University of Southern Queensland
Faculty of Engineering and Surveying

Factors in the Selection of Contractors for Engineering Works

A dissertation submitted by

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towards the degree of

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Abstract

This project is on the factors used in the selection of contractors for engineering works.

Traditionally, the selection of contractors was based simply on price. The problem with this approach is that the lowest priced bid doesn't necessarily represent the best value for money. The appropriate consideration of non-price factors together with price in the selection process can improve the probability that the project will be successful.

Whilst many practitioners now also include non-price factors in considerations to select contractors, methodologies for this consideration and the factors used vary greatly. The author's research was unable to locate industry-wide standards that would help practitioners to achieve best practice. This project identifies how this gap may be filled for a particular range of values of projects.

The project work undertaken incorporates literature-based research and a questionnaire that was completed by 10 experienced industry professionals. It also includes two case studies where the full sets of tender documents were reviewed. One of these projects was current and the author was able to assess the submissions prior to the sitting of the tender evaluation panel. The other project was examined as the contract was let based on price and is a good example of the problems that can occur by using this method of selection.

The results of the questionnaire was examined further and combined with the knowledge gained through this research to produce sample checklists of factors and weightings that could be applied to different types of projects. This gives an indication of what factors are important and how they might be assessed to achieve best value for money whilst minimising unnecessary cost to industry.

Further such research may be beneficial to the construction industry in relation to projects of greater value and delivered through more innovative contracting approaches such as Public Private Partnerships.

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ENG4111 Research Project Part 1 & ENG4112 Research Project Part 2

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Date

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LAUREN CLARKE

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Abbreviations

BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer (a.k.a. BOT, Build-Operate-Transfer)
CV	Curriculum Vitae
DCAP	Detailed Consultants Activity Proposal
DMO	Defence Materiel Organisation
ITR	Invitation To Register
KPI	Key Performance Indicator
LIP	Local Industry Provider
NCOP	National Code of Practice
OH&S	Occupational Health and Safety
PPP	Public Private Partnership
PWC	Commonwealth Government Standing Committee for Public Works
QA	Quality Assurance
RFQ	Request For Quotation
RFT	Request For Tender
TEP	Tender Evaluation Plan
VFM	Value For Money
WTSS	Weapons Training Simulation Systems facility

Glossary

Principal	The party under a contract for whom work is being done.
Contractor	An organisation or individual legally bound by a contract to perform the work specified in said contract (or as agreed by the Principal).

Chapter 1 – Introduction

The use of factors other than price is not a new concept but there has been increasing awareness recently of the benefits of using other factors as well as price in the evaluation of tender bids.

It is becoming common practice to apply non-price criteria in the evaluation of bids for all but the most simple-low cost works. The premise of this project is that there is room for improvement in how these factors should be judged and how they can be incorporated in the decision process.

By taking into account other factors as well as price, the principal is able to evaluate contractor against criteria that are good indicators of the likely success of the project. However, the specific non-price factors that should be applied for engineering works varies based on project specific details, as is expected given that all engineering projects are unique in at least some respect.

The author's research was unable to locate industry-wide standards specific to the topic of this dissertation. Some broad guidance as to the nature of factors that may be considered in evaluation of tenders is included in Australian Standard 4120-1994, Code of Tendering, with a suggestion that factors may be weighted (Standards Australia Ltd, 1994). However, no explanation of the listed factors is provided in the standard nor are there any recommendations as to what any weightings might be. This is not a criticism of the standard as the stated purpose of the standard is "to encourage high ethical standards in tendering in the construction industry". This project also explores in some detail what factors could be used for a variety of projects based on their nature, value and contract form to be used.

1.1 Background

In the past, the selection of contractors for engineering works has been based almost solely on price. That is, the contract was awarded to the tenderer who submitted the

lowest cost proposal. By only considering cost, the risk that these projects will be unsuccessful is significantly increased.

The basic features of traditional contracting are a lump sum contract awarded to the lowest priced bidder. In recent times the inadequacy of this approach has been recognized and there has been work done by both government bodies as well as commercial organisations to develop better evaluation procedures.

There are many different methods used and each has merit. The main aim of this project is to investigate current practice with a view to providing insight into a standard approach that could be adopted.

1.2 Project Aim

The aim of this project is to:

> "Prepare example checklists of factors that may be considered during the selection of contractors for engineering works with budgets between $80,000 and $20 million taking into account the nature and estimated value of the work as well as the contract type."

The reasoning behind the selection of the financial thresholds used in this dissertation is presented in Section 1.4 – Selection of Project Thresholds.

1.3 Objectives

The objectives that will enable me to achieve the aim of my project are:

1) Research current methods employed by government bodies and publicly listed companies to select contractors for engineering works.

2) Determine what factors, and their weightings where appropriate, could be used for a range of projects based on the nature of the work, estimated cost and contract type.

3) Explore how cost is best considered as a factor in the selection of a contractor so that there is no undue bias towards or against one contractor or another based on price.

4) Investigate a specific example of a project that was tendered using a traditional method (i.e. with price the primary consideration) and determine what non-price factors could have been considered to improve the outcome of the project.

As time permits,

5) Determine if a project that used a partnering, relationship contracting, or alliance type contract resulted in the project being completed more successfully than would have been expected using a more traditional method.

1.4 Selection of Project Thresholds

There are numerous different financial thresholds used in procurement processes by government bodies in Australia and these change from time to time, sometimes quite significantly.

Both the Tasmanian Government (Tasmanian Department of Treasury and Finance, 2007) and NSW local councils (Strathis, 2001) require a public tender process for public works estimated to cost over $100,000. Commonwealth Procurement Guidelines - January 2005 provide mandatory procurement procedures for agencies operating under the Financial Management and Accountability Act 1997 when conducting “covered procurements”, with an open tender process, or select tender

process with an initial open approach to the market, being an important aspect in covered procurements. Generally, procurements by Federal agencies estimated at over $80,000 are considered to be covered procurements, including most engineering works, and a tendering process is therefore mandatory. For the purpose of this dissertation, the lower of the two financial thresholds given above, $80,000, has been used as it applies to a number of Federal agencies, including the Department of Defence which, as can be seen below in Figure 1.1, is by far the Australian Governments largest procurer of goods and services (Department of Finance and Administration, 2007b).

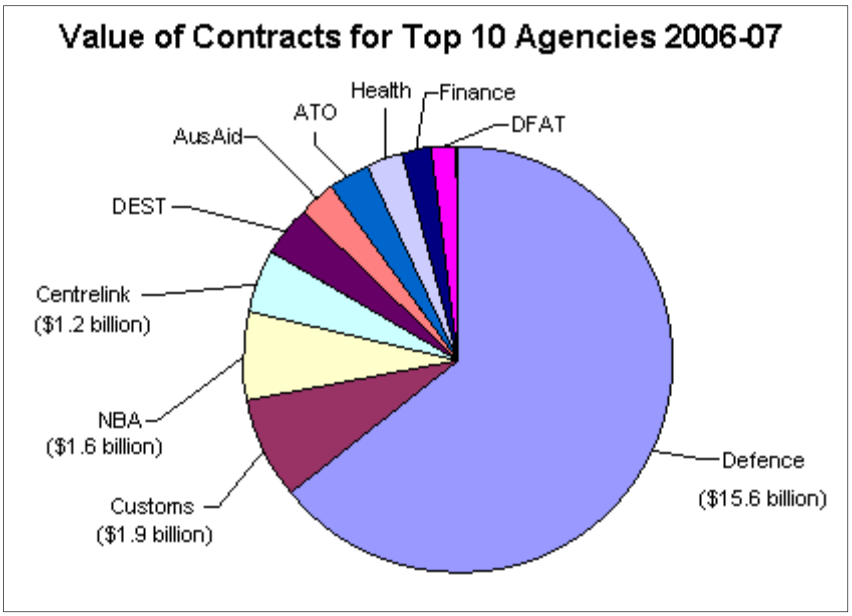

Figure 1.1 – Value of contracts let by Federal Government Agencies.

It is worthy of note that these procedures assist the Australian Government to comply with specific international obligations such as the Australia – United States Free Trade Agreement (Defence Procurement Policy Manual, 2006).

Whilst this dissertation focuses on non-price factors as well as price in a tendering process, it is not suggested that non-price factors are irrelevant when considering the selection of contractors for engineering works under $80,000. Depending on the nature of the works, some works under $80,000 may be more technically challenging than works well in excess of $80,000. In such cases, the person, or persons,

approving the particular purchase, say in the case of obtaining competitive quotes, needs to be satisfied that sufficient information has been gained from the contractors who were invited to submit quotations to enable a value for money decision to be made. If the works are simple and the qualities of the contractors known, which would normally be the case in a Request For Quotation (RFQ) process, then the selection of the lowest price may satisfy the approving authority. However, additional consideration needs to be given to how quotations will be assessed when letting more technically demanding works to ensure contractors are advised to include relevant additional information in their submissions in response to an RFQ.

Again for the purpose of this dissertation, an upper limit of $20 million has been selected. One reason for having an upper limit is to maintain an aim and a structure for the dissertation. As the estimated cost and complexity of an engineering work increase, so does the complexity of the procurement process in order to ensure overall value for money. For example, placing a habitable structure on the surface of the moon would be an extremely complex procurement and is well beyond the scope of this dissertation. The figure of $20 million is a financial threshold used by the Department of Defence in the letting of engineering works. Facilities and Property Division (1992), states that projects of strategic significance or having an estimated value in excess of $20 million are termed Major Capability Submissions and require higher level Defence committee consideration prior to referral to the Government compared to projects under $20 million without strategic significance.

Another indication of the increased complexity of works valued at over $20 million is gained from Department of Finance and Administration (2007a) which suggests that for larger projects with estimated whole-of-life costs greater than $100 million it is more likely that projects will be suitable for more complex procurement methods such as Public Private Partnerships (PPP). However, it is unlikely that a PPP approach would be cost effective for projects with a capital cost of less than $20 million as the costs to implement this multi-faceted process are unlikely to be matched by the potential savings (Department of Finance and Administration, 2007a).

Having established lower and upper financial thresholds for this dissertation, intermediate thresholds of $500,000 and $6 million will also be applied. $500,000 is an adjustment of the long standing Defence Department financial threshold of $250,000 separating “minor works” and “medium works” with $6 million being the financial threshold above which public works proposals by federal agencies are required to be referred to the Commonwealth Government Standing Committee for Public Works (PWC) (Facilities and Property Division, 1992).

Whist the financial thresholds for the purpose of this dissertation are based mainly on similar thresholds used by various government bodies, to a degree they remain arbitrary, with these government bodies themselves regularly reviewing the relevance and appropriateness of their financial thresholds. An example of this is a recent change to the value of Commonwealth public works above which it is mandatory to refer proposals to the PWC. In September 2007, this threshold was raised from $6 million to $9 million. (Department of Finance and Administration, 2007c). This change is not reflected in this document, nor is it believed necessary to do so.

1.5 Outline of Project Work

The achievement of the objectives as stated in the specification for this project involved an investigation into current industry views and practices with a focus on identifying what is done well and what issues still exist that could be addressed.

A multi-faceted investigation has been conducted which includes the following elements:

1) preliminary research ;
2) a questionnaire;
3) the review and evaluation of a set of submissions for a contract currently being let;

4) an examination of the tender documentation for a previously completed project where the contract was awarded based on tendered price.

Throughout the project, I have also had a number of informal discussions with relevant industry professionals which has greatly improved my understanding of the subject of contractor selection.

1.5.1 Background Research

A number of works are available on the aspects of tendering and contracting in general. This project commences with a review of a number of relevant works regarding what factors are used and provide a list of reference material for interested practitioners in this area. The intention of this review was to provide the background information needed to form the of base knowledge to support future project work.

1.5.2 Questionnaire

The preparation of the questionnaire involved a research into the appropriate format and style of questions to use as well as a suitable general layout.

The questionnaire was split into two sections with the first regarding factors used in selection and the second involving evaluation practices.

Section A required the respondent to rate the importance of a number of non-price factors and then stating an appropriate weighting for price for works of different value. As previously stated, Section B required respondents to discuss current tender evaluation procedures.

Five representatives from each side of the process were asked to participate as it is beneficial to seek differing points of view. Experienced industry professionals with a

high degree of involvement with tendering from either the principal or contractor view of the process completed the questionnaire.

The questionnaire is discussed in detail in Chapter 4.

1.5.3 Tender Evaluation Panel

A proceedings of a sitting tender evaluation panel was observed to validate knowledge gained from research and improve my understanding of the practicalities tender evaluation.

It also tested my level of understanding of how tenders are evaluated as it is was possible to compare the my assessment with the board's decision.

This experience in discussed further in Chapter 5.

1.5.4 Review of Tender Documents

Knowledge gained from the previous objectives will be applied to reassess the contractor submissions with the aim to determine which contractor offered best value for money.

This review is primarily to verify that the research undertaken has resulted in valid conclusions being drawn regarding selection factors and their use.

The details of this aspect of the project work undertaken is also included in Chapter 5.

1.5.5 Informal Interviews

Although each of these occurrences will not be specifically discussed they have been vitally important to this project as this has provided the opportunity to ask questions and learn from the experiences of professional with years of experience dealing with the issues involved in the subject of this project.

1.6 Conclusions

Having researched the various methodologies used for the selection of contractors for engineering work and after further analysis of the other information gathered, I will provide recommendations for standard lists that might be used as checklists when determining how contractors are to be selected for proposed engineering works valued between $80,000 and $20 million.

As cost has traditionally been the main factor in selection of contractors, this factor requires special consideration when determining formal processes to be followed during contractor selection. The aim of these processes should be to ensure that consideration of other specific factors is not unduly influenced by prices submitted by contractors which, in effect, would result in price being considered more than once; put another way, the intended effective "weighting" of cost may unintentionally be altered, either increased or decreased.

Chapter 2 – Background Research

2.1 Introduction

In the past, the typical contractor selection method was to give the work to the lowest priced conforming offer (Hatush and Skitmore, 1998, Wong et al., 2001, Alarcon and Mourgues, 2002, Holt, 1998, Waara and Brochner, 2006). It has since become recognised that the selection of a contractor based on price alone greatly increases the significant risk that the project will be unsuccessful (Singh and Tiong, 2005, Zhang, 2004, Wong et al., 2001).

Projects completed using price as the primary selection factor are prone to delivery issues such as cost-overruns, delays and in some cases quality control issues (Singh and Tiong, 2005, Ioannou and Leu, 1993, Hatush and Skitmore, 1998). It is for these reasons that more appropriate selection methods have been developed that seek to gauge the likelihood that a contractor will be able the successfully complete the work within the specified conditions.

The research in this area is very much ongoing with the first work on the use of factors other than price being done in the late 1980's (Waara & Brochner, 2006). Since that time, the benefits of incorporating considering non-price factors as selection criteria have been well established. Most organizations now employ a contractor selection process that takes non-price factors into account, usually with some variation of the weighted multi-criteria method (Wong, 2004).

However, problems can occur when comparing a significant number of subjective features of multiple contractor submissions while insuring that one contractor is not unfairly selected over another based on marginal differences in their capability as assessed by human decision makers who by nature have biases.

Another issue is that each project is different. The requirements in terms of materials, personnel, equipment, etc vary from project to project. This variability

makes it difficult to judge which factors and weightings should be used to select the contractor that will best be able to successfully deliver the work.

There is an established need to determine the selection process and criteria for the selection of contractors for different engineering works. It is for these reasons that this project will aim to determine appropriate example checklists of factors with suggested weightings for different types of engineering projects for a range of estimated values and given contract type.

2.2 Current contractor selection practices

2.2.1 Overview

In Australia, price is still the primary consideration for the majority of low value projects (Defence, 2007, Tasmanian Department of Treasury and Finance, 2006, Strathis, 2001). This is presumably due to the costs involved in considering non-price factors. However, this practice does not pose so great a problem since low cost projects are generally priced as such due to the lack of technical difficulty and small scope of the work. This means that it in most cases if the contractor satisfies a few basic requirements then it is likely that the project will be completed successfully.

For intermediate to high cost engineering projects, as the size and complexity increases so does the risk that the selection of the right contractor will be critical. It therefore follows that more attention needs to be given to assessing these other factors as well as cost when selecting a contractor for larger works.

Government bodies are significant purchasers of engineering services and have been the leaders in incorporating non-price criteria in their contractor selection methodologies (APCC 1998). This is possibly due to the fact that not only are they responsible for a large number of multi-million dollar infrastructure projects but they must be able to fully justify the expenditure of public funds so are more strictly

bound to follow a rigid decision process (Palaneeswaran and Kumaraswamy, 2000, Hatush and Skitmore, 1998, Wong et al, 2001).

The Tasmanian Government is one example of a government body that has developed a well-defined procedure for contractor selection that includes non-price factors where appropriate, based on the estimated cost and the nature of work.

2.2.2 Thresholds used to determine procurement method

The Tasmanian Department of Treasury and Finance (2006) outlined the following procurement methods to be used for projects within a number of ranges of estimated cost:

- Under $10,000, procurement method used is at the discretion of the agency directing the work.

- Between $10,000 and $100,000 ($250,000 for road and bridge construction projects), at least three written quotes to be obtained.

- Above $100,000 ($250,000 for road and bridge construction projects), a public tender process for which only pre-qualified contractors are able to submit tenders.

The $100,000 threshold is also used by NSW local councils with projects estimated to cost above this using an open tender process but for projects below this threshold the procurement method used is at the discretion of the relevant council (Strathis, 2001).

WG Clarke (2007, pers. comm., 5 May) said, from the 1st of July 2007, for construction projects the Department of Defence will use increased thresholds of:

- Under $10,000, single quote, written for above $2,000.

- Between $10,000 and $80,000, at least three written quotes to be obtained.

- Above $80,000, a public tender process for which only pre-qualified contractors are able to submit tenders (interview with Departmental staff).

The significance of these thresholds is to define when the value of the project warrants the additional expenditure more complex evaluation procedures involve. The use of prequalification in the above cases is a means by which the principals aim to reduce these costs as it lowers both the Principals' costs and those of tenderers who submit unsuccessful tenders.

2.2.3 Tender Evaluation

There are a variety of different methods that can be employed to select which contractor should be awarded a tender but research conducted for this project has indicated that the most commonly used are:

1) Bespoke approaches, which are widely used in industry and are selection procedures that are developed by individual organisations so there are many variations and relies purely yes/no criteria and the decision maker's judgement. This process is very subjective and is more susceptible to the biases of the decision maker (Holt, 1998).

2) Multi-criteria selection methods which use weighted non-price factors as well as price in either a single or two-stage (i.e. prequalification) selection process (Alarcon and Mourgues, 2002). This approach reduces the impact of the biases of the decision maker by determining the weighting of each criterion prior to viewing any submissions.

For both of these methods, a two-stage selection process is preferable as it helps to eliminate non-conforming submissions and also obviously lowers costs by reducing the number of tenders that the principal (or their representative) is required to assess.

The pre-qualifying process results in a smaller group of contractors to be assessed who are likely to provide acceptable tenders with a high probability of success in a two stage tender process for work of a specific size and nature. Reducing costs by having a limited number of contractors prepare tender submissions for each project also reduces the overall cost to industry.

For a one off project the open tender process is an acceptable procurement method but if an organization has an ongoing requirement for similar works yet continually seeks to use this method it is seen as bad practice and contractors are likely to become disgruntled. This is likely to compel the tenderers to increase their tender price to that client in order to recoup costs. In any process that is implemented for selection of contractors, the cost to industry and the cost to the organization should be a considered. In situations of repeat business for a panel of contractors, processes that unnecessarily drive up cost to industry will eventually drive up cost to the organization (Ng, 2001).

2.2.4 Contract Types

As discussed below, the tendered price is influenced by how the work is being let (i.e. the type of contract being used). This is due to the fact that the contract defines the financial obligations of each party entering into the agreement such as when and how the contractor will be paid.

The type of contract is used as a way to clearly define and distribute financial risk between the principal and the contractor. Some contracts allocate all financial risk to the principal (e.g. Cost Plus, Unit Rates), and conversely risk can also be assumed by the contractor (e.g. Design & Construct, Lump Sum/Head Contractor). Degrees of risk sharing can also be achieved using a contract type such a partnership which can

be used in a situation where both parties directly benefit from superior contractor performance.

There are many different types of contract and as they are a drafted document there is variation from project to project (Croft 2001). Some common general types of contract are:

- Cost Plus, the principal pays for all materials and other project construction costs as well as a fixed fee to the contractor (i.e. the principal takes all financial risks) (USQ 2007);

- Unit Rates, the contractor is paid for the work based on a quantity such as the excavated volume of material or the amount of concrete poured and risk is assumed by the principal (USQ 2007);

- Lump Sum/Head Contractor, a traditional form of contracting where the contractor is paid a set amount to cover all project construction costs (although sometimes the principal will define specific additional costs that will be covered in the contract) and includes contractor profit so the contractor assumes financial risks for construction. This is a very common form of contract in the public sector, particularly for smaller projects for which well developed and checked documentation can be produced prior to calling for tenders (Facilities and Property Division, 1992), thus the "lump sum" is known to the principal subject to any approved variations. For this and the previously listed contract forms, the principal retains responsibility for the design and documentation of the works, often through a separate contract;

- Design & Construct, similar to lump sum but the contractor must also consider the additional risks and costs associated with the design process with the principal having sufficient information for contractors to scope the work. This information could be in the form of a functional design brief with performance specification or, alternatively, tenderers may be provided with sketch plans and partial documentation. It remains the

contractor's responsibility to complete design and documentation and construct the works. In some cases, the principal may advise a ceiling price to tenderers (Facilities and Property Division, 1992);

- Project Management, contractor is again paid a set fee by the principal but there is a liability risk the contractor assumes. The project manager manages the overall design of each separable package or trade of the project and the letting of each trade contract, with each successful construction contractor being engaged directly by the principal who therefore carries the co-ordination risk (Facilities and Property Division, 1992);

- Managing Contractor, again the contractor is paid a set fee but the contractor carries both the design and co-ordination risks associated with each separable package of work (Facilities and Property Division, 1992). The successful contractor for each package is engaged by the Head Contractor, effectively becoming a sub-contractor, thus removing significant risk from the principal;

- Build-Own-Operate (BOO) or Build-Own-Operate-Transfer (BOOT), where the financial risks are distributed more evenly between contractor and principal as the contractor also benefits from better performance through their continued involvement after construction for the period prior to transferring to the principal (under BOOT) (USQ 2007), and

- Public Private Partnership (PPP), provides the opportunity to combine separate but related public sector contracts, that may or may not include engineering works, and so simplify the public sector's contract management task (Department of Finance and Administration, 2007a). As for BOO projects, and PPP's can be structured as BOO or BOOT contracts, the built facilities are owned and operated by the private organisation. In some cases where there is spare capacity within the PPP arrangement, for example airport facilities built under a PPP arrangement that are not fully utilised by the public sector as may happen in the case of

the Department of Defence, the opportunity may be provided to the private sector to fully utilise the facilities it would own and so further reduce overall costs to the public sector. As suggested in Section 1.4, experience indicates that PPP's are more suitable for projects with whole-of-life costs estimated at greater than $100 million.

The benefits of using non-price factors as well as price is clearly evident in projects where the principal assumes more risk as in these cases there is little incentive for the contractor to improve its performance as their additional effort doesn't result in financial gain (or at least directly).

The three forms of contract that will be focused on in this project are Head Contractor (Lump Sum), Design & Construct, and Managing Contractor as they are good examples of where there are clear advantages to using other factors as well as price and also because works in the defined price range are most commonly let using these more traditional types of contract as discussed in Chapter 1.

2.2.5 Non-price Factors

As previously stated, the factors that should be considered do vary based on project specific details but there are a number of general factors that may be applied in most cases.

The typical non-price factors considered are (Tasmanian Department of Treasury and Finance 2006):

- relevant experience;
- appreciation of the task;
- past performance;
- sustainability;
- technical skills;
- resources;
- management systems, and

- methodology.

Many other examples of similar lists have been produced such as those by Waara (2004), Singh and Tiong (2005), Sonmez et al. (2002), Holt (1997), Wong (2004), Palaneeswaran and Kumaraswamy (2000), Hatush and Skitmore (1998), Wong et al. (2001), Waara and Brochner (2006) and Standards Australia Ltd (1994).

2.2.5 Price

The way in which price and non-price factors should be considered is a contentious issue. Generally, they are considered separately with the specific non-price factors being evaluated for all contractors first and then price being looked at to determine 'Value for Money (or VFM).'

The VFM concept is open to very wide interpretation. It the process of selection of contractors for engineering works, poorly defined methods for determining VFM can result in lengthy discussions at tender evaluation meetings.

The Tasmanian Government (2006) has a very clearly defined methodology for determining VFM, with the most contentious issues such as the weighting of price being agreed upon prior to calling tenders.

In contrast, the VFM approach used by Defence is a much more subjective one. Essentially, after the non-price factors have been assessed the tender evaluation board simply discusses the 'Value for Money' of each bid without any formal numerical analysis and although the board must provide justification for their decision it can susceptible to the biases of individual panel members formed in the viewing of submissions or even more personal reasons (Defence Materiel Organisation, 2006).

Price considerations are discussed in greater depth in Chapter 6.

2.3 Conclusions

As the procurement method being investigated is effectively that of open tendering, possibly in a staged process, for works valued between $80,000 and $20 million, commonly used types of contract for this value work are lump sum/head contractor, design and construct, and managing contractor.

There has been a significant shift in the way contracts are let with price no longer being the only factor. Research continues to be done into improved methods for the selection of contractors for engineering works that includes what factors should be considered as well as how they should be evaluated when determining which contractor will best be able to deliver works successfully to achieve best value for money for the principal.

Chapter 3 – Research Methodology

3.1 Overview

The research methodology developed for this project involved a number of separate lines of investigation which were, for the most part, completed in parallel.

Preliminary work involved research to identify the key issues and relevant background information. The purpose of this stage was to gain the base knowledge required to continue with the project.

The next aspect of the project to commence was the development and distribution of a questionnaire. As previously discussed, the questionnaire sought to elicit the views of both principals and contractors regarding their experiences related to contractor selection.

While waiting for responses to the questionnaire to be received, there was the opportunity to examine the full sets of tender documents for two projects. One of these was currently being assessed and I was able to assess prior to the viewing the sitting of the Tender Evaluation Panel (TEP). The other project was one that was awarded based on price and for which there has been a number of incidents involving quality of work, which resulted in remedial work being required to be done by the contractor within the defects period. This is discussed in more detail in Chapter 5-Section 5.4.

3.2 Background Research

Preliminary literature based research was carried out to gain a general knowledge of current areas of research and also the tender processes being employed in industry. This information was then used as the basis to developing the questionnaire.

3.3 The Questionnaire

To enhance understanding of current industry views on the use of factors in the selection of contractors for engineering works, a questionnaire was developed and distributed to both principals and contractors.

The development of the questionnaire was a significant task in itself. Research was done to identify an appropriate length, layout and question style to suit the type of information being sought and obtain relevant responses.

The questionnaire was utilises a semi-structured interview type approach. The respondents were first asked relatively simple closed format questions in Part A to lead into more in depth answers sought in the open format questions of Part B (Georgia Institute of Technology, 1997). The reasoning behind this is primarily that not only is it extremely difficult to find suitably experienced individuals willing to complete the questionnaire, but the information being sought is more focused on the practical experience of the respondent and simple yes/no or scaled responses alone won't achieve this objective.

The content and style of questions was purposely kept quite simple to make it easier for respondents to complete. With current industry conditions in mind, this was done with the expectation that it would increase the likelihood of timely completion and return of questionnaires by participants (Leung, 1997).

A generic form of this document can be found in Appendix B - B.2 Generic Questionnaire.

Firstly, respondents are asked to identify the nature of the works they are involved with so that more meaningful observations would be able to be made from the responses given for a specific value range and the specified contract type.

The rest of the questionnaire has two main sections, the first requiring the respondent to rate the importance of 11 commonly used non-price factors and also to suggest the

weighting that price should have as a percentage for projects of different value. The second section asks that the respondents give their opinion on aspects of current practice to gain a general understanding of how industry selects contractors and to discover where problem areas are so that possible improvements in procedure could be identified.

The questionnaire was distributed to 10 industry professionals. The group consisted of 5 principals (or their representatives) and 5 contractors. Participants were sought from both sides of the evaluation procedure to identify any inconsistencies as any disparities may indicate where there is room for the tender process to be improved.

As necessary, there was further contact with individual participants to get clarification of regarding some responses.

3.4 Experience of Tender Evaluation Panel Procedures

This aspect of the project involved examining the tender submissions for the Contract Administration/Project Management contract of the project discussed in Chapter 5.

Permission from the Defence was required to access the relevant tender documents and attend the panel meeting, which was sought and granted.

Prior to observing the evaluation meeting, the submissions were examined and assessed according to the criteria and scoring guide as shown in Appendix C.

3.5 Review of Tender Documents

Knowledge gained from the previous project work was applied to reassess the contractor submissions with the aim to determine which contractor offered best value for money.

This review is primarily to verify that the research undertaken has resulted in valid conclusions being drawn regarding selection factors and their use.

The details of this aspect of the project work undertaken is also included in Chapter 5.

3.6 Informal Interviews

An important part of this project has been the knowledge gained simply through discussions with relevant professionals. Spending part of the project time at the Oakey Army Base gave access to people who regularly deal with the issues being investigated.

This interaction allowed for thoughts to be discussed and the verification of ideas/findings. It has provided me with the opportunity to ask questions and learn from the experiences of professional with years of experience dealing with the issues involved in the subject of this project.

The topic explored in this dissertation is one that is not easily undertaken by an undergraduate with very little practical knowledge. So although most of these discussions will not be specifically referred to in this dissertation, they have made a significant contribution to the soundness of information presented to this project.

Chapter 4 – Discussion of Factors Incorporating Industry Views

4.1 Introduction

Principals and contractors can often have conflicting interests in that the principal is looking to obtain the best product possible but the contractor will generally be trying to maximise profit, which means they may only provide the minimum standard as required to fulfil their contractual obligations. The use of an appropriate selection process can facilitate a better alignment of the principal's and contractor objectives (Waara & Brochner, 2006).

This research project involved gaining insight from both those who set selection criteria (i.e. principals) and those whose livelihoods depend upon fulfilling them by submitting successful tenders (i.e. contractors) to ascertain whether there are any dissimilarities between the two, which could then indicate areas for improvement.

The chapter is based on the knowledge gained during initial research and the responses from industry representatives to the questionnaire.

4.2 Selection Factors

4.2.1 Non-Price Factors

The first section of questionnaire sought to gauge the importance of a number of factors (using a Likert scale of 1 (meaning of little importance) to 5 (very important)), taking into account project value and procurement method.

There are a number of non-price factors that come up consistently in works regarding the selection of contractors such as those by the Tasmanian Department of Treasury and Finance (2006), Waara (2004), Singh and Tiong (2005), Sonmez et al. (2002),

Holt (1997), Wong (2004), Palaneeswaran and Kumaraswamy (2000), Hatush and Skitmore (1998), Wong et al. (2001) and Waara and Brochner (2006).

The following factors were those that frequently occurred and were chosen to be investigated:

(a) Task appreciation/ understanding of the scope of the project and possible risks

The assessment of this factor involves determining what level of understanding the contractor has regarding what is required of them to complete the project successfully.
Another aspect of this factor is judging if the contractor is able to identify and mitigate risks to the project.

If the contractor misjudges the amount work involved then this can either result in either an under/over-estimation of the cost. That is, the contractor will submit either a low price so will be at odds with the principal by claiming variations during the construction or the price the principal pays is inflated.

As expected, the responses to the questionnaire indicated that this is one of the more important factors to be considered.

(b) Methodology to deliver project

The methodology the contractor proposes is also an indicator of the contractors understanding of the project but it is primarily a way for the assessors to judge if the contractors are using an appropriate the processes in place to complete the works in the specified time-frame. Obviously, if there is a time over-run this results in increased costs to both the principal and contractor.

It follows that a reasonable methodology is a good indicator of the ability of the contractor and likely success of the project.

(c) Current capacity of company to carry out the work

The capacity to complete the work is a critical factor. If the contractor already has a one or more projects then the addition of the new project may not work. When considering current capacity, any other tenders that the contractor has submitted but have not yet been awarded must be taken into account.

(d) Demonstrated relevant past experience of company

A contractor with experience on jobs of a similar size and type is beneficial to the project as they are likely to be more aware of possible risks and have a better general understanding of the project. Another aspect of past experience is how long ago the project was undertaken as this has a negative impact on the relevance of that experience.

(e) Key personnel experience and roles in relation to the project

The experience of the key personnel can have varying influence over the success of a project. Well developed company processes that recognise the levels of experience held by company personnel at various levels and that allow for appropriate review of decisions made by these personnel help to minimise risks due to a lack of experience. Principals may recognise that in such a case, lack of experience by some personnel who otherwise have good training, skills, and work ethic, will be made up for by good company experience and management review. However, a principal will often be swayed by key personnel who have the up-front experience and who may be able to deal directly and quickly with issues as they arise rather than learning from their mistakes with the associated risk of delays or additional cost to the principal.

The current state of market means that engineers and experienced tradespersons are in high demand, particularly in northern and western parts of Australia, so the people the contractor will have working on the project may have relevant experience gained while working with a range of different companies. Conversely, the high demand for

experienced personnel may result in a shortage of appropriately qualified personnel for particular projects.

There is no doubt that the individual experience of key personnel who will be directly involved with the project can have a significant impact on the successful outcome of a project. This collective knowledge and experience available to the contractor for a specific project as detailed in the contractor's tender submission will obviously be carefully considered by the principal during tender assessment. However, it must also be noted that it is a common occurrence for key personnel to be reshuffled before or during the delivery phase of a project and those key personnel who are named in the tender submission may not necessarily end up being involved with the project until completion.

The reasons for this may be varied, such as individual family circumstances, illness, resignations, promotions, or competing priorities within the contractor's organisation due to projects bid for and won, or perhaps not won. What the principal wants to guard against is a tenderer listing "Team A" in a submission but putting "Team B" on the job when the tender is successful. It should therefore be made clear to tenderers that substitution of key personnel needs to be advised to the principal and agreed. It may be appropriate to include a succession plan for key personnel in submissions by tenderers, being careful to note that acceptance of a submission would then be seen to indicate approval of the key personnel listed as alternatives in the succession plan. Submissions should therefore the same level of information such as CV's for all key personnel listed in a submission, including alternatives.

(f) Current financial position/viability of company

The financial capacity of the contractor can be a critical factor in the successful completion of project. The risk that unexpected project costs may not be able to be funded increases if the contractor is relying on a single contract for their total revenue (CPLI 1996).

It is common for thresholds to be applied for minimum annual turnover (the value of the project may not be above a certain percentage of the total annual turnover) and the there must be sufficient working capital to ensure the smooth running of the project. It has been suggested by CPLI that a contract should not be awarded to a contractor if the value of the work represents more than 50% of their annual turnover or more than 20 times their working capital.

Such consideration of financial capacity of tenderers helps to protect contractors from winning works which might place them in financial trouble (similar to qualifying for a financial loan). This then helps to protect the principal from the negative affects that a financially over-extended contractor can have on the progress of a project, affects such as delays in delivery of materials or delays due to loss of sub-contractors. In more serious cases, the selected contractor may be forced out of business.

Of course, the principal can take other measures to protect against this eventuality such as insuring that any progress payments are always less than the cost to re-establish a new contract for the works, time permitting. Obviously, a better overall outcome for the project is more likely to be achieved if such situations are avoided in the first instance.

(g) Proposed program of works

A realistic program of works further demonstrates the contractors understanding of the requirements of the contract as well as that the methods being employed are appropriate to the project.

For whatever reason, the principal may have specific needs for the works to be completed by a specific date or during a specific period. The program of works should indicate how the principal's requirements are to be met in the most efficient manner. Risks to meeting these requirements should be highlighted in the tender submission, including possible cost penalties or escalations caused by restrictive timeframes.

(h) Demonstrated commitment to Ecologically Sustainable Development

The use of this factor is increasing with public's awareness of the importance of sustainability. Government agencies are greatly influenced by shifts in public opinion and with their significant buying power are able to apply this factor in their evaluation processes.

(i) Quality Assurance

As a factor for consideration in selecting contractors for works, the quality assurance practices employed by the contractor gain in importance for more complex, higher value works. To achieve a total quality outcome at the end of the project, each stage of the project needs to be subjected to the necessary quality assurance processes in order to achieve overall success. Therefore, a demonstrated commitment to quality assurance by a contractor should provide a level of confidence to the principal that the complexity of a project will be properly managed and that the risk to the budget is reduced.

Further, where the conduct of the principal's business results in the letting of similar repeat future projects, such a commitment to good quality assurance practices should result in a contractor maintaining, or improving upon, the standard of outcomes achieved on previous outcomes. That is, adherence to good quality assurance practices will result in well documented processes and continuous improvement, which should be recognised and appropriately valued by the principal when letting future works.

(j) Insurance details

Even with all due attention paid to best practice for occupational health and safety, quality assurance, and any other relevant practice, it is not possible, at least not from a financial perspective, to fully eliminate all risks associated with a project. Acts of god (force majure), human error, unforseen equipment or material failure, and even

intentional acts of vandalism or theft by unknown parties, are potential risks to the success of a project. Failure to adequately insure against such risks can have huge detrimental effects on the project outcome if not properly covered by an appropriate level of insurance.

In the worst case situation, an uninsured event may result in the failure of a project, or perhaps even the failure of a contractor's business during a project thus leaving the principal in a position of having to re-establish a new contract to complete the works.

Appropriate levels of insurance will provide confidence to the principal that if the insured events do occur, the negative impact they may make on the project can be minimised, thus improving the likelihood that standards will be maintained during the life of the project and that a successful outcome of a project will be achieved. Often, appropriate insurances are a mandatory aspect of a tender submission.

(k) National Code of Practice compliance

More and more, government bodies are requiring contractors to comply with the National Code of Practice for the construction industry. Compliance becomes a mandatory factor for particular types of work, including all new works.

4.2.2 Price

As previously discussed, in the past successful tenders were traditionally determined almost wholly on price. More recently, it has become accepted practice to give due consideration to a range of non-price factors. However, practices vary widely as to how consideration of price is incorporated into the overall tender assessment process.

Price remains a major factor in the selection of contractors but is it just another factor that should be considered in a similar manner to non-price factors or should it be

considered separately to non-price factors before a final decision is made on the successful tenderer?

In any process to consider price the aim should be to achieve value for money whilst remaining within the principal's budget, which can be an issue in itself depending on the robustness of the budget estimate.

4.3 Results of Questionnaire

Figure 4.1 below shows the importance, as indicated by the industry professionals who completed the questionnaire, of the following factors:

(a) Task appreciation/ understanding of the scope of the project and possible risks
(b) Methodology to deliver project
(c) Current capacity of company to carry out the work
(d) Demonstrated relevant past experience of company
(e) Key personnel experience and roles in relation to the project
(f) Current financial position/viability of company
(g) Proposed program of works
(h) Demonstrated commitment to Ecologically Sustainable Development
(i) Quality Assurance
(j) Insurance details
(k) National Code of Practice compliance

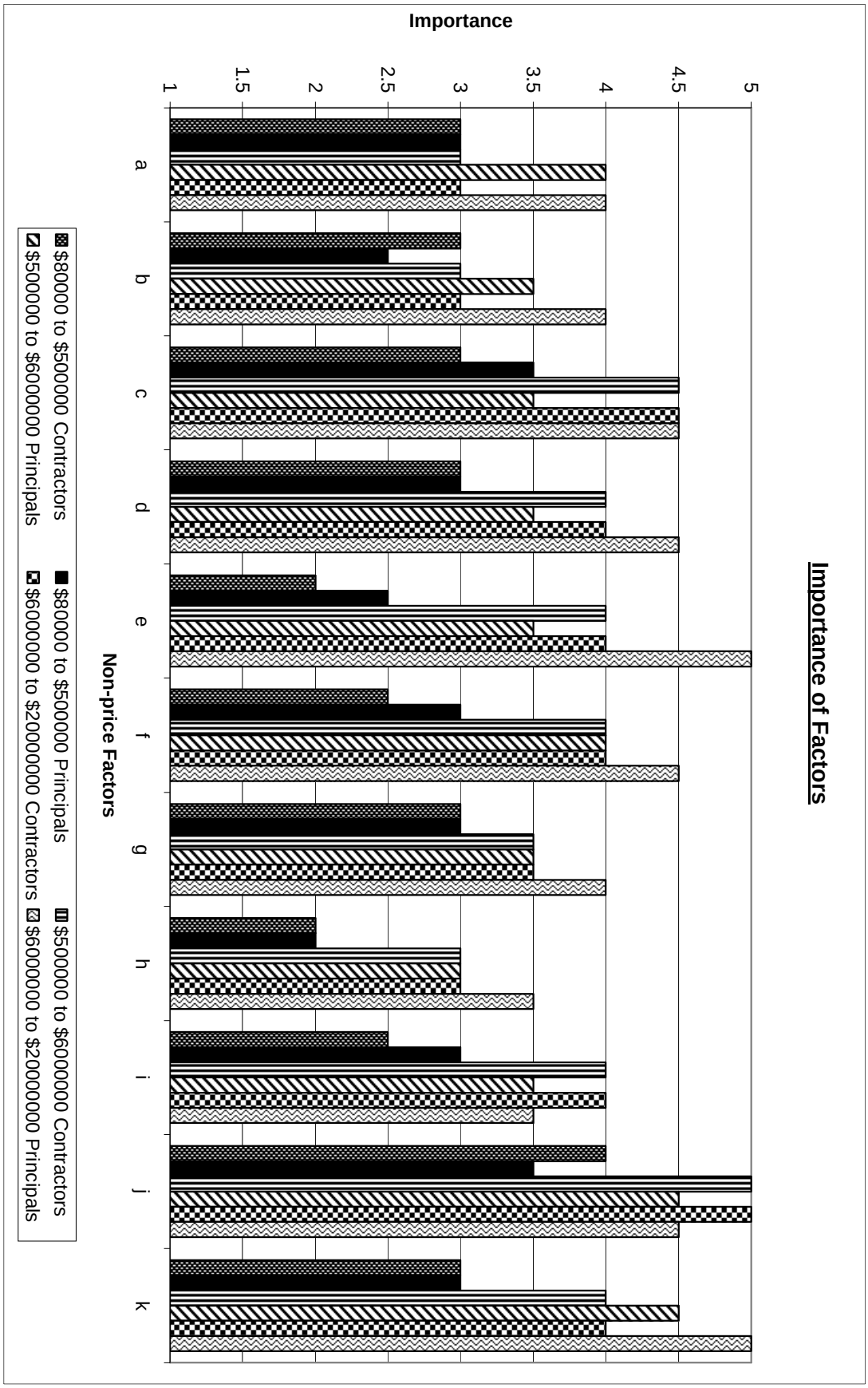

Figure 4.1 – Importance of Non-price Factors

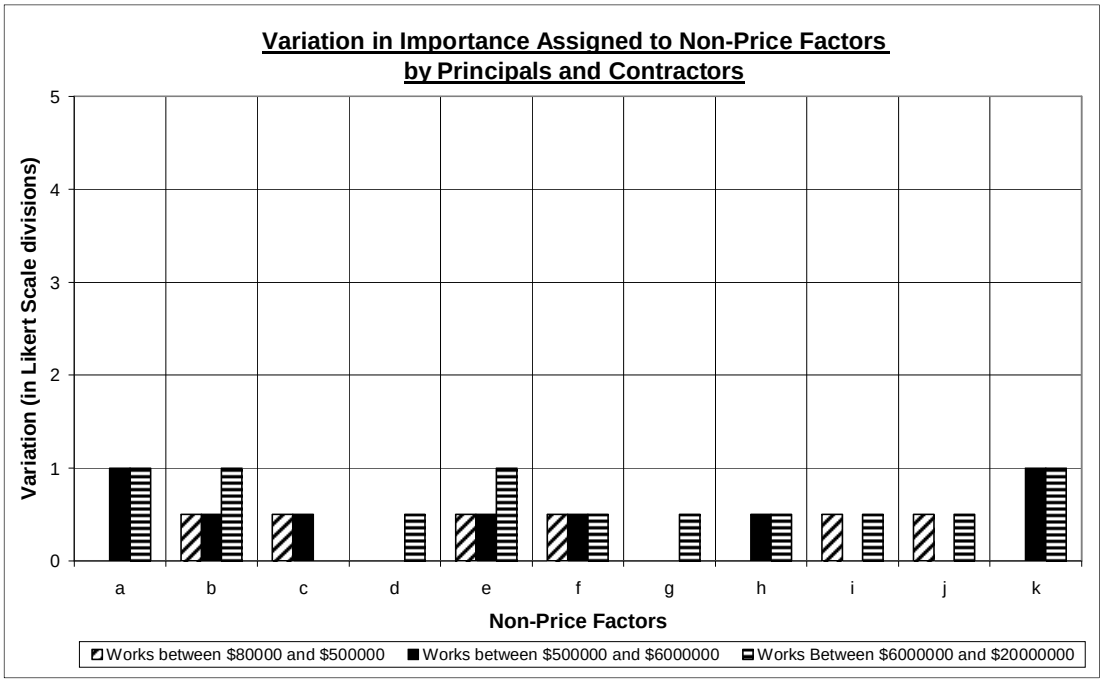

Figure 4.2 - Variation in Importance of Non-Price Factors.

The questionnaire also invited the respondent to identify any other factors that they believed should be considered and indicate what level of importance should be assigned to this additional factor. These are listed in the following table:

Table 4.1 – Additional Non-price Factors Identified.

Factor	**Value of Works**		
	80-500k	**500k-6m**	**6m-20m**
*OH&S	5	5	5
**Contact Referees	-	3	4
***Subcontractors (LIP's)	2	3	-
****Deliverables & Outcomes	3	4	4

The graph below shows the results of the questionnaire regarding what respondents suggest the weighting of price should be with respect to project value.

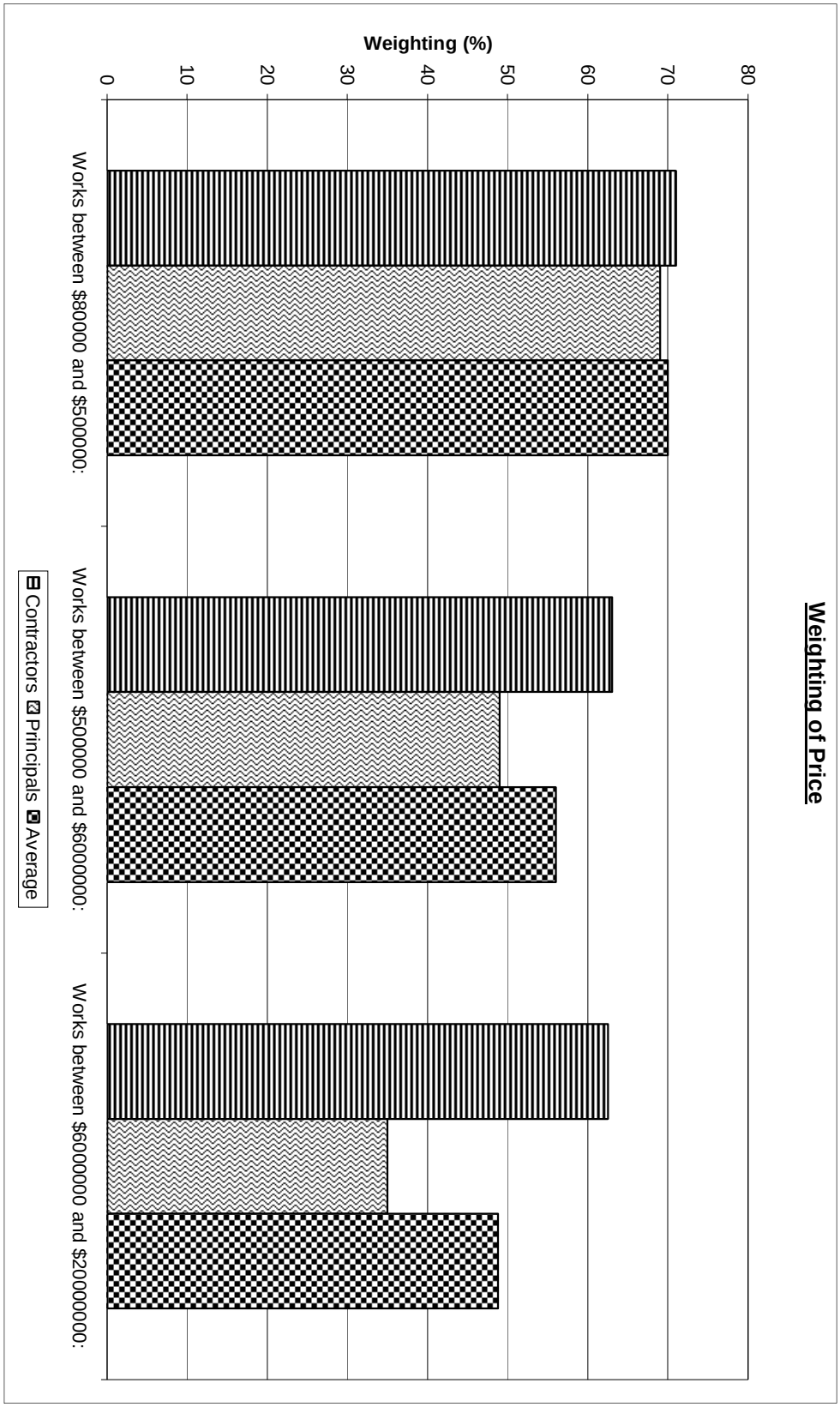

Figure 4.3 - Weighting of Price Against Project Value.

Also, see Appendix B – B.3 Summary of Responses for the data the graphs presented in this section are based on as well as the detailed comments made in Parts A and B.

4.4 Discussion

4.4.1 Non-Price Factors

Generally there is a correlation in the views of principals and contractors on the importance of the non-price factors included in the questionnaire. As shown in Figure 4.2, in many cases factors are equally important to both parties but in other cases the variation is small (≤1 Likert Scale divisions). This is a good indication that both parties consider the factors presented are of a similar level of importance and are likely to agree on well considered evaluation processes that include such factors with appropriate weightings assigned.

Furthermore, if the contractor believes a factor is important then it is likely that it is considered when managing their business so it should be a straightforward matter to demonstrate their commitment to the criterion. Also, as the same criterion is important to the principal, they are aware of the benefit of considering the criterion to ensure the success of the project by selecting a suitable contractor.

Of the additional factors respondents identified, adherence to legislative OH&S requirements would be considered a mandatory factor in the selection of contractors. Documentary evidence of the contractor's OH&S policy and a demonstration of a commitment to the maintenance of OH&S standards during the delivery of works should be included in tender submissions.

A list of relevant contact referees should be included as a mandatory requirement in the submission of tenders. During assessment of tender submissions, referees can then be used if necessary to confirm and assess claims in other areas of tender submissions. Obviously, if the contact referees are not relevant to the nature of the works to be delivered, their value as a referee for the tenderer will be diminished.

The inclusion of a list of proposed sub-contractors within the tender submission may be of varying importance to the principal depending of the scope of work the head contractor intends individual sub-contractors to complete. For more significant sub-contractor work elements, it becomes more necessary for the tender submission to include more information on the sub-contractor similar to the information provided in relation to the head contractor for factors such as understanding of the particular element of work, past experience of the sub-contractor, capacity to carry out the work, and sub-contractor key personnel.

As suggested by one of the respondents, the use of LIP's (Local Industry Providers) may also be a requirement of the principal in order to meet government directives to support local industry.

It is considered that the last point listed, "Deliverables and Outcomes", is generally covered under the factor "Task appreciation/understanding of the scope of the project and possible risks".

4.4.2 Price

The results of the questionnaire, as shown in Figure 4.3, indicate that (as expected) respondents agree that the as the project value and complexity increases so should the weighting of non-price factors.

4.5 Factors and the Tendering Process

Having discussed a range of different factors above, for individual projects a plan is required to determine what factors apply to the particular project and what the relative importance each factor has in the overall project. Non-price factors are generally given a weighting relative to other non-price factors so that in the tender

assessment process each tender submission can be assessed to provide a non-price or technical score.

In developing a plan for a tender evaluation it is important that the Tender Evaluation Plan (TEP) be agreed prior to the opening of tenders. Ideally, the Request for Tender (RFT) documentation should include a list of factors, or schedules, which should be addressed by contractors in their submissions so that it is then clear to contractors as to what the principal believes are important factors in the assessment of tenders.

Whilst principals may prefer not to advise contractors of the weightings of such factors, it is also important that weightings be agreed prior to opening of tenders. Determining weightings, or varying weightings, during the tender assessment process should be avoided as members of the assessment board may then be influenced by information contained in individual tender submissions as to what the relative weightings should be. Thus, determining or varying weightings during an assessment may artificially favour one or more tenderers in relation to the other tenderers. Therefore, this situation should be avoided by agreeing, after due consideration, the factors and their weightings prior to opening of tenders.

In any process to consider price, the aim should be to achieve value for money without undue bias due to influences that should be isolated from the tender process. Such influences might be a conflict of interest (such as members of the tender selection committee having a personal relationship with a tenderer or a business interest in a tenderer). To achieve this, some practitioners give price a weighting. Another measure is to not reveal price details of tender submissions to the members of the tender selection committee until the committee has agreed on the overall non-price or technical score for each submission. With or without a weighting on price, the committee make value for money determinations only after non-price factors have been assessed.

Tendering processes are discussed further in Chapter 5 followed by various issues relating to price and value for money considerations being discussed in greater detail in Chapter 6.

4.6 Conclusions

In this chapter, a range of possible factors for the selection of contractors for engineering works have been discussed, incorporating comments from practitioners in industry to provide guidance as to the relative importance of each factor. Information and discussions developed in this chapter and the following Chapters 5 and 6 will be used to develop checklists in Chapter 7.

Chapter 5 – Tender Evaluation Practices

5.1 Introduction

Processes utilised by principals to select tenders for engineering works vary widely. The owner of a company may select a construction contractor for a variety of reasons – loyalty to friends and family, in support of local, state, or national industry in preference to companies outside these boundaries, intuition, or, quite sensibly, contractors who have delivered good outcomes for the company in the past. However, in the case of government departments, publicly listed companies, or in any situation where the interests of the "owner" are placed in the hands of other people to make such decisions then probity becomes an issue. Decisions must be fair to all parties involved and should be able to stand up to scrutiny.

Therefore it is essential to follow tendering processes in place to ensure open and effective competition for works. As is clear from the aim of this project, appropriate use of factors in the selection of contractors for engineering works is an important part of the process, but how they are best used changes depending on various elements as discussed in Chapter 7.

Knowledge of the relevance and relative importance of each factor for a specific project is critical when determining the tender evaluation methodology for a tender evaluation plan. Well considered selection and weighting, if appropriate, of factors is an essential ingredient in ensuring the best tender is selected in an efficient manner, that is, keeping unnecessary costs to both the principal and industry to a minimum.

Inexperience and a lack of due regard to costs to industry on the part of the principal or his representative unnecessarily drive up costs through poor tendering processes. To help address this situation, careful consideration needs to be applied to the tender assessment methodology to ensure that it is appropriate for the particular works. At some point in this determination, a person well experienced in tendering processes and with a good knowledge of the particular project needs to review the tender

assessment methodology to ensure it appropriate considering the specific needs of the project.

5.2 Background Discussion

There is a little doubt that current federal government tendering procedures have the potential to increase the overall cost of delivering engineering projects (for example see below). These additional costs may seem unavoidable as the aim of the tendering procedures is to ensure open and effective competition whilst minimising the opportunities for fraud, bribery, collusion or any other form of misconduct in the process of expending public funds that can drive up tendered prices. Even though the justification for these processes may be clear, they should still be subject to review to ensure that the expenditure of such funds remains efficient and effective, i.e. good tendering procedures should achieve open and effective competition and thus produce fair pricing and value for money.

As recently as the 1980's Federal government departments when letting works valued at over $20,000 called for tenders from the open market in a one-stage tender process. Certainly, this gave fair access to government works to any company wishing to submit a tender. However, total costs to both government and to industry was potentially enormous for individual projects.

Consider if, in 2007, a government tender was advertised for a project with an estimated cost of $200,000 (to allow for cost increases since 1987). Anyone may tender and tender documents may be purchased for a cost of say $50. If the government project officer receives 70 submissions, the manpower consumed by the tender opening committee followed by the tender evaluation board could not be justified to the tax-payer. Then consider the cost to industry. At a conservative estimate of $1,000 per tenderer to prepare a submission, the cost to industry is $70,000, costs that eventually need to be recouped in one way or another. Before the first sod of earth is dug out of the ground, the total value of the actual works may be exceeded by the total of other costs to the principal and to industry. As unbelievable

as this may seem such situations were not uncommon in the 1980's (W.G. Clarke, pers. comm., 10 Aug 2007).

A far more efficient process for low cost projects is to research the market and select a short-list of suitable contractors (Department of Finance and Administration 2005). If there are to be regular repeat similar projects further market research should be conducted and contractors should be rotated through the short-listing process if there are more than three or four suitable contractors in the market.

For larger more complex projects, a two-stage tender process may be considered. In the first stage an Invitation To Register (ITR) interest may be issued. Interested contractors complete the relevant documentation for the ITR, which is significantly lest demanding of contractor resources than full project Request For Tender (RFT) documentation. ITR submissions are then assessed to select a short-list of contractors, frequently three or four, who are the issued a RFT. With such a process, far more attention can be paid to selection criteria/factors than could be expected under an open tender process.

When organisations have a requirement to regularly go to the market to engage industry to deliver significant works, it may becomes cost effective to set up a panel of contractors for these works, or if the type of works varies, a number of panels may be desirable for each particular type of work (Defence Materiel Organisation, 2006). The selection of contractors for inclusion on a panel can be considered to be the first stage of a two stage tendering process, with contractors qualifying for a panel after being assessed against selection criteria, or factors, considered relevant for the particular purpose of the panel.

Through an ITR process, all interested parties may make submissions addressing relevant criteria for inclusion on a panel. A tender assessment process is then undertaken to determine the make-up of the panel members. Subsequently, contractors from the panel are short-listed to tender for specific projects. As the criteria or factors for inclusion on a panel do not address a specific project they will vary from the range and weighting of factors used for specific projects.

In selection for a panel, therefore, the factors that would be of greater importance might include:

- previous relevant company experience;
- experience of key personnel within the company;
- financial standing of the company, and
- quality assurance and management systems.

Further to the discussion on Quality Assurance in Chapter 4, this factor may be of more significance or importance in relation to the management of a panel. One of the outcomes of a well implemented quality assurance system is continuous improvement. As well as the delivery of quality individual projects, a principal would want to see improvement over time of the quality and competitiveness of tender submissions from panel members. However, it is frequently a requirement that such panels only have a limited life, with new panels being re-advertised on a regular basis to provide fair opportunities to other contractors to join the panel (Department of Finance and Administration, 2005).

Some practitioners might suggest that this prequalification for the particular type of work therefore covers the assessment of the technical or non-price factors in the selection of contractors. Thereafter, the successful tenderer for a particular project can be simply selected on price.

This may be appropriate for low cost, simple works. However, for higher cost, more complex works, membership on a panel may be considered to be only an indication that a contractor has demonstrated that the "basics" can be met, but some contractors can obviously do the basics better than others. The same factors can be considered in more detail, but with additional non-price factors such as task appreciation and methodology, when they are placed in the context of a specific project. Contractors still need to demonstrate that the basic requirements can be met and improved upon for the specific project before more technically demanding aspects of the particular project are addressed.

When a panel is first established, the factors used to assess submissions to determine suitability for inclusion of contractors on a panel may also be used to determine an order of merit for the panel. The number of members included on the panel may be limited depending on the number of projects forecast to be let each year, but it may not be the case that every member of the panel will be given the opportunity to submit a tender for every project. As tenders are assessed for each project let, the order of merit for the panel can be adjusted in accordance with the order of merit of the particular tender. As each subsequent project is put out to tender, the top one or two contractors in the order of merit may be short-listed and the next one or two not given an opportunity on the previous tender may be given the opportunity to tender and again the results of the tender are used to adjust the order of merit. In this way, the principal can rotate through the panel to provide a fair opportunity to panel members to win work whilst ensuring the best performing contractors at a particular point in time are included on the shortlist for each project (Standards Australia Ltd, 1994).

From comments made by various respondents to the questionnaire, there would appear to be a consensus that generally only three or four contractors should be invited to tender for each project. If there are sufficient projects to be let, the panel is rotated in a way that provides fair opportunity to panel members to win work. The factors used to select contractors from the panel for each works play an on-going role in the effective management of the panel. The whole process, if managed well, should result in the panel members becoming more competitive over time.

Performance on the panel may become a factor in itself. Contractors that continually rate low during tender evaluation may be dropped from further consideration for short-listing, noting that inclusion on a panel is normally not a promise of work. Rather it is a commitment from the principal to provide an opportunity to win work. Under the above process this commitment would have been met.

5.3 Example Case Study 1 – WTSS Facility

5.3.1 Background Information

As part of the research into the use of factors in the selection of contractors, current industry practice was investigated through observing a sitting tender evaluation panel.

The project that will be discussed is the construction of a Weapons Training Simulation Systems Facility (WTSS facility) at the Army Aviation Centre, Oakey.

There are a number of these facilities located at bases across Australia. The facility houses projectors and other equipment such as audio and computers that simulate weapons training exercises. Multiple weapons are able to be simulated and all feature realistic sensory feedback with user experiencing recoil and audio close to the firing of a live weapon.

It follows that the purpose of these facilities is to provide a means by which recruits can practice before being involved in live-fire exercises and trained soldiers can maintain their skills. The use of these computer simulated firing exercises has been shown to significantly improve soldier performance and since no bullets are actually fired it is not only safer but a more efficient use of resources.

All contractors approached by Defence for this project are from a pre-qualified panel established to perform similar such works.

The design contract was awarded to a consultancy firm on a single select basis. This action was approved due to the fact that the firm had previously designed eleven other WTSS facilities for Defence. It was therefore deemed that they were in a very good position to provide a cost effective service to design and provide tender documentation for Defence's WTSS.

Defence then required that the Contract Administration/Project Management contractor be finalised. Three contractors (excluding the firm selected for the design consultancy to prevent a conflict of interest) were then selected from a list of pre-qualified contractors and were invited to submit tenders for Contract Administration/Project Management contract. All three contractors indicated they were able to perform the work by submitting tenders.

This prequalification of contractors ensures that only competent contractors are being presented for evaluation and reduces the likelihood that the board will encounter nonconforming/deficient submissions.

5.3.2 Evaluation Criteria

The panel assessed three tenders for the Project Manager/Contract Administrator contract for the construction of the WTSS facility. The successful tenderer will then be required to appoint a head contractor for the project and to manage the project throughout the construction of the facility before handover for Defence Materiel Organisation (DMO) fit-out.

Two non-price factors were considered as well as VFM. These factors were Detailed Consultants Activity Proposal (DCAP) and Consultants Key Personnel with weightings of 60% and 40%, respectively. The criteria (including sub-criteria) and weightings as set in the Request for Proposals is as shown below in Table 5.1 – Evaluation Criteria and Weightings.

Table 5.1 – WTSS Evaluation Criteria and Weightings.

Evaluation Criteria	Weighting
DETAILED CONSULTANTS ACTIVITY PROPOSAL (DCAP) 1. The Consultant's understanding of what Defence will require the Consultant to do. 2. Demonstrated insight and understanding of the nature and scope of the project with appreciation of potential problems and proposed solutions. 3. All aspects of the Consultant's approach which could distinguish that approach from that of other consultants, in performing the specific Services of the contract	**60%**
CONSULTANT'S KEY PERSONNEL 1. Experience of the proposed persons. 2. Roles and responsibilities of all key personnel, their current commitments and how those commitments would be managed, including their commitment to this project if appointed. 3. Resource commitment.	**40%**
FEE FOR SERVICE	**Value for Money**

Prior to attending the evaluation proceedings, the official assessors were required to review the submissions and use the evaluation guide as shown in below in Figure 5.2 – Evaluation Scoring Guide to give each contractor a score for every sub-criteria.

I was permitted to view the three tender submissions and also scored each contractor against the prescribed criteria using the following guide:

Table 5.2 – Evaluation Scoring Guide.

Description	Criteria	Score
Excellent	Compliant. Exceeds specified performance or capability and the additional input adds value. Tenderer clearly understands the requirement. No weaknesses or deficiencies. Excellent probability of success.	5
Very Good	Compliant. Tenderer's supporting statement indicates a very good understanding of the requirement. No weaknesses or deficiencies. Very good probability of success.	4
Good	Compliant. Tenderer's supporting statement indicates an good understanding of the requirement. No major weaknesses or deficiencies. Good probability of success.	3
Acceptable	Compliant. Tenderer's supporting statement indicates a general understanding of the requirement. Some minor weaknesses or deficiencies and further clarification may be needed. Fair probability of success.	2
Marginal	Compliance stated by tenderer. Tenderer's supporting statement does not indicate the level of understanding or indicates some misunderstanding of the requirement. Some major weaknesses or deficiencies. Low probability of success.	1
Unacceptable	Non-compliant. The tenderer's supporting statement indicates a complete misunderstanding of the requirement or non-compliance without any supporting statement regarding compliance without any supporting statement or the tenderer has not supplied any statement regarding compliance with the requirement. Very low probability of success.	0

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5.3.3 Procedure

The evaluation panel meeting was run as follows:

There was a chair to the proceedings who guided the group. The non-price criteria were judged first. Starting with the first non-price criteria, each assessor gave their score and justification. Then there was a group discussion after all panellists had

given their score for a particular contractor for a criteria to get a consensus on what the final board agreed score should be.

To make sure there was no one person leading the group thought the order in which assessors were asked to reveal their scores was alternated. That is, for the first contractor discussed when assessing the first non-price criteria the order in which the assessors revealed their score was Assessor A, Assessor B then Assessor C but for the next contractor the order was Assessor B, Assessor C then Assessor A.

5.3.4 Panel Results/Reasoning

The scores given for the non-price factors were:

Table 5.3 – Assessment of Tender Submissions

	Assessor A			**Assessor B**			**Assessor C**			**Board Agreed**			**Author**		
Criteria	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
1	3	4	3.75	2.5	3.5	2.5	2.8	4.3	4	2.7	4	3.5	3.5	4.5	5
2	3	4	3.75	2.5	3.5	2.5	2.8	4.3	4	2.7	4	3.5	3	5	5
3	3	4	3.75	2.5	3.5	2.5	2.8	4.3	4	2.7	4	3.5	3	5	5
4	2.75	4	3.75	2	2.5	3	2.7	3.75	3.7	2.5	3.75	3.7	3	5	4
5	2.75	4	3.75	2	2.5	3	2.7	3.75	3.7	2.5	3.75	3.7	4	5	5
6	2.75	4	3.75	2	2.5	3	2.7	3.75	3.7	2.5	3.75	3.7	3	3	3

Using the method outlined in the tender evaluation plan, Contractors 1, 2 and 3 were given overall percentages for their performance in addressing the non-price criteria of 53%, 78% and 71.6%, respectively. That is, Contractor 2 was placed first on technical score, with Contractor 3 placed second, and Contractor 1 third. Based on these scores, the panel agreed that selection of any one of the contractors would provide a good probability for a successful outcome for the project.

Lastly, to determine the panels' preferred contractor, the tendered price was considered to determine which submission offered the best value for money. Contractor 1's price was significantly lower than the cost estimate the panel had been

provided in the evaluation plan, Contractor 2 was slightly lower than the estimate and Contractor 3 a little greater.

By using the information given in the schedule of resources submitted by each contractor, it was shown that Contractor 2 had committed slightly more man-hours than Contractor 3 but Contractor 1 had specified less than half the time of the other two. To compare the prices, the total price can be divided by the number of hours each contractor had specified would be spent on the project to present an hourly rate. This calculation revealed that although Contractor 1 had the cheapest total price it had the highest hourly rate at $190/h followed by Contractor 3 at $151/h and with Contractor 2 having the lowest at $121/h.

Comparative assessment was then conducted between submissions. Contractor 2 had a higher technical score, a lower tendered price and a lower hourly rate than Contractor 3. Therefore, Contractor 2 clearly represented better value for money than Contractor 3 and Contractor 3 was not considered further.

Contractor 2 had a better technical score but a higher total price than Contractor 1. However, the hourly rate for Contractor 2's services was lower than that for Contractor 1. The panel therefore considered that Contractor 2's submission represented best overall value for money for Defence. Although initially Contractor 2 appeared to be the preferred contractor, following the formal sitting of the panel, a comparison of the estimated value for the work as detailed in the tender evaluation plan with the figure actually budgeted for the work revealed a large shortfall in available funds if Contractor 2 was selected. After further discussions, the panel determined that only Contractor 1's tendered price was within the available budget.

5.3.5 Outcome

After the first formal sitting of the panel the panel was reconvened for further discussions relating to available budget and it was the panel's decision to recommend Contractor 1 as the preferred contractor. This report was then forwarded to Canberra for approval and the contract was awarded to Contractor 1.

5.4.6 Conclusions

The total time and effort spent by the Defence to conduct the full evaluation of all three submissions does not appear to be necessary as Contractor 1 was deemed to be the only tenderer who provided a submission with a tendered price that was within the available budget. If the actual budget restrictions had been included in the tender evaluation plan rather than only what was an estimate of possible costs, then Contractors 2 and 3 might have been discounted early in the tender evaluation process. Contractor 1 would still have subject to a full evaluation and the panel would have made a determination on the probability of success of only Contractor 1.

Although there was the intention to use factors other than price in order to do a comparative assessment in determining the preferred tenderer, in reality this did not eventuate. The contract was awarded mainly on the basis of the tendered price of only one of the tenderers being within budget. The end use of considering the non-price factors was, therefore, only to determine the likelihood of success of the particular submission. The fairly straightforward nature of the project and the quality of Contractor 1's tender submission mean that it is still likely the project will be successful in this case but the overall process employed did highlight some deficiencies such as mentioned above in relation to missing information in the tender evaluation plan.

5.4 Example Case Study 2 – Fire System Storage Tank

5.4.1 Background Information

To explore the effect of selecting a contractor based on price alone, a project where this was the case was studied. To this end, the tender documentation for the installation of a Fire System Storage Tank for Defence was examined.

5.4.2 Assessment of Submissions

Three tenderers were assessed using the following criteria and weightings:

Table 5.4 – Fire System Storage Tank Evaluation Criteria and Weightings.

Assessment Criteria	Description	Criteria Weighting Factor (%)
SCHEDULE A Task Appreciation & Methodology	Understanding of project key risks, methodology and value added to given.	40%
SCHEDULE B Management and Resource Plan	Management structure (roles & responsibilities) and system (OH&S, IR, QA & site management)	30%
SCHEDULE C Current Capacity	Provide details of their current work load including capacity for this Project	15%
SCHEDULE D Project Program	Showing: Commencement, Major tasks/components, Hold/Witness Milestones, Progress Claims, Contingency, Handover & Final Retention Claim	10%
SCHEDULE E Conformance with Tender Documentation	Provision of Specification schedules, Copies of Licences, etc.	5%

Contractor 1 had the lowest technical score (only just satisfied minimum acceptable score) but had submitted a price 15% lower than the central tender and 25% lower than the highest bid.

However, Contractor 1 received a marginally acceptable technical score where Contractors 2 and 3 was given a scores 30% and 18% greater, respectively.

The board considered that Contractor 1 offered the best value for money but the bid was considered very low so the contractor was asked to confirm the details of their submission. The contractor confirmed that they would be able to deliver the work given the tendered sum so were awarded the contract.

Also, sensitivity tests performed revealed the following order of contractor preference:

When 20% Technical Score/80% Price,

1) Contractor 1
2) Contractor 3
3) Contractor 2

But when 50% Technical Score/50% Price,

4) Contractor 2
5) Contractor 3
6) Contractor 1

5.4.3 Problems

One problem that has become evident within the defect liability period is the poor connection of the tank to the fire booster pump. The tank manufacturer specified that the connection required an 8 bolt configuration. The tank side of the connection provided the bolt holes to accommodate this configuration but the contractor used just 4 bolts. The problem was soon identified as when in was put in service it had a very obvious leak.

Another problem that occurred involved the float control valve that controls the water level of the tank. In this case, due to design issues there have been issues determining who is responsible for the problem but ultimately the contractor will be held accountable to ensure the fault is rectified.

5.4.4 Outcome

Although the upfront cost saving was a significant, there have been a number of delivery issues encountered resulted in increased costs.

5.4.5 Conclusions

The price submitted by the contractor was significantly lower than the other two submissions but the generally poor management by the contractor throughout the project has highlighted the shortcomings of selecting contractors based on price alone even for a straightforward project.

In this case, even though there were a lot of issues, the initial savings still provide a net benefit to Defence. That is, the savings were greater than the additional costs incurred.

Chapter 6 – Further Discussion of Consideration of Price

6.1 Introduction

As discussed in Chapter 2, more recent practice in the selection of contractors for engineering works is to consider price and non-price factors separately with the specific non-price factors being evaluated for all contractors first and then price being looked at to determine value for money. However, practices vary widely as to how consideration of price, or value for money, is incorporated into the overall tender assessment process.

The research carried out during this dissertation found that, even with extensive use of non-price factors, price almost always remained the major factor in the selection of contractors. However, some practitioners treated price much in the same manner as non-price factors, including the assignment of a weighting, whilst others considered price quite differently to non-price factors, did not apply a weighting, and made final decisions on the preferred tenderer based on less mathematically based discussions. Whilst the concept of value for money may not be applied in any standard way, in the process of selection of contractors for engineering works, poorly defined methods for determining value for money can result in lengthy discussions at tender evaluation meetings and with the validity of the agreed decision being in question.

The Tasmanian Government (2006) has a very clearly defined methodology for determining value for money, with the contentious issues such as the weighting of price being agreed upon prior to calling tenders. In contrast, the value for money approach used by Defence is a more subjective one. Essentially, after the non-price factors have been assessed the tender evaluation board discusses the 'Value for Money' of each bid without a formal quantitative analysis. Although the board must provide justification for their decision it can susceptible to the biases of stronger individual panel members formed in the viewing of submissions or for other reasons not necessarily known to other panel members. The Tasmanian Government approach of defining a quantitative approach to determining value for money in the

tender evaluation planning stage, well before any tender submissions are viewed, helps to eliminate opportunities for biases that may unduly influence decisions in a more subjective approach.

In any process to consider price the aim should be to achieve value for money whilst remaining within the principal's budget, which can be an issue in itself depending on the robustness of the budget estimate. In this chapter, a number of such general issues relating to price will be discussed. Then examples of quantitative methods for considering price in relation to non-price factors with the aim of achieving the best value for money decision will be reviewed followed by comment on a qualitative subjective approach.

6.2 Why not just select on lowest price?

There are a variety of reasons as to why a principal might be concerned about an unexpectedly low tendered price:

- potential for excessive claims for variations - some contractors prey on omissions or ambiguities in project documentation in order to claim variations and improve profit;
- undue pressure on sub-contractors by head contractor to reduce sub-contractor costs to head contractor and thus affect sub-contractor performance;
- short-cuts on the job, such as thin slabs, that are hidden when the project is complete, and
- poor quality finishes.

As highlighted throughout this dissertation, price remains a major factor in the selection of contractors for engineering works. However, when other non-price factors are considered, issues such as the above may come to light to indicate that the lowest tendered price might not correspond to the lowest whole-of-life cost solution on offer.

6.3 Management of Obviously Low Bids

If a submitted price is considered by the tender evaluation panel to be too low to effectively deliver the stated scope, the tenderer should be advised that it is believed that his tenderer price is low and he should be requested to confirm his price. No specific amounts should be mentioned, although degrees might be discussed. To ensure fairness in the tendering process, the tenderer should be given the opportunity to either confirm his price or withdraw the tender; the Commonwealth Government will not allow tendered prices to be varied. The Government actually wants contractors to make a reasonable profit (Department of Finance and Administration, 2005).

There are, of course, reasons why a tenderer might be in a position to submit a significantly lower bid than other tenderers such as:

- new construction methods;
- innovative equipment or processes;
- favourable relationship with suppliers;
- lower overheads through better innovative management procedures;
- “buying a job” to utilise otherwise idle plant, or
- “buying a job” to get into a new market.

Therefore, once a contractor confirms a tendered price, it should be accepted.

6.4 Apples with Apples

The tender evaluation panel needs to ensure when comparing price that the prices actually represent the delivery of the same scope of work. If necessary, adjustments should be made to the tendered prices so that “apples are compared with apples”, with any such adjustment being documented in the tender evaluation report.

6.5 Budget Considerations

Some tendered prices may be ruled out purely on the basis that they are outside the principal's budget. Once it is confirmed that the price submitted is for the scope of work included in the RFT (that is, no additional quantifiable costs have unnecessarily been included in the tendered price), if the price is still outside of the principal's budget, the submission can be eliminated from further consideration thus reducing the total time committed by the principal to evaluate the tenders.

6.6 Quantitative Methods of Considering Price.

There are a variety of quantitative methodologies that may be employed in a predetermined process for tender evaluation to combine a technical score based on non-price factors with price or a score for price. Such methodologies remove the need for some of the subjective discussions regarding price during tender evaluation, discussions that may be unduly influenced by a strong tender selection panel member's support for a particular submission for reasons that might not be fully transparent to the other panel members.

By the panel agreeing to the assessment methodology to combine technical score and price prior to the issuing of the request for tender and so before any submissions are viewed by panel members, such influences or biases are reduced. For less complex smaller projects where total cost is primary concern, a matrix methodology or similar simple approaches may be used. As complexity and estimated costs of projects increase and technical factors relating to the capabilities of contractors become more important, then a fixed weighting to these factors and price may be more appropriate.

Matrix Methodology:

In the matrix methodology, a minimum technical score must be established and recorded in the tender evaluation plan. This minimum technical score is represented

in Figure 1 below by the vertical line between boxes 3 and 4 and boxes 1 and 2. The middle horizontal line in Figure 1 represents the median price submitted by tenderers.

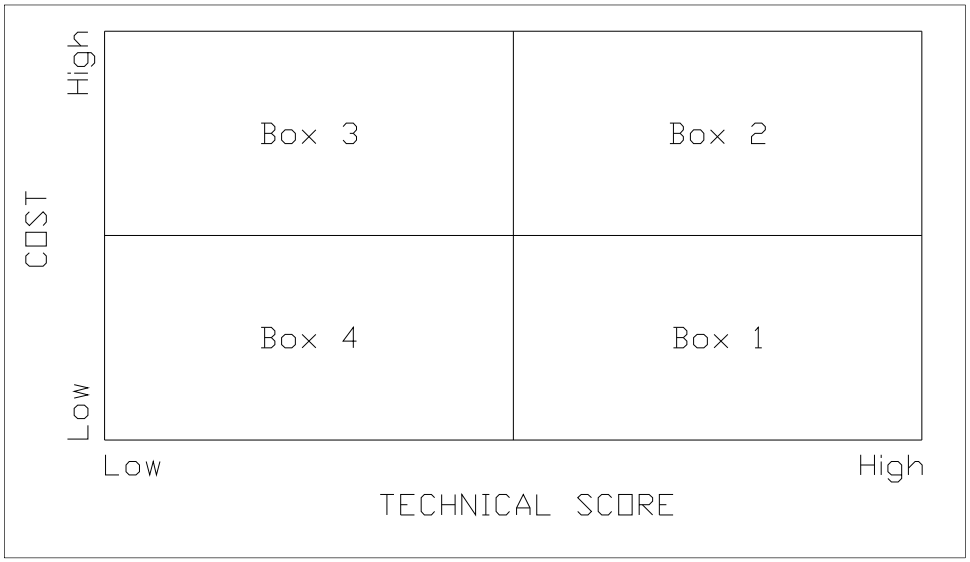

Figure 6.1 - Technical Score vs. Cost.

Each tenderers technical score and price is then plotted on the diagram.

Tenders that are contained in boxes 2, 3 or 4 are eliminated.

The preferred tenderer should be taken from box 1 as points plotted in this box represent submissions with high technical score for low cost. In the event that only one tender is categorised as low cost-high technical score then this tenderer should be awarded the contract. More commonly, there will be multiple submissions that fall into this category and in this case the contract may be given to the lowest price in the case of simple works. Alternatively, a comparison may be made on the percentage differences in technical score compared with cost to determine value for money. Initially, any submission with both a lower technical score and a higher price than any other individual submission in box 1 can be eliminated. Then remaining tenderers in box 1 are compared in pairs to eliminate tenderers one at a time until only one tenderer remains. A submission with a higher percentage difference for a superior technical score compared to a percentage difference for a higher price represents better value for money and remains in consideration. Conversely, a

submission with a lower percentage difference for a superior technical score compared to the percentage difference for a higher price will result in the tenderer being eliminated as the higher price is not considered value for money. This elimination process effectively allocates a weighting to price of 50% (CPLI, 1996).

Value for Money Calculation:

This is quite a simple method that is calculated by dividing technical score by cost to provide the number of technical points bought for each dollar spent. The submission that gains the highest value from this calculation therefore represents the best value for money. As for the previous method, this method results in an equal weighting being allocated to technical score and price, that is price has an overall weighting as a factor of 50% (CPLI, 1996).

Combined Score Methodology:

Normalised scores are calculated for both the technical score and for price then the preferred contractor is found by applying the predetermined weightings to the normalised technical score and price for each of the tenders.

The normalised technical scores are found by assigning a score of 100 to the best contractor then giving each other a score based on the percentage difference from best score. For example, if Tenderers A, B and C have technical scores of 25, 28 and 21, respectively, the normalised scores are calculated as follows:

Tenderer B = 100

Tenderer A = 100 – (((28-25)/28) x 100)
= 89.3

Tenderer C = 100 – (((28-21)/28) x 100)
= 75

The normalised price scores are found in a similar manner with the lowest price being given a score of 100 and other prices being assigned scores based on their variation from the lowest price.

The final score is then found by applying to the normalised scores the relative weighting that had been predetermined for price and technical factors. Further testing can be conducted by checking the sensitivity of small changes in the weightings to technical score and price to see if such changes result in a change of preferred tenderer. For example, if the predetermined weighting for price was 60%, the calculations might be repeated for a weighting of price of 55% and 65%. If the tender evaluation panel wished to change the preferred tenderer based on such sensitivity tests, then justification would need to be provided as to why the original weighting for price was not appropriate (Tasmanian Department of Treasury and Finance, 2006, CPLI, 1996).

6.7 Consideration of Price in Defence Contracting

Defence consider Value for Money in a sometimes subjective manner during tender evaluation with no specific weighting applied to price. If a particular submission scores the highest technical score and has the lowest price, then the decision of preferred tenderer is clear. If this is not the case, as above, any submission with both a lower technical score and a higher price in comparison to any other individual submission can be eliminated. The remaining tenders are then compared in pairs with the key assessment of the panel being to determine what additional benefit or reduction in risk a tender offers at what additional cost to Defence. The process continues until only the single preferred tenderer remains. The process relies heavily on the collective experience and judgement of the tender selection panel (Defence Material Organisation, 2006). This methodology can result in extensive discussions by the tender assessment panel, but if followed openly and fairly to its logical conclusion it effectively provides a weighting to price. However, the influence of a strong evaluation board member during value for money considerations may unduly sway other board members as price is not clearly weighted.

6.8 Conclusion

As above, some methods for considering price automatically give a weighting of 50% to each of price and technical score. Even the approach taken by Defence in not specifically allocating a weighting to price can effectively lead to a weighting of price approximating 50% during value for money discussions in the tender evaluation process.

Low cost technically simple works should tend towards 100% weighting of price. Consultancies for more technically demanding projects may tend towards 60 or 70% for technical score. Generally weighing of price for construction contracts will not be lower than 50%. Tasmanian Department of Treasury and Finance (2006) states that a price weighting of lower than 60% "would represent extraordinary circumstances. Agencies adopting a weighting of less than 60% will be required to justify their decision."

Of the quantitative approaches discussed, only the Combined Score Methodology allows for the allocation of these various weightings to price. Utilising weightings for technical score and for price that are agreed by the tender evaluation panel prior to the issuing of the RFT, reduces the influence of possible biases of panel members during tender evaluation. These weightings, however, should be subject to serious consideration by the actual panel members who should be very familiar with the project to ensure that the weightings are appropriate.

Chapter 7 – Proposed Improvements in the Use of Factors

All aspects of the research conducted for this project contributed to gaining an understanding of different views and current practices involving the use of factors in the selection of contractors. The factors and weightings suggested are based the questionnaire results but some adjustments have been made where appropriate to reflect the two works the author was able to review that gave an indication of the range of weightings that should be assigned to factors and what impacts the relative weighting of price and non-price factors which were produced by Waara and Brochner (2006) and the Department of Treasury and Finance (2006).

This chapter outlines some proposed lists of factors and weightings for projects for the three financial ranges as defined in previous chapters of $80,000 to $500,000, $500,000 to $6 million, and $6 million to $20 million, using each of traditional contract types of Head Contract, Design & Construct and Managing Contract.

7.1 Head Contract

The factors that should be considered for projects using a Head Contract will vary according to the level of difficulty and value of a project but previous experience and past performance are the two key factors that should be considered in all cases.

7.1.1 $80,000 to $500,000

For projects within this value range,

- Price should be the primary selection criteria for projects in this range as works in this range are generally of small scope and complexity which diminishes the impact selecting a contractor with a high technical score. Non-price factors should still be assessed as successful tenders should be

able to demonstrate at least an acceptable level of conformance with the specified selection criteria. A weighting of 80-90% for price is appropriate given the stated value and contract type.

- A small number of factors should be used to minimise the time and cost of tendering, which benefits both the contractor who can easily prepare the tender and the principal who will not be required to assess huge submission. 2 to 3 non-price factors applied with a relative weighting of 10-20%, as appropriate considering the relative complexity/difficulty of the project would be suitable for this price range and contract type.

- The two essential criteria for this price range would be Relevant Experience and Past Performance. If the contractor has delivered similar work in an effective and efficient manner then the risks for projects in this low value category are low.

- The financial capacity is another factor that may be considered for projects in the higher end of this range. Also, depending on the complexity and time frame of the project, the contractors proposed methodology might be seen a significant factor in the success of the project.

Table 7.1 – Suggested Criteria and Weightings for Head Contracts between $80,000 and $500,000.

	Weighting (%)	
Criteria	***Minimum***	***Maximum***
Relevant Experience	5	10
Past Performance	5	10
Financial Capacity	0*	10
Methodology	0*	10
Price	80	90

* Note: If in any evaluation plan, more than the minimum number of factors is applied, a weighting of less than 5% is proposed then serious consideration should be as to whether the factor is important enough to include.

7.1.2 $500,000 to $6 million

For projects within this value range,

- As the project value increases, generally so does the scope and complexity. This means that the technical capability of the contractor has more influence on the likely success of the project. In this range however, there can be both low and high complexity jobs so a weighting of 60-80% for price is appropriate.

- Due to the greater value of jobs in this range, the technical capability of the contractor is of more importance. More factors will need to be considered. 3 to 5 non-price factors applied with a weighting of 20-40%, as appropriate considering the relative complexity/difficulty of the project would be suitable for a Head Contract in this value range.

- Along with Relevant Experience and Past Performance (the importance of which was discussed in the previous section), Financial Capacity and the contractors proposed Methodology become essential criteria. The methodology gives an indication of the contractors ability to manage the work and assessing the financial capacity ensures that they are able to adequately finance the project prior to payment by the principal.

Table 7.2 – Suggested Criteria and Weightings for Head Contracts between $500,000 and $6 million.

	Weighting (%)	
Criteria	***Minimum***	***Maximum***
Relevant Experience	5	15
Past Performance	5	15
Financial Capacity	5	10
Methodology	5	10
Resources	0	10
Price	60	80

7.1.3 $6 million to $20 million

For projects within this value range,

- Projects in this price range are likely to be require a technically sound contractor to be successful. The importance of non-price factors is of much greater importance. A weighting of price between 50% and 60% would be appropriate for a Head Contract in this range.

- A number of non-price factor should be considered for these higher valued projects. 4 to 7 non-price factors should be applied with a combined weighting of between 40% and 50%, as appropriate considering the relative complexity/difficulty of the project.

- The Management Systems used by the contractor is an essential criteria to demonstrate the ability of the contractor to properly manage a complex project to deliver a quality outcome on time and budget.

- Depending on project specific details, the factors used could also include Key Personnel or the Resources the contractor intends to commit to the project.

Table 7.3 – Suggested Criteria and Weightings for Head Contracts between $6 million and $20 million.

	Weighting (%)	
Criteria	***Minimum***	***Maximum***
Relevant Experience	10	20
Past Performance	10	20
Methodology	5	15
Financial Capacity	5	10
Management Systems	5	10
Key Personnel	0	10
Resources	0	10
Price	50	60

7.2 Design & Construct

The factors that should be considered for projects let using a Design & Construct contract differs slightly from those of a Head Contract. As the principal only provides performance specifications and preliminary concept designs, a suitable contractor should be able demonstrate past experience and good performance as well as an excellent appreciation of the task.

The selection of a skilled contractor is particularly critical for this type of contractor where the contract documentation is not quite so specific as is the case with a Head Contract. It follows that the weighting of price is therefore generally lower than would be use for a Head Contract.

7.2.1 $80,000 to $500,000

Projects within this price range would not normally be delivered using a Design & Construct project. Unique jobs in this price range are usually handled more efficiently by letting separate design and construction contracts.

However, some examples of types of project that do fall into the category of Design & Construct are generic or 'off the shelf' solutions such as temporary buildings and sheds. For these types of job, the three factors that should be considered are relevant experience, past performance and of course, price.

7.2.2 $500,000 to $6 million

For projects within this value range,

- As with a Head Contract, 3 to 5 non-price factors should be applied with a weighting of 30-40%, as appropriate considering the relative complexity/difficulty of the project. The number of factors could be considered mostly a function of project value but the aim of using factors is to reduce project risks, which depend on the contract type. So unlike Head Contracts, for Design & Construct projects an Appreciation of the Task is essential to the good alignment of Contractor and Principal.

- Due to the higher risk of associated with this contract type, it is not recommended that the weighting of price exceed 70%. A suitable weighting of price for a Design & Construct Contract in this range would be between 60% and 70%.

Table 7.4 – Suggested Criteria and Weightings for Design & Construct Contracts between $500,000 and $6 million.

	Weighting (%)	
Criteria	***Minimum***	***Maximum***
Task Appreciation	10	15
Relevant Experience	5	10
Past Performance	5	10
Financial Capacity	5	10
Key Personnel	0	10
Resources	0	10
Management Systems	0	10
Price	60	70

7.2.3 $6 million to $20 million

For projects within this value range,

- For a Design & Construct Contract in this range there is significant risk to the Principal if an inferior contractor is selected. It follows that price should have a weighting of 40-60%.

- Again, for this relatively high value range and risk more factors will need to be considered. Between 4 and 7 non-price factors should be applied with a weighting relative to price of 40% to 60%, as appropriate considering the relative complexity/difficulty of the project.

Table 7.5 – Suggested Criteria and Weightings for Design & Construct Contracts between $6 million and $20 million.

	Weighting (%)	
Criteria	***Minimum***	***Maximum***
Task Appreciation	10	20
Relevant Experience	10	15
Past Performance	10	15
Financial Capacity	5	10
Key Personnel	5	10
Resources	0	10
Management Systems	0	10
Price	40	60

7.3 Managing Contract

The factors that should be for a Managing Contract are more focused on the past experience of the company, past performance and the key personnel the contractor proposed to assign to the project.

The importance of the non-price factors (or technical score) in general is greater for this type of contract compared with a Head Contract.

7.3.1 $80,000 to $500,000

The complexity of projects within this value range is such that they do not commonly warrant the use of a Managing Contractor. This method of procurement is best utilized in situations where numerous packages of work need to be let to complete the job.

7.3.2 $500,000 to $6 million

Projects of valued in this intermediate range are sometimes more suitable for completion using a Managing Contract as they are likely to have a greater scope and complexity.

For projects within this value range,

- A Managing Contract is a case where additional expenditure to gain a more technically capable contractor can result in a significantly better project outcome. 3 to 5 non-price factors should be applied with a weighting of 30-50%, as appropriate considering the relative complexity/difficulty of the project.

- It follows that price should have a weighting of 50-70%.

Table 7.6 – Suggested Criteria and Weightings for Managing Contracts between $500,000 and $6 million.

	Weighting (%)	
Criteria	***Minimum***	***Maximum***
Management Systems	10	15
Relevant Experience	5	10
Past Performance	5	10
Task Appreciation	5	10
Financial Capacity	5	10
Key Personnel	0	10
Resources	0	10
Methodology	0	10
Price	50	70

7.3.3 $6 million to $20 million

For projects within this value range,

- For Managing Contracts in this higher value range, the use of 4 to 7 non-price factors with a relative weighting of between 50% and 60%, as appropriate considering the relative complexity/difficulty of the project is suitable.

- It follows that price should have a weighting of 40-50%.

Table 7.7 – Suggested Criteria and Weightings for Managing Contracts between $6 million and $20 million.

	Weighting (%)	
Criteria	***Minimum***	***Maximum***
Management Systems	15	20
Relevant Experience	10	15
Past Performance	10	15
Task Appreciation	5	10
Financial Capacity	5	10
Key Personnel	0	10
Resources	0	10
Methodology	0	10
Price	40	50

7.4 Conclusions

These checklists may be used to develop more quantitative evaluation methodologies that include both price and non-price factors with the aim to ensure the selection of contractor submissions which have the highest probability of success, that is submissions that will achieve the best overall outcomes for principals.

Chapter 8 – Conclusions

8.1 Achievement of Project Objectives

The project addressed all primary objectives, although to varying degrees. Overall, a quite reasonable level of conformance with the objectives as outlined in the project specification has been achieved. Chapter 7 contains example checklists of factors that might be used for engineering works of a range of values, this being a specific aim of the project.

8.2 Specific Comments on Use of Factors

Even with the now more widely used practice of including non-price factors in the assessment of tenders, based on the research conducted for this project, price remains the single most important factor in the process to select contractors for engineering works. However, awarding contracts purely on the basis of tendered price is fraught with danger, more so as the value and complexity of a project increase.

The number of non-price assessment criteria should be kept to a reasonable minimum, selecting the factors that are most relevant to the success of the project; the consideration of each additional criterion adds costs to both the principal's organization to assess submissions and to that of the tender in the preparation of the submissions. It can still be expected that as the size and complexity of projects increase, so will the number of criteria that the principal would like to consider to assess submissions.

Criteria and their weightings should be agreed for each engineering project prior to the issue of requests for tender. The circumstances of each engineer works, even when the design and scope of projects appear similar, do vary so set criteria and weightings are neither appropriate nor desirable. Additionally, non-price factors with an agreed weighting of less than 5% should perhaps be removed from the assessment process.

Serious consideration should also be given to providing an agreed weighting for price for inclusion in the tender evaluation plan. The recommendation as to what this weighting for price might be should be made by the tender selection panel who therefore need to be very familiar with the project very early in the process. A quantitative approach, such as the Combined Score Methodology, can then be used to quickly assess value for money. Also, a minimum and a maximum weighting for price in relation to the actual agreed weighting may be included in the tender evaluation plan, thus allowing timely sensitivity calculations to be carried out during tender assessment.

8.3 Further Work

Future work in on the subject of the factors in the selection of contractors for engineering works could be:

- Evaluate more contracts that were let under a lump sum contract.

- Further development of checklists and weighting of factors for different types of contract.

- Consider engineering consultancy as an area in itself and develop checklists and weighting of factors. The five P's, Prior Planning Prevents Poor Performance (PPPPP) apply here so the type and weighting of factors is different than what is suitable for construction projects. That is, a heavier weighting will generally be applied to non-price factors to obtain a technically superior consultant with the expectation that the construction phase will be handled more efficiently and a higher quality product will be produced through the expertise of the consultant.

- Review a project that was delivered using a partnering arrangement such as PPP and compare to a similar project that was delivered through a

more traditional method (Defence is currently delivering a project called Single LEAP, Stage 1 under a PPP arrangement with Plenary Living. The project is valued at over $300 million and provides new living accommodation at Enoggera, Amberley and Holsworthy. The contractor, Plenary Living, will finance, design, construct, operate, and maintain the facilities including accommodation management for a period of 30 years (Infrastructure Division, 2007).

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Appendix A

Project Specification

University of Southern Queensland

FACULTY OF ENGINEERING AND SURVEYING

ENG4111/4112 Research Project
PROJECT SPECIFICATION

FOR:	**Lauren Elizabeth Clarke**
TOPIC:	Factors in selection of contractors for engineering works
SUPERVISOR:	Dr. David Thorpe
SPONSORHSIP:	Faculty of Engineering and Surveying, USQ
PROJECT AIM:	The aim of this project is to prepare example checklists of factors that may be considered during the selection of contractors for engineering works with budgets between $80000 and $20 million taking into account the nature and estimated value of the work as well as the contract type.

PROGRAMME: (Issue A, 26th of March 2007)

1. Research current methods employed by government bodies and publicly listed companies to select contractors for engineering works.

2. Determine what factors, and their weightings where appropriate, could be used for a range of projects based on the nature of the work, estimated cost and contract type.

3. Explore how cost is best considered as a factor in the selection of a contractor so that there is no undue bias towards or against one contractor or another based on price.

4. Investigate a specific example of a project that was tendered using a traditional method (i.e. with price the primary consideration) and determine what non-price factors could have been considered to improve the outcome of the project.

5. Write and submit dissertation in the required format.

As time permits,
6. Determine if a project that used a partnering, relationship contracting, or alliance type contract resulted in the project being completed more successfully than would have been expected using a more traditional method.

AGREED: _____(student) _____(supervisor)

Date: / / 2007 Date: / / 2007

Assistant Examiner: _____

Appendix B

Questionnaire - B.1 Cover letter
- B.2 Generic Questionnaire
- B.3 Summary of Responses

B.1 Cover Letter

Lauren Elizabeth Clarke
2 Somerset Street,
Toowoomba 4350
Home: (07) 4632 8565
Mobile: 0448965279
Fax: (07) 4634 2797
Email: w0025375@mail.connect.usq.edu.au

Dear [*Insert name of respondent*],

Thank you for agreeing to give of your time to complete the attached questionnaire. I have designed the questionnaire to be completed in hopefully no more than 30 to 40 minutes.

As a final year student at the University of Southern Queensland I am required to complete a research project (or dissertation) in order to obtain my Bachelor of Engineering (Civil) degree.

The topic I have chosen is '*Factors in the selection of contractors for engineering works*'. The aim is to prepare example checklists of factors that may be considered during the selection of contractors for engineering works with budgets between $80,000 and $20 million taking into account the nature and estimated value of the work as well as the contract type.

Hence, the purpose of the questionnaire is to gain comment from contractors and principals (or principal's representatives) in relation to factors in selection of contractors for engineering works. The questionnaire results will be used to compare the information from current practitioners with recent trends in national and international research on the subject.

It is envisaged that particular attention will be focused on weightings of factors, i.e. their relative importance to contractors and principals, and the related cost to industry. Also, additional factors raised by respondents will be reviewed. The contract type for the purpose of the main part of the questionnaire will be that of Head Contractor.

Thank you again for your assistance.

Regards,
Lauren Clarke

B.2 Generic Questionnaire

GENERAL INSTRUCTIONS

- Please print this document to be completed at your earliest convenience before faxing to (07) 4634 xxxx.
- Only complete sections which relate to the works your company/organisation normally performs or lets, noting that the general form of the contractual arrangement is considered to be that of a Head Contractor.
- If you have any questions, don't hesitate to contact me via phone (044896xxxx) or email (w002xxxx@mail.connect.usq.edu.au).

For the purposes of this questionnaire, please indicate the broad nature of works you are involved with:

(a) Civil infrastructure
(b) Low to medium rise vertical construction
(c) Communications
(d) Other:_____

PART A

1. Projects estimated at $80,000 to $500,000. Please indicate the level of importance of each factor.

Factor	1. Little Relevance	2. Of Some Importance	3. Important	4. Very Important	5. Most Important	Not Relevant	**Comment**
(a) Task appreciation/ understanding of the scope of the project and possible risks							
(b) Methodology to deliver project							
(c) Current capacity of company to carry out the work							
(d) Demonstrated relevant past experience of company							

(e) Key personnel experience and roles in relation to the project							
(f) Current financial position/viability of company							
(g) Proposed program of works							
(h) Demonstrated commitment to Ecologically Sustainable Development							
(i) Quality Assurance							
(j) Insurance details							
(k) National Code of Practice compliance*							
Other Factors <u>excluding price</u> (Please enter other factors you consider relevant). (l)							
(m)							
(n)							

*This may only have relevance for your company if you undertake Federal Government Contracts

If price were to be weighted as a factor against non-price factors, what weighting do you believe should be accorded to price? _____% (For example, small lower cost projects may be generally less technically demanding than larger engineering projects so price may have a relatively higher weighting of say 60 or 70% or higher.)

2. Projects estimated at $500,000 to $6,000,000. Please indicate the level of importance of each factor.

Factor	1. Little Relevance	2. Of Some Importance	3. Important	4. Very Important	5. Most Important	Not Relevant	**Comment**
(a) Task appreciation/ understanding of the scope of the project and possible risks							
(b) Methodology to deliver project							
(c) Current capacity of company to carry out the work							
(d) Demonstrated relevant past experience of company							
(e) Key personnel experience and roles in relation to the project							
(f) Current financial position/viability of company							
(g) Proposed program of works							
(h) Demonstrated commitment to Ecologically Sustainable Development							
(i) Quality Assurance							
(j) Insurance details							
(k) National Code of Practice compliance*							

Other Factors <u>excluding price</u> (Please enter other factors you consider relevant). (l)							
(m)							
(n)							

*This may only have relevance for your company if you undertake Federal Government Contracts

If price were to be weighted as a factor against non-price factors, what weighting do you believe should be accorded to price? _____%.

3. Projects estimated at $6,000,000 to $20,000,000. Please indicate the level of importance of each factor.

Factor	1. Little Relevance	2. Of Some Importance	3. Important	4. Very Important	5. Most Important	Not Relevant	**Comment**
(a) Task appreciation/ understanding of the scope of the project and possible risks							
(b) Methodology to deliver project							
(c) Current capacity of company to carry out the work							
(d) Demonstrated relevant past experience of company							
(e) Key personnel experience and roles in relation to the project							
(f) Current financial position/viability of company							
(g) Proposed program of works							

(h) Demonstrated commitment to Ecologically Sustainable Development							
(i) Quality Assurance							
(j) Insurance details							
(k) National Code of Practice compliance*							
Other Factors excluding price (Please enter other factors you consider relevant). (l)							
(m)							
(n)							

*This may only have relevance for your company if you undertake Federal Government Contracts

If price were to be weighted as a factor against non-price factors, what weighting do you believe should be accorded to price? _____%.

4. Do you have any general comments on Part A?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

PART B

1. Do you believe the cost to industry is properly taken into consideration in the tender process? (The nature of the principal may be relevant in responding to this question.)

2. What issues in particular do you believe unnecessarily drive up costs for tendering?

3. Do you believe contractor tender submissions are always treated fairly?

4. Do contractors generally receive good feedback on unsuccessful submissions?

5. Do you have any other comments on the subject of factors to be considered in the selection of contractors for engineering works?

_____
_____
_____
_____
_____
_____
_____

6. Would it be okay to contact you to discuss your responses should I have further questions or require clarification?

YES / NO

If yes, could you please indicate when you are usually available and a preferred contact method.

_____
_____
_____
_____
_____
_____
_____

Thank you again for taking the time to complete this questionnaire.

B.3 Summary of Responses

Works the respondent is involved with:

C1: Civil infrastructure

C2: Low to medium rise vertical construction

C3: Fire protection

C4: Low to medium rise vertical construction, communications and electronic integrated security solutions

C5: Civil infrastructure and low to medium rise vertical construction

P1: Building maintenance and refurbishment

P2: Civil infrastructure and low rise vertical construction

P3: Civil infrastructure and low to medium rise vertical construction

P4: Civil infrastructure

P5: Civil infrastructure

PART A

Scores given:

Works between $80000 and $500000:

	Non-Price Factors											Price (%)	
Respondent	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*		
C1	*3*	*3*	*3*	*3*	*2*	*2*	*3*	*2*	*2*	*4*	*3*	*75*	
C2	2	3	3	2	1	1	2	1	1	5	2	80	
C3	4	3	2	3	2	3	3	2	3	3	3	50	
C4	3	3	3	3	4	2	3	3	2	3	2	65	
C5	2	2	5	3	2	5	3	1	4	5	5	85	*
Average	3	3	3	3	2	2.5	3	2	2.5	4	3	71	
P1	3	3	3	2	3	4	3	3	3	3	5	70	
P2	4	3	3	2	3	1	4	2	2	1	2	75	***
P3	3	2	3	4	2	3	2	1	2	5	-	60	
P4	2	2	4	3	2	3	3	1	5	5	3	90	
P5	2	2	4	3	3	3	2	2	2	3	5	50	****
Average	3	2.5	3.5	3	2.5	3	3	2	3	3.5	3	69.0	
Overall average	3	2.5	3.5	3	2.5	2.5	3	2	2.5	3.5	3	70	

Works between $500000 and $6000000:

	Non-Price Factors											Price (%)	
Respondent	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*		
C1	*3*	*3*	*4*	*4*	*3*	*3*	*3*	*2*	*3*	*5*	*4*	*70*	
C2	2	2	3	3	2	3	3	1	1	5	1	75	
C3	5	3	4	3	2	2	3	2	3	3	3	40	
C4	3	3	4	4	4	5	5	5	5	5	5	50	
C5	3	3	5	4	4	5	3	2	5	5	5	80	*
Average	3	3	4	3.5	3	3.5	3.5	2.5	3.5	4.5	3.5	63	
P1	4	4	4	3	3	4	3	3	4	4	5	60	**
P2	5	5	3	4	4	5	5	4	3	5	4	55	***
P3	3	3	3	3	4	3	4	3	2	5	5	50	
P4	3	2	4	3	3	4	3	2	5	5	4	60	
P5	4	3	4	4	4	4	3	3	3	4	5	20	****
Average	4	3.5	3.5	3.5	3.5	4	3.5	3	3.5	4.5	4.5	49.0	
Overall average	3.5	3	4	3.5	3.5	4	3.5	2.5	3.5	4.5	4	56	

Works between $6000000 and $20000000:

	Non-Price Factors											Price (%)	
Respondent	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*		
C1	*3*	*3*	*4*	*4*	*4*	*4*	*3*	*3*	*5*	*5*	*5*	*60*	
C2	3	3	4	3	3	3	3	1	1	5	1	70	
C3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
C4	3	3	5	5	5	5	5	5	5	5	5	40	
C5	3	3	5	4	4	5	3	2	5	5	5	80	*
Average	3	3	4.5	4	4	4	3.5	3	4	5	4	62.5	
P1	5	4	4	4	5	5	4	4	4	4	5	50	**
P2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
P3	4	4	4	4	5	3	5	4	2	5	5	40	
P4	3	3	5	4	4	4	4	3	5	5	5	30	
P5	4	4	5	5	5	5	3	3	3	4	5	20	****
Average	4.0	3.8	4.5	4.3	4.8	4.3	4.0	3.5	3.5	4.5	5.0	35.0	
Overall average	3.5	3	4.5	4	4.5	4	4	3	4	5	4.5	48.75	

Other factors identified:

	Value of Works		
Factor	**80-500k**	**500k-6m**	**6m-20m**
*OH&S	5	5	5
**Contact Referees	-	3	4
***Subcontractors (LIP's)	2	3	-
****Deliverables & Outcomes	3	4	4

Comments:

(a) Task appreciation/ understanding of the scope of the project and possible risks

Projects estimated at $80,000 to $500,000.

C4: There are two methods of construction and the level "Task Appreciation" and a detailed understanding of the project scope changes between the two methods.

The first method of construction and tendering is on a fully documented and Specified scope of works provided by Design Consultants.

Although important for the Sub-contractor to demonstrate an understanding and task appreciation of the scope for the project it is less critical when assessing tender submissions. The "Task Appreciation" and full scope required by the sub-contractor should be contained within the Specified works given by the Design Consultant therefore as long as the sub-contractor complies with the Specification it should cause less of a concern to impact on tender assessment.

The second method of construction and tendering is on a Design and Construct basis (D&C). This method is for the Head Contractor to demonstrate to client the construction methods and delivery whilst providing the most "cost effective" outcome.

When using this method the tender assessment board should place a heavier weight on the sub-contractor's tender submission in this factor. Failure for the sub-contractor to understand the full scope of the project can result over lapping between trades (two sub-contractors allowing for the same scope) or worse, having gaps in the scope of works between sub-contractors (neither sub-contractor allowing for the works required).

This can result in project running over budget and project deliver delays.

Projects estimated at $500,000 to $6,000,000.

C4: There are two methods of construction and the level "Task Appreciation" and a detailed understanding of the project scope changes between the two methods.

The first method of construction and tendering is on a fully documented and Specified scope of works provided by Design Consultants.

Although important for the Sub-contractor to demonstrate an understanding and task appreciation of the scope for the project it is less critical when assessing tender submissions. The "Task Appreciation" and full scope required by the sub-contractor should be contained within the Specified works given by the Design Consultant therefore as long as the sub-contractor complies with the Specification it should cause less of a concern to impact on tender assessment.

The second method of construction and tendering is on a Design and Construct basis (D&C). This method is for the Head Contractor to demonstrate to client the construction methods and delivery whilst providing the most "cost effective" outcome.

When using this method the tender assessment board should place a heavier weight on the sub-contractor's tender submission in this factor. Failure for the sub-contractor to understand the full scope of the project can result over lapping between trades (two sub-contractors allowing for the same scope) or worse, having gaps in the scope of works between sub-contractors (neither sub-contractor allowing for the works required).

This can result in project running over budget and project deliver delays.

Projects estimated at $6,000,000 to $20,000,000.

C4: There are two methods of construction and the level "Task Appreciation" and a detailed understanding of the project scope changes between the two methods.

The first method of construction and tendering is on a fully documented and Specified scope of works provided by Design Consultants.

Although important for the Sub-contractor to demonstrate an understanding and task appreciation of the scope for the project it is less critical when assessing tender submissions. The "Task Appreciation" and full scope required by the sub-contractor should be contained within the Specified works given by the Design Consultant therefore as long as the sub-contractor complies with the Specification it should cause less of a concern to impact on tender assessment.

The second method of construction and tendering is on a Design and Construct basis (D&C). This method is for the Head Contractor to demonstrate to client the construction methods and delivery whilst providing the most "cost effective" outcome.

When using this method the tender assessment board should place a heavier weight on the sub-contractor's tender submission in this factor. Failure for the sub-contractor to understand the full scope of the project can result over lapping between trades (two sub-contractors allowing for the same scope) or worse, having gaps in the scope of works between sub-contractors (neither sub-contractor allowing for the works required).

This can result in project running over budget and project deliver delays.

(b) Methodology to deliver project

Projects estimated at $80,000 to $500,000.

C2: Demolition on smaller jobs in particular.

C4: As with the above when the project has been Specified by a Design Consultant, this is of lesser concern to the head contractor when assessing tender responses as the detailed delivery of project is contained within the Specification.

As with the above when using the Design and Construct (D&C) method this becomes of greater importance. The sub-contractors should demonstrate in their tender submission the methodology to deliver the project taking into considerations all regulations, compliances, policies, local site requirements, foreseeable time delays and safety management.

Projects estimated at $500,000 to $6,000,000.

C4: As with the above when the project has been Specified by a Design Consultant, this is of lesser concern to the head contractor when assessing tender responses as the detailed delivery of project is contained within the Specification.

As with the above when using the Design and Construct (D&C) method this becomes of greater importance. The sub-contractors should demonstrate in their tender submission the methodology to deliver the project taking into considerations all regulations, compliances, policies, local site requirements, foreseeable time delays and safety management.

Projects estimated at $6,000,000 to $20,000,000.

C4: As with the above when the project has been Specified by a Design Consultant, this is of lesser concern to the head contractor when assessing tender responses as the detailed delivery of project is contained within the Specification.

As with the above when using the Design and Construct (D&C) method this becomes of greater importance. The sub-contractors should demonstrate in their tender submission the methodology to deliver the project taking into considerations all regulations, compliances, policies, local site requirements, foreseeable time delays and safety management.

(c) Current capacity of company to carry out the work

Projects estimated at $80,000 to $500,000.

C4: The Head Contractor should submit to the sub-contractors a project schedule (time frame for delivery) before sub-contractors send back their tender submissions.

The weighting of this factor relies on the capacity of the company (size) and additional resources the company has in reserve.

Also other current works underway with the company and percentage of completion of those current works underway.

Projects estimated at $500,000 to $6,000,000.

C4: The Head Contractor should submit to the sub-contractors a project schedule (time frame for delivery) before sub-contractors send back their tender submissions.

The weighting of this factor relies on the capacity of the company (size) and additional resources the company has in reserve.

Also other current works underway with the company and percentage of completion of those current works underway.

Projects estimated at $6,000,000 to $20,000,000.

C4: More importance in large projects, the current workload of the company and the current capacity to deliver a large project should be weighted heavily, as failure to do so could impact heavily on project delivery (obviously dependant of type of trade).

P4: Note within the context of current market which is struggling for capacity.

(d) Demonstrated relevant past experience of company

Projects estimated at $80,000 to $500,000.

C4: Important for the company to demonstrate they have had experience in delivering similar projects. Though on smaller projects this is less critical.

P1: Would depend on technical relevance of the scope.

Projects estimated at $500,000 to $6,000,000.

C4: More important in larger projects to ensure the company's tendering have demonstrated and can provide references to having the capability to deliver similar projects, both types and size.

Projects estimated at $6,000,000 to $20,000,000.

C4: More importance for the company to demonstrate capability to deliver projects of similar SIZE and type.

(e) Key personnel experience and roles in relation to the project

Projects estimated at $80,000 to $500,000.

C4: Important for the company to demonstrate key personnel for project management responsibilities and that they sufficient resources to deliver the project

if successful. This factor also ties into the current capacity and current works underway with the company.

Projects estimated at $500,000 to $6,000,000.

C4: Important for the company to demonstrate key personnel for project management responsibilities and that they sufficient resources to deliver the project if successful. This factor also ties into the current capacity and current works underway with the company.

Projects estimated at $6,000,000 to $20,000,000.

C4: Important for company to demonstrate communication paths (project managers), all key personnel and time (in percentages) that these staff will be committed to the project.

(f) Current financial position/viability of company

Projects estimated at $80,000 to $500,000.

C4: Less important for sub-contractors on smaller works. More important for customers to assess Head contractors financial stability to pay sub-contractors in a timely manner (Many sub-contractors have been forced to fold due to lack of payments from Head Contractors).

P2: This assumes tenderers are members of a pre-approved panel.

Projects estimated at $500,000 to $6,000,000.

C4: Becomes more important in larger projects for the company to demonstrate financial stability. Smaller sub-contractors should only be considered if their scope of works is small an impact on project is smaller. The head contractor should ensure smaller sub-tractors are paid in a timely manner to avoid cash flow issues.

P2: This assumes tenderers are members of a pre-approved panel.

Projects estimated at $6,000,000 to $20,000,000.

C4: Most important companies must have a strong financial backing (cash flow) and must be able to endure longer time frames between payments.

(g) Proposed program of works

Projects estimated at $80,000 to $500,000.

C4: Dependant on client's time frame and clients capabilities requirements. This factor can be of little importance to of great importance.

Projects estimated at $500,000 to $6,000,000.

C4: Again this factor may vary dependant on the client's requirements and impact to client on time delays. Sizable projects normally have KPI's attached for the Head Contractor and may impact financially on the Head Contractor if project milestones are not reached.

Projects estimated at $6,000,000 to $20,000,000.

C4: Becomes more critical in larger projects though again can change dependant upon clients requirements.

(h) Demonstrated commitment to Ecologically Sustainable Development

Projects estimated at $80,000 to $500,000.

C4: Dependant on type of project being undertaken.

P2: Will become more important as Government directions are enforced.

Projects estimated at $500,000 to $6,000,000.

C4: Becomes more important of larger projects, companies demonstrating more cost effective methods of delivery are weighted higher upon tender assessment.

Projects estimated at $6,000,000 to $20,000,000.

C4: More important for the company to demonstrate "cost effectiveness" in their tender responses.

(**i) Quality Assurance**

Projects estimated at $80,000 to $500,000.

C4: Important for guaranteeing quality in processing of delivery (including paperwork). Though less critical on smaller projects.

Projects estimated at $500,000 to $6,000,000.

C4: Becomes more important on larger projects, for both paper work and work flow processes.

Projects estimated at $6,000,000 to $20,000,000.

C4: Becomes more important on large projects, for both paper work and work flow processes.

(j) Insurance details

Projects estimated at $80,000 to $500,000.

C4: Important to ensure the company has sufficient insurances to protect themselves, the head contractor and the client.

P2: This assumes tenderers are members of a pre-approved panel.

P3: Considered as Yes/No, i.e. needs to be in-phase.

Projects estimated at $500,000 to $6,000,000.

C4: More important to ensure the company has sufficient insurances to protect themselves, the head contractor and the client. Head Contractor must ensure more avoidance of risk.

P2: This assumes tenderers are members of a pre-approved panel.

P3: Considered as Yes/No, i.e. needs to be in-place.

Projects estimated at $6,000,000 to $20,000,000.

C4: More important to ensure the company has sufficient insurances to protect themselves, the head contractor and the client. Head Contractor must ensure more avoidance of risk.

P3: Considered as Yes/No, i.e. needs to be in-place.

(k) National Code of Practice compliance

Projects estimated at $80,000 to $500,000.

C2: Depends on project.

C4: Dependant on company size, the company's union involvement and critical client time frame requirements but less critical on smaller projects.

P2: Will become more important as Government directions are enforced.

P3: For Federal jobs, small $ value means jobs of this size are usually delivered through a different method (i.e. Spotless).

Projects estimated at $500,000 to $6,000,000.

C2: Depends on project.

C4: Larger projects involve larger companies and more risk to union disruptions and time delays. The NCOP compliance becomes more important to avoid time delays.

P3: This is in the range for Federally funded projects. Needs to be in-place for the contractor and sub-contractors. Considered as Yes/No.

Projects estimated at $6,000,000 to $20,000,000.

C4: Larger projects involve larger companies and more risk to union disruptions and time delays. The NCOP compliance becomes more important to avoid time delays.

P3: This is in the range for Federally funded projects. Needs to be in-place for the contractor and sub-contractors. Considered as Yes/No.

Do you have any general comments on Part A?

C1: No comment.

C2: No comment.

C3: No comment.

C4: No comment.

C5: No comment.

P1: I believe this process to be very fair. It can be very frustrating for a tender board who are familiar with the capability of a contractor from previous projects to find the submission has been submitted with numerous errors and notes relating to a totally different project.

P2: Technical ability becomes more important as project cost and complexity increase.

P3: Non-price factors increase in importance for larger jobs.

P4: The higher the project $ value the greater the focus should be on the technical and quality factors of the selection process as this is where the risk to project budget occurs.

With bigger contracts, those (tenderers) in the running (short-listed) should be able to meet the technical requirements and the focus shift more toward management of the project to achieve successful outcomes.

P5: The nature of the contract will need to be considered when assigning weightings to each factor.

> e.g. criteria for constructing a road will vary from criteria for a Reverse Osmosis Water Treatment Plant (the latter is absolutely outcome/deliverable driven whereas constructing a road is very standard practice with well established on-going practices.

PART B

1. Do you believe the cost to industry is properly taken into consideration in the tender process? (The nature of the principal may be relevant in responding to this question.)

C1: No not fully. Different principals I deal with seem to have different levels of consideration of this issue. I'd much rather do business with people who understand the implications of all the additional paperwork and bureaucracy involved in preparing tender submissions.

C2: No comment.

C3: No comment.

C4: Smaller tenders (up to $500,000.00) do impact on companies to provide tender responses though with larger companies normally this is contained and absorbed in company overheads and becomes a cost passed on to the projects won. These smaller projects for smaller companies can have a bigger financial impact costing up to $4,000 in overheads and administration to prepare and submit a mid sized project submissions with no guarantee of cost recovery.

Larger projects up to ($20,000,000 and over) do have a huge financial impact on industries time and resources. Large tender submissions can take up to 12 months to prepare and submit and cost industry up to $500,000 (all trades taken into consideration) with no guarantee of cost recovery.

C5: No.

P1: There is considerable cost to industry with design and construct projects. I have noted recently that the Queensland Government has identified the cost to industry and is now providing a lot of preliminary test results and design docs.

P2: Not for the lower cost projects - an $80K job takes as much effort in tender development as does a $500K job with the Government's requirement.

P3: There is additional costs incurred in the tendering process for federal and state funded jobs due to perceived need to run ITR (Invitation to Register) and RFT (Register for Tender) phases. Many times additional tenderers are included to validate the pricing, which unnecessarily adds costs to the process. These costs are not well understood by the industry.

P4:
- Not always
- If it is a poor tender process, the chances are submitted prices could be inflated.
- Some processes are very time consuming
- Typically, contractors will submit a more accurate and appropriately costed tender if they have a reasonable chance of success (i.e. 1 out of 3 as opposed to about 20).

P5: Perhaps I am not in the best position to comment, however, most respected consulting engineering firms would be well aware of cost to industry. The necessity to provide the principal with satisfactory outcomes has to be the number one priority.

2. What issues in particular do you believe unnecessarily drive up costs for tendering?

C1: Insufficient time frame for submission, excessive schedules to be filled out, including schedules for issue that have little importance to the actual works (particularly if the works are simple).

C2: Ambiguous tender documents; large volume tender documents; market condition

C3: Ambiguous or poorly documented specifications and drawings introduce uncertainty for the tenderer. Incorrect technical details which require clarifying at tender stage.

C4: This is a difficult question to answer as there are a lot of small processes and weighting factors involved in a tender response that would be unnecessary if measured alone. If placed in the clients prospective all these are necessary to provide a total outcome and to minimize risk in all aspects of the project delivery.

C5: Short timeframes to tender. Incomplete tender documentation. Unfair contract conditions e.g. no latent conditions or wet weather allowance.

P1: Insufficient timeframes for tendering; insufficient details and description of work proposed; preliminary design work; industry workloads at the time of tender.

P2: The Government's increasing requirements for meeting environmental, IR and other codes of practice.

P3:
- The inadvertent use of ITR and RFT phases;
- Inclusion of too many contractors in ITR and RFT;
- Inability to go to a selected panel or invited tenderers;
- Inability to go sale source with a construction price check on tender fees for a cost planner.

P4:
1) Risk transfer from principal to contractor.
2) Poor scope definition.
3) Onerous condition of contract.
4) Unrealistic program expectations.

P5: No comment.

3. Do you believe contractor tender submissions are always treated fairly?

C1: Can't really say. I wouldn't really know I've never had what I would call a good debrief on one of my unsuccessful tenders. In fact, I've rarely had detailed feedback on successful tenders either. However, I have no real reason to believe that any have been treated unfairly.

C2: No- but yes the majority of the time.

C3: No, depending on the nature of the organization deciding on the tenders. Many decisions are often made based on price alone, without considering all other factors. Better decisions are usually made if a weighting formula is used.

C4: Generally "yes" when submitting government tenders, government have strict processes and procedures in place to ensure unfair treatment of all tender's is minimized.

The commercial arena does not necessarily treat tenders fairly, sometimes the outcome is already known before the tenders are submitted with your company being nothing more than a price check.

C5: No. In both the public and private sectors persons who are responsible for all evaluation and award process often skew the results to the favoured companies.

P1: All tender evaluation boards of which I have participated as chairperson or board member have been treated fairly.

P2: There <u>can</u> be temptation to evaluate easier a tender with a value close to a project budget if the budget is set.

P3: Federal funded and state funded job (as well as others) commonly have an Evaluation Board that applies rating to the criteria (as mentioned previously). The board then makes a non-price recommendation and a value-for-money recommendation.

P4:
- Difficult to comment.
- It is a function of those assessing the tenders, particularly with respect to non-price criteria.

P5: Providing set criteria as identified in Part A reduces the incidence of unfair treatment. As a local government organization we are bound by the Local Government Act to ensure fairness, best value and open and accountable assessment. In the private sector this may be different.

4. Do contractors generally receive good feedback on unsuccessful submissions?

C1: As above.

C2: No.

C3: No. It is not normal to receive any feedback unless successful with the bid.

C4: Again with government tenders "yes" with commercial tenders "not always".

C5: As a general rule this is very poorly handled by both the public and private sectors. Often the feedback is blatant lies and contains gross factual errors.

P1: Contractors requesting feedback on unsuccessful submissions are always given relevant feedback as to identified weaknesses.

P2: Contractors receive a letter advising outcome of tenders and are entitled to a meeting to discuss if desired.

P3: A member of the Board is usually appointed to debrief the contractors. Contractors only rarely request this information.

P4:
- Again, depends on the principal.
- Some do provide detailed debriefs.
- Most do provide feedback if asked.

P5: From the principal point of view I guess unsuccessful tenderers are cast aside quickly, therefore probably not.

5. Do you have any other comments on the subject of factors to be considered in the selection of contractors for engineering works?

C1: If it's well documented with detailed specs and construction drawings there should be more reliance on price, particularly with the type of work I am involved with.

C2: Working relationship or past experience with the company and personnel is weighted heavily in my opinion.

C3: Equally as important as price is the contractor's ability to complete the works and provide a high quality job. This should be assessed by looking at previous jobs, the end users overall satisfaction and the contractors reputation.

C4: No comment.

C5: No comment.

P1: No comment.

P2: No comment.

P3: There are sometimes other YES/NO criteria supplied such as: equal opportunity, local content (equipment and labour), and indigenous opportunities.

P4:
- The greater the capital value and uncertainty of scope the more non-price criteria should come into play.

- Focus should be a best value outcome rather than lowest tender price.

P5: No comment.