and to ensure that the negotiated terms of such changes are based on sound technical and commercial grounds; and

• ensure that the Owner’s procurement procedures and processes are visible, and commercially fair.

In setting these objectives, it should be clear that the contract finalisation stage is designed to settle all outstanding technical, commercial and/or legal issues necessary for the finalisation of the contract. It is not designed to allow the preferred tenderer to vary its price upwards nor to allow the Owner to reduce the tendered price.

Transfield effectively harnessed the opportunities of the D&C process to deliver the Brisbane Airport Rail Link within the project cost parameters and two months ahead of schedule. Transfield employed structured methodology to develop the working relationship with the design consultants. This methodology included a design charter, aligned goals and management techniques that focussed the team on supplying design outputs to meet the construction priorities. Features were delivering continuous improvement through structured consultation and feedback. Excellent communications and information flow supported the effort. The design construction process supported the fast-tracked construction strategy, requiring coordinated activity over many work fronts. Construction activity commenced only two months after contract award with piling following four months later.
5.0 Administration

5.1 Contract Administration

A D&C contract imposes some additional requirements on the parties during the post-award phase. To ensure that the Owner’s objectives and success criteria are met, particular consideration should be given to the following issues in the tender and contract documents:

- Communication is a key issue. Contractors require review and decisions from Owners in a timely manner. Owners should institute the formation of a senior group, often known as a Project Review Group, Project Control Group or Project Alignment Group to ensure that there are no impediments to the successful completion of the project, to take an overview, away from the day-to-day issues, of significant matters and to ensure that the appropriate resources are being applied in sufficient quantity and at the right time.

- Variations, often called Changes, are another area of differentiation between traditional and D&C contracts. The Contractor is responsible for the design and has taken on that risk. Therefore it is entitled to prepare its design to take advantage of any savings in design development. Equally, the Owner is entitled to require the Contractor to provide a product that fully complies with the Owner’s performance and technical criteria. Variations will only arise if the Owner changes its performance scope or technical criteria, or if an event specified in the Contract conditions (such as a change in law or regulation) occurs. Owners should be prepared to authorise design changes which do not impact on function, performance or quality.
• Owner’s Design Input and Review often causes tension between the parties. The Owner wishes to make suggestions and ensure that it has constructed that which it requires, whilst the Contractor is generally under significant time and budget constraints. Owners can assist in managing this issue by ensuring that the Contract documents:
  - clearly set out the Owner’s requirements in regard to hold points and milestone dates;
  - clearly set out the Owner’s requirements in regard to a review or comment procedure (including the time to be allowed by the Contractor in programming such a procedure);
  - require the Contractor and Owner to develop and agree a Project Management Plan and a Design Management Plan; and
  - clearly set out the Owner’s obligations in regard to review of documents.

Flexibility and a cohesive approach to the task between contractor, client and consultants was a major factor in the success of the $15 million Landmark Resort project in Nelson Bay, NSW. Having negotiated a D&C contract for the job, Leighton Contractors was able to use the advantages of the method to deliver a significantly positive outcome to its client. An open approach to design initiatives and strategies was a key factor of the 122-room resort’s early development and could only have been afforded under the D&C method. This, together with the fact that the Leighton project team was able to introduce a number of key design innovations to the project as a result of the flexibility of the D&C process, led to substantial savings in time and cost and the project being completed on schedule and within budget.
6.0 Conclusion

The model guidelines set out in this document reflect what the ACA believes to be contemporary best practice in the use of the D&C procurement process.

The Association believes that adoption of this model process by Owners and Contractors will contribute greatly to the success of the project, especially in meeting the time, cost and quality expectations of the Owner. Adoption of this model process will also maximise the opportunities for improved value for the Owner through innovation.

In developing these guidelines the ACA has the twin objectives of informing Owners and stimulating discussion and debate within the industry.

Ultimately it is the Association’s desire to maximise the opportunities for a successful outcome for the Owner and Contractor and to improve the efficiency and effectiveness of the industry.
Acknowledgments
Thanks are expressed to the following for their contribution to the development and documentation of D&C Projects – A Model Procurement Process.

David Hudson (Chair)
Peter Brecht
Peter Dempsey
Bob Gussey
Dr. Brian Hewitt
Jim Barrett
Evans and Peck Management

Thanks are expressed to the following organisations that provided case study material for this publication.

Barclay Mowlem Construction Limited
Baulderstone Hornibrook Pty Ltd
Clough Limited
Leighton Contractors Pty Limited
Thiess Pty Ltd
Transfield Pty Limited

ACA Members