A framework for developing construction procurement strategy

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Proceedings of the Institution of Civil Engineers – Management, Procurement and Law, 165(4):223-237 2012.

ABSTRACT

There are a number of different approaches to procuring goods, services and works, each of which can result in different outcomes. Procurement strategy is all about the choices made in determining what is to be delivered through a particular contract, the procurement and contracting arrangements and how secondary procurement objectives are to be promoted.

This paper outlines the components of a procurement strategy, the available options and the factors which need to be considered. It draws upon the menu of options embedded in the ISO 10845 construction procurement standards and the FIDIC and NEC3 families of contracts. It then presents a framework within which choices can be made in support of project objectives in the delivery or maintenance of infrastructure. The application of the framework enables resources and objectives to be matched to the choices made regarding the manner in which needs are to be met and provides a platform for achieving optimal project outcomes.

1. INTRODUCTION

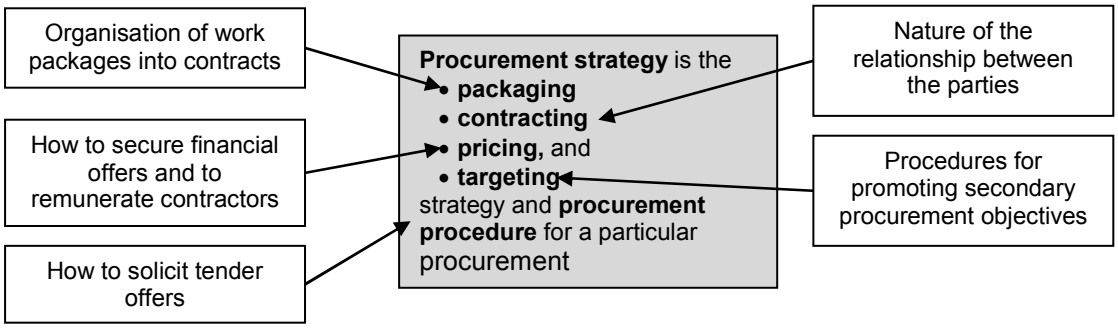
Strategy in the delivery and maintenance of infrastructure may be considered as the skilful planning and managing of the delivery process. It involves a carefully devised plan of action which needs to be implemented. It is all about taking appropriate decisions in relation to available options and prevailing circumstances in order to achieve optimal outcomes.

The ICE's *Client Best Practice Guide* (Kershaw and Hutchison, 2009) asserts that procurement strategy needs to be aligned with project objectives which are described in the business case and points out that '*the procurement strategy is key to defining how the project is to be delivered'.* This Institution of Civil Engineers' report suggests that the procurement strategy should 'include the basis for seeking tenders e.g. full design and then construct, design and build, PFI/PPP etc., work packaging - the number of contracts and work breakdown between contracts, publicity to attract the right level of interest from the market, process for bidder prequalification and short listing, bid and evaluation processes, including time frame, criteria used for scoring and comparing bids, attitude to risk allocation and contingencies, process for accepting winning bids, terms of engagement / forms of contract and roles and responsibilities (e.g. health and safety)'.

The Association for Project Management's *Body of Knowledge* (Association for Project Managers, 2006) states that 'the procurement strategy should include potential sources of supply, terms and types of contract / procurement (for example, partnering or alliancing - versus commodity purchasing), conditions of contract, type of pricing, and method of supplier selection'. ISO 10845-1 defines procurement strategy as 'the selected packaging, contracting, pricing and targeting strategy, and procurement procedure for a particular procurement' (see Figure 1).

The South African Institution of Civil Engineering has reported severe shortages in civil engineers employed by local authorities in South Africa and a severe shortage of engineers in developing countries, based on the number of engineers per capita (Lawless, 2005). Other South African researchers have indicated a shift over time of engineers from the public sector to the consulting sector (Watermeyer and Thumbiran, 2009). A recent World Bank report (Foster, 2008) which examined infrastructure in 24 countries that together account for 85 % of GDP, population and infrastructure aid flows of sub-Saharan Africa, found that countries typically only manage to spend about two thirds of the budget allocated to investment in infrastructure. The recently launched World Bank's *Africa Regional Strategy* recognises that Africa's competitiveness is 'impeded by

poor public investment choices, weak budget management, and corrupt or lethargic procurement practices'. This strategy also identifies 'inadequate resources available to implement the strategy' as one of three main risks facing Africa in realising its full potential for *sustained growth and poverty reduction* (World Bank, 2011).



Note: Procurement strategy is all about the choices made in determining how best to achieve objectives

Figure 1 – Components of a procurement strategy

The vast majority of infrastructure projects in sub-Sahara Africa are currently delivered using a traditional preplanned approach to construction which requires that the design and specifications be adequately developed and approved by clients before public tenders are invited. This requires projects to be priced as lump sums or in terms of a bill of quantities, prior to the award of a contract. Design professionals are commonly paid a percentage of the cost of construction when it becomes known. This approach is known to work best in the following circumstances (CIDB, 2006):

- the client has adequate in house capabilities and capacity to either undertake the design or to brief consultants and to oversee the design process; and

- there is adequate time to complete the design and associated documentation before tenders for construction are invited.

Clients are today under pressure to deliver projects, on time, on budget, within shorter time frames. This has led to the 'fast tracking' of the traditional preplanned approach to construction by the streamlining of procedures to minimise delays between activities and to permit activities to be undertaken out of sequence. This has resulted in contracts for construction works being awarded where the works are not fully or precisely scoped. In many instances, this has led to very disappointing outcomes e.g. the final contract prices of the construction works for the 2010 World Cup Stadia was approximately 100% higher than the pre-tender estimates and approximately 50% higher than the contract price at award. Developmental outcomes in developing countries in terms of participation of local labour and enterprises, job creation, health and safety and skills transfer are also all too often disappointing.

Against this background, it is surprising that very little thought or energy in developing countries is given to procurement strategy which has the potential to significantly improve procurement outcomes and the quantum of infrastructure delivered and maintained against a budget. This is in the main due to the wide spread use of local forms of contract which are formulated around a design by employer mode of delivery and payments being made in terms of bills of quantities. This position is reinforced by a number of multilateral development banks who have in recent years harmonised their conditions of contract around the so called FIDIC 'Pink Book' which is framed around a design by employer contracting strategy, bills of quantities, best endeavours to secure the participation of local labour and reasonable endeavours to secure the participation of local contractors (FIDIC, 2010). It is also reinforced by the World Federation of Engineering Organizations (WFEO) in their most recent publication on capacity building which places the procurement phase after the detailed design phase i.e. procurement takes place after the works have been designed (WFEO, 2010).

This paper provides a framework within which choices can be made from the available delivery management, contracting and procurement options to improve project outcomes in the delivery or

maintenance of infrastructure. It is based on the menu of options embedded in the recently published ISO 10845 construction procurement standards and the FIDIC and NEC3 families of contracts.

2. PACKAGING STRATEGY

A packaging strategy is according to ISO 10845-1, the 'organisation of work packages into contracts'. Work packages can be linked either to contracts or to a series of package orders issued in terms of a framework agreement over a term which is typically between 3 and 5 years. A package is accordingly works relating to one or more projects which can be linked to one or more programmes which have been grouped together for delivery under a single contract or a package order. The number of packages within a portfolio of projects establishes the number of contractual relationships which an employer and his management team have to manage and administer. It also establishes the number of procurement transactions which need to be processed. The packaging strategy determines the quantum of resources that an employer has to have at his disposal to procure infrastructure or services relating to the maintenance thereof. The packaging strategy has accordingly a major impact on an organisation's capacity to deliver and maintain infrastructure against a budget, particularly a time related budget.

There are a number of factors that need to be considered when packaging works. These include interdependencies between projects and programmes, whether or not framework agreements will be put in place, levels of competition amongst contractors, organisational and managerial complexities, the spatial location of projects, the scale and nature of the works, economy of scale, the manner in which interfaces between packages are to be managed and controlled, project risk, risk allocations, programming (scheduling) requirements, attractiveness to markets, matching contractor skills and capabilities, commissioning requirements, deployment of administrative resources, scope of service and secondary procurement policy objectives. (ISO 10845-1 defines a secondary procurement policy as *'*a procurement policy that promotes objectives additional to those associated with the immediate objective of the procurement itself').

Projects should only be broken down into smaller contracts (unbundled) when there is administrative capacity to administer the increased number of contracts that result from the unbundling of the project and the unbundling does not result in an inappropriate division of responsibilities, increased contractual risk, duplication of establishment charges and under-utilisation of resources. An alternative approach to unbundling is to require main contractors to 'unpack' their contracts into smaller contracts using targeted procurement procedures linked to key performance indicators established in terms of ISO 10845-5, ISO 10845-6 or ISO 10845-7. Such procedures require contractors to procure the services of small businesses to perform such contracts and to administer them and, in so doing, remove this burden from employers (Watermeyer *et al.*, 1998, Watermeyer, 2000).

3. CONTRACTING STRATEGY

A contracting strategy according to ISO 10845-1 is 'the strategy that governs the nature of the relationship which the employer wishes to foster with the contractor, which in turn determines the risks and responsibilities between the parties to the contract and the methodology by which the contractor is to be paid*'*. The contracting strategy determines not only the risk allocations between the parties to a contract but also the project management demands, the design strategy and the nature and number of professional service agreements that are entered into (Bower, 2003).

The historic approach to the delivery of infrastructure has been the design by employer contracting strategy whereby the contractor undertakes only construction on the basis of full designs issued by the employer. This contracting strategy requires that the design and specifications be adequately developed before tenders are invited so that they can be priced. This enables the design to meet the employer's requirements closely and the construction contract when awarded can proceed without major change, delay or disruption.

An alternative to the design by employer contracting strategy is the so-called design-and-construct contracting strategy. In this strategy, the contractor undertakes most of the design and all construction in accordance with the employer's brief and his detailed tender submission. This option provides single point accountability, enables the design to be integrated and allows the construction to commence before the detailed design has been completed. A variation to the design and construct contracting strategy is the develop-and-construct contracting strategy. This strategy is similar to that of design-and-construct, except that the employer issues a concept design as a baseline document for the development of the design.

In the management contractor contracting strategy a management contractor is responsible for planning and managing all post-contract activities, including, if required, any design of the works or portion thereof, and for the performance of the whole of the contract. The management contractor subcontracts construction works to others. The only construction works contract with the employer is the one with the management contractor.

In the construction management strategy, a third party (professional service provider) provides consultation during the design stage and is responsible for planning and managing all post-contract activities for contractors appointed by the employer. Construction managers are typically appointed where the interfaces between inter-related packages need to be managed, it is desirable to have direct contracts with specialist trade contractors, or construction and / or materials management support is required to enable fledgling contractors, embryonic enterprises or aspirant entrepreneurs to complete their contracts satisfactorily (Watermeyer, 1995). All construction works contracts are entered into by the employer and not the construction manager.

Contractors can also be contracted to provide construction (with any level of design responsibilities) only, construction and maintenance or construction, maintenance and operation services. Contractors may also in some instances be required to finance the design, construction, maintenance and operation of a package in terms of a public private partnership (PPP) or private finance initiative (PFI). (A PPP of PFI can be regarded as an agreement between the public sector, e.g.. a government, a state or region, a ministry or a municipality, and a private sector organisation to share the risk, responsibility and possibly the investment associated with the provision of a public service through concessions, leases, build, operate and transfer and management and maintenance contracts (Kinder and Wright, 2009). Such contracting arrangements are, however, frequently governed by treasury regulations or instructions.

4. PRICING STRATEGY

A pricing strategy according to ISO 10845-1 is the 'strategy which is adopted to secure financial offers and to remunerate contractors in terms of the contract' Two types of pricing strategies are encountered in the FIDIC and NEC3 families of contracts – price based and cost based (see Table 1).

Table 1: Price-based and cost-based pricing strategies

Pricing strategy	Description
Price based	
Lump sum	Contract in which a contractor is paid a lump sum to perform the works. (Interim payments which reflect the progress made towards the completion of the works may be made)
Bill of quantities	Contract in which a bill of quantities lists the items of work and the estimated / measured quantities and rates associated with each item to allow contractors to be paid, at regular intervals, an amount equal to the agreed rate for the work multiplied by the quantity of work actually completed
Price list / price schedule	Contract in which a contractor is paid the price for each lump sum item in the Price List / Schedule that has been completed and, where a quantity is stated in the Price List / Schedule, an amount calculated by multiplying the quantity which the contractor has completed by the rate
Activity schedule	Contract in which the contractor breaks the scope of work down into activities which are linked to a programme, method statements and resources and prices each activity as a lump sum, which he is paid on completion of the activity. The total of the activity prices is the lump sum price for the contract work.
Cost based	
Cost reimbursable	Contract in which the contractor is paid for his actual expenditure plus a percentage or fee
Target cost	Cost reimbursable contract in which a target price is estimated and on completion of the works the difference between the target price and the actual cost is apportioned between the employer and contractor on an agreed basis

A bill of quantities is a common form of pricing strategy used where the contractor undertakes construction on the basis of full designs issued by the employer. A bill of quantities is usually prepared in accordance with an industry standard system of measurement that provides rules and procedures for describing, measuring and documenting the works in a standard manner. The primary purpose of a bill of quantities is to arrive at a tender price within relatively short time frames so that a tender can be evaluated and a contract awarded.

The employer is liable for increases in the tender price arising from increases in quantities and mistakes in compiling the bill of quantities e.g. omissions, departures from the rules of measurement, ambiguities and inconsistencies.

Lump sum, price list / schedule and activity schedule pricing strategies may be used with the design by employer, design and construct and develop-and-construct contracting strategies. The activity schedules are developed by the contractor, possibly in terms of a framework for activities specified by the employer. Price lists / schedules can be either developed by the employer or the contractor. In the lump sum and activity-based pricing strategy, the contractor is at risk for costs associated with completing the contract and is not compensated for any errors or omissions in arriving at the lump sum or the total of prices for all the activities. Likewise in the price list / schedule pricing strategy, the items included in such lists cover all that the contractor is to be paid in terms of the contract. The employer is only at risk should a stated quantity increase.

In a cost-reimbursable contract wages, salaries, materials, plant and equipment can be reimbursed at open market or competitively tendered prices with deductions for all discounts, rebates and taxes which can be recovered as illustrated in Figure 2. Some of the items of equipment can be reimbursed at prices that are agreed in terms of the contract or at a percentage up or down of published hire lists where such lists exist. Overhead charges for telephones, hand tools, personal safety equipment, refreshments, first aid facilities, toilet facilities etc can be included in a percentage overhead charge applied to wages and salaries of those working on site. Charges can be based on actual cost. Fees to cover items such as profit, company overheads, finance changes, insurances, and performance bonds, as relevant, can then be added. Such contracts can be competitively tendered as tenderers can compete on the basis of margins and rates (i.e. the percentages that are to be applied to the various cost components, the rates tendered for equipment and the fees) as illustrated in Figure 2 (Watermeyer, 2009).

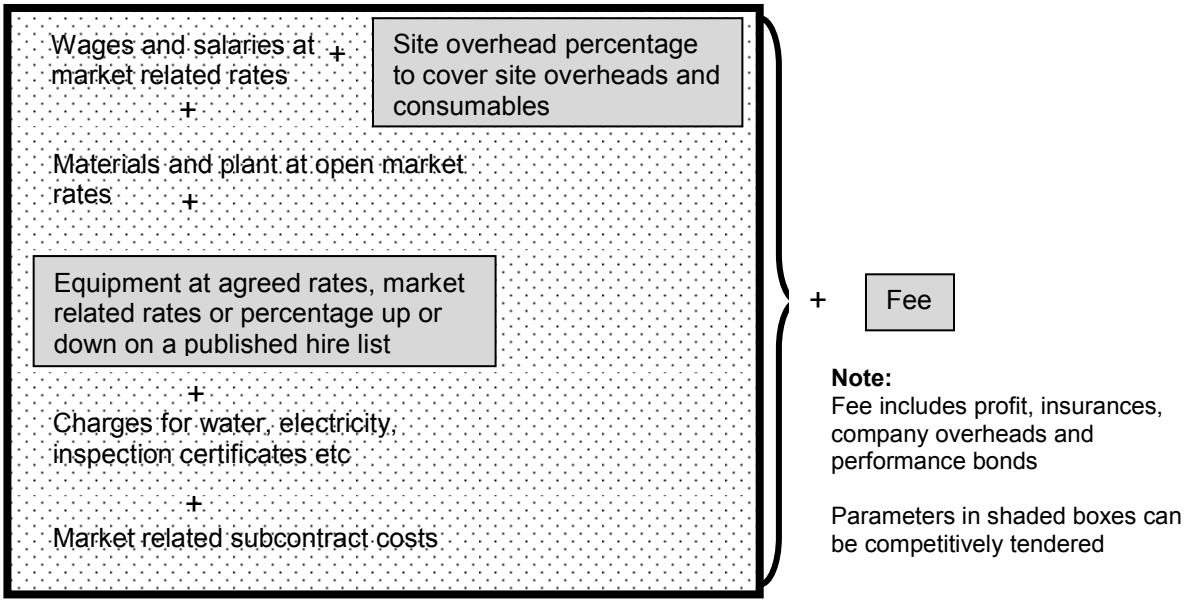


Figure 2 – Typical cost components in a cost reimbursable contract (Watermeyer, 2010)

A cost-reimbursable pricing strategy can be used with any of the aforementioned contracting strategies and is most often used in emergency situations, unless the productivity / costs can be controlled. The management contractor contracting strategy enables costs to be controlled should such a contractor be required to subcontract most of the works and services for which he is responsible to others, preferably in terms of a competitive tender process, and keeps the work done by himself to a minimum. A target cost contract enables productivity to be controlled by means of a target price as illustrated in Figure 3 (Watermeyer, 2009). A target price is agreed between the employer and the contractor to control productivity. The initial target price is adjusted for compensation events (e.g. scope changes and events which are at the employer's risk), except those associated with scope changes proposed by the contractor, throughout the contract to arrive at a final 'cost' to keep the target equitable. The contractor is paid his costs, profit and overheads on a monthly basis as the work proceeds on a monthly forecast basis. The

difference between the 'final cost' and the amount paid to the contractor when the work is completed is shared between the employer and contractor in agreed proportions. If the cost overruns are borne entirely by the contractor, the contract may be regarded as being a guaranteed maximum price contract.

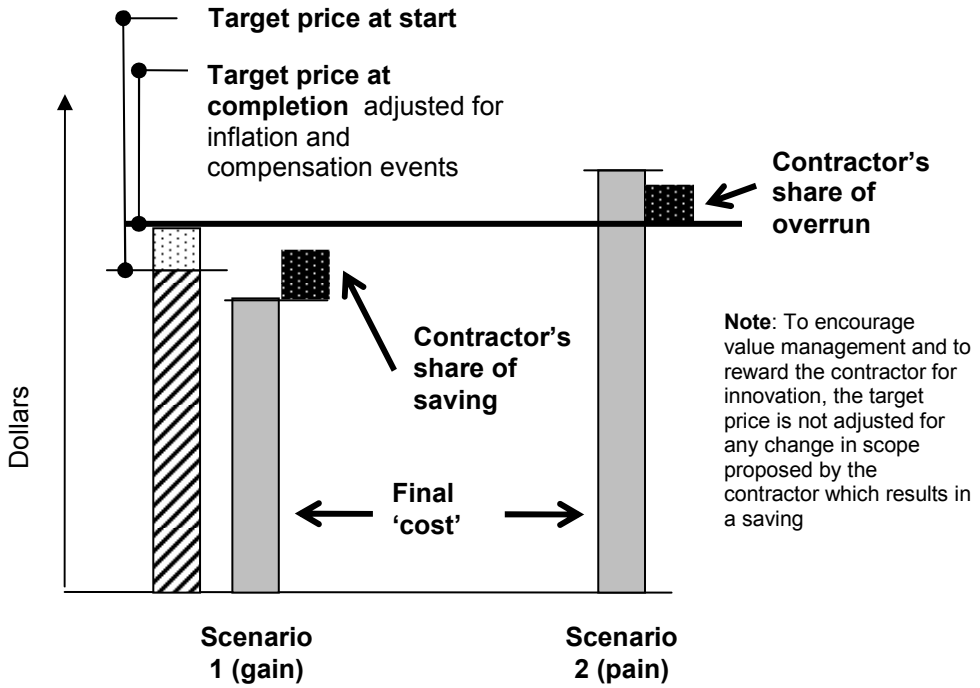


Figure 3 – Target contract concept (Adapted from Watermeyer, 2010)

The target price can be established using a bill of quantities or an activity schedule. A bill of quantities approach is not recommended as the employer is exposed to cost uncertainties in the formulation of the bill and hence the final target price. The use of activity schedule to set the target price is preferred as this approach transfers the price risk to the contractor and provides cost certainty. The activity schedule which links lump sum prices for activities to a programme allows planned value (authorised budget) and earned value (value of work completed and partially completed) to readily established at a point in time. These values can be compared with actual cost and can be used to answer the following questions:

- Is the project under or over our budget (target)?
- How efficiently are resources being used?
- How efficiently must the remaining resources be used?
- What will the remaining work cost i.e. what is the project likely to cost?

A target cost contract requires open book accounting. This enables the employer and his agents to monitor very closely the engagement of targeted enterprises and targeted labour and the wage rates paid to employees at both a main and subcontract level.

Research has indicated that in order to provide higher value and less waste the fragmentation in design needs to be addressed, preferably before 25% of the design is complete (Lichtig, 2006). Target cost contracts can be used to facilitate early contractor involvement in terms of the design by employer, develop and construct and design and construct contracting strategies. This is possible as contractors can be contracted on the basis of their cost parameters and a target price can be negotiated when there is sufficient production information available to agree a target price. Escape clauses can be inserted into design and construct contracts to enable the employer to use the designs and approach the open market in the event that agreement cannot be reached regarding the target price (Watermeyer, 2009).

The pricing strategies provided for in the FIDIC and NEC3 international forms of contract are described in Tables 2 and 3.

5. TARGETING STRATEGY

ISO 10845-1 defines a targeted procurement procedure as 'the process used to create a demand for the services or goods of, or to secure the participation of, targeted enterprises and targeted labour in contracts in response to the objectives of a secondary procurement policy'. Such procedures can be used to promote secondary procurement objectives such as those relating to redressing racial, gender, ethnic or age imbalances within a society, local economic development and poverty alleviation (Watermeyer,1998; Watermeyer, 2004a).

The participation of target groups can be measured in monetary terms, as monetary transactions can be readily verified and audited. The participation of targeted enterprises can generally be measured in terms of receipts for work or services performed or for the provision of supplies for a contract while the participation of targeted labour can be readily measured in terms of the amounts spent on wages and allowances. Procedures to quantify and verify such transactions in the performance of the contract need to be included in the contract. This can be done in specifications or other contract information which apply to the contract (Watermeyer, et al.,1998, Watermeyer, 2000).

The most convenient way of measuring and quantifying the participation of targeted groups is by means of a contract participation goal i.e. the amount paid to targeted labour in the form of wages and allowances or the value of the supplies, services and works procured from targeted enterprises expressed as a percentage of the contract amount. Such goals measure the flows of money from the contract to the target group and as such provide a measurable key performance indicator. Requirements and incentives to achieve or exceed a such KPIs can be readily formulated (Watermeyer, 2000).

ISO 10845-5, ISO 10845-6, ISO 10845-7 and ISO 10845-8 provides a series of performance-based specifications to facilitate the establishment of a contract participation goal for a particular contract in respect of the participation of targeted enterprises, targeted partners in joint ventures, local resources and targeted labour, as relevant. Upon award of the contract, these specifications form the basis for monitoring and verifying that the contractor achieves the contract participation goal in the performance of the contract (Watermeyer,2004b).

Contract participation goals (CPG) may be used, in addition to measuring and reporting on the quantum of business or employment generated in respect of targeted enterprises or targeted labour through the performance of the contract, to:

- reserve a portion of the contract work for specified target groups;
- establish the basis for the awarding of tender evaluation points; or
- establish performance targets for the payment of financial incentives.

Alternatively, contractors may be required to subcontract specific portions of a contract to targeted enterprises. Requirements for subcontracting work including subcontracting procedures can be established in the scope of work.

There are accordingly a number of techniques and mechanisms associated with targeted procurement procedures, all of which are designed to promote or attain the participation of targeted enterprises and targeted labour in contracts (see Table 4). ISO 10845-1 provides practical guidance on the implementation of these techniques.

Similar procedures can be adopted to promote secondary objectives associated with the reduction of negative environmental impacts or the promotion of health and safety performance beyond statutory requirements.

Table 2: NEC3 standard contract - range of types and pricing strategies

NEC3 contract	Recommended usage	Pricing strategy	
Engineering and Construction Contracts			
NEC3 Engineering and Construction Contract (ECC)	Engineering and construction works, including any level of design responsibility.	**Priced based options** **A:** Priced contract with Activity Schedule **B:** Priced contract with Bill of Quantities	**Cost based options** **C:** Target contract with Activity Schedule **D:** Target contract with Bill of quantities **E**: Cost reimbursable contract **F**: Management contract
NEC3 Engineering and Construction Short Contract (ECSC)	Engineering and construction works which do not require sophisticated management techniques, comprise straightforward work and impose only low risks on both the employer and contractor.	Priced contract with Price List	
NEC3 Engineering and Construction Subcontract (ECS)	Engineering and construction works where the contractor has been appointed under the ECC and is written as a back to back set of terms and conditions	**Priced based options** **A:** Priced contract with Activity Schedule **B:** Priced contract with Bill of Quantities	**Cost based options** **C:** Target contract with Activity Schedule **D:** Target contract with Bill of quantities **E**: Cost reimbursable contract
NEC3 Engineering and Construction Short Subcontract (ECSS)	Engineering and construction works where the contractor has been appointed under the ECC or ECSC where sophisticated management techniques are not required and the works comprise straightforward work and impose only low risks on both the contractor and subcontractor	Priced contract with Price List	
Professional Services Contracts			
NEC3 Professional Services Contract (PSC)	Professional services, such as engineering, design or consultancy advice	**Priced based options** **A:** Priced contract with Activity Schedule	**Cost based options** **C:** Target contract **E**: Time based contract
		G: Term contract (Time based and lump sum prices)	
Term Service Contracts			
NEC3 Term Service Contract (TSC)	Manage and provide a service over a period of time	**Priced based options A:** Priced contract with Price List	**Cost based options** **C:** Target contract with Price List **E**: Cost reimbursable contract
NEC3 Term Service Short Contract (TSSC)	Manage and provide a service over a period of time or provide a service, which does not require sophisticated management techniques, comprises straightforward work and imposes only low risks on both the employer and contractor	Priced contract with Price List	
Supply Contracts			
NEC3 Supply Contract (SC)	Local and international procurement of high value goods and related services including design	Priced contract with Price Schedule	
NEC3 Supply Short Contract (SSC)	Local and international procurement of goods under a single order or on a batch order basis and is suitable for use with contracts which do not require sophisticated management techniques and impose only low risks on both the Purchaser and the Supplier.	Priced contract with Price Schedule	

Table 3: FIDIC standard contract - range of types and pricing strategies

FIDIC contract	Recommended usage	Pricing strategy
Conditions of Contract for Construction for Building and Engineering Works designed by the Employer (Red Book)	Building or engineering works designed by the employer. (The works may include some elements of contractor designed works)	Bill of quantities
Conditions of Contract for Construction (MDB harmonised edition) for Building and Engineering Works designed by the Employer (Pink Book)	Building or engineering works designed by the employer funded by the Multilateral Development Bank. (The works may include some elements of contractor designed works)	Bill of quantities
Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Plant and for Building and Engineering Works, designed by the Contractor (Yellow Book)	The provision of electrical or mechanical plant and the design and construction of building or engineering works.	Lump sum
Conditions of Contract for EPC Turnkey Projects (Silver Book)	The provision on a turnkey basis of a process or power plant, of a factory or similar facility, or an infrastructure project or other type of development	Lump sum
Conditions of Contract for Design, Build and Operate Projects (Gold Book)	"Green field " building or engineering works which are delivered in terms of a traditional design, build and operate sequence with a 20 year operation period. (The contractor has no responsibility for financing of the project or its ultimate commercial success.)	Lump sum
Short Form of Contract ("Green Book") (1999) as published by the International Federation of Consulting Engineers (Green Book)	Building or engineering works of relatively small capital value or for relatively simple or repetitive work or work of short duration. Use for design by employer or contractor designed works.	Lump sum Bill of quantities Cost reimbursable
Dredging and reclamation works (Blue Book)	Dredging and reclamation work. Use for design by employer or contractor designed works.	Lump sum price with or without schedule of rates / bill of quantities Bill of quantities Cost plus
Conditions of Subcontract for Construction (Test edition)	Use in conjunction with the FIDIC Red and Pink Book	Bill of quantities
Client/Consultant Model Services Agreement (White Book)	Pre-investment and feasibility studies, designs and administration of construction and project management, both for Employer-led design teams, and for Contractor-led design teams under Design and Build procurement	Rates and prices as agreed between the parties

Table 4: Targeting strategies (targeted procurement procedure)

Method	Description
Evaluation points	Give a weighting to social and economic policy objectives along with the usual commercial criteria, such as quality, which are scored at the short listing stage or the admission to a data base
	Give a weighting to social and economic policy objectives along with price and where relevant, quality, during the evaluation of tenders
Incentives for KPI's	Incentive payments are made to contractors should they achieve a specified target (key performance indicator) associated with a social or economic goal in the performance of a contract
Mandatory subcontracting	Require contractors to invite competitive tenders from targeted enterprises for specified portions of the works in terms of a specified procedure and specific forms of subcontract. Upon the award of the contract, the subcontractor becomes a domestic subcontractor
Contractual obligations	Make policy objectives a contractual condition, e.g. • A fixed percentage of the work is required to be subcontracted out to enterprises that have prescribed characteristics, or a joint venture shall be entered into • Parts of the works are to be executed using employment intensive methods.

6. FRAMEWORK AGREEMENTS

ISO 10845-1 defines a framework agreement as 'an agreement between an employer and one or more contractors, the purpose of which is to establish the terms governing contracts to be awarded during a given

period, in particular with regard to price and, where appropriate, the quantity envisaged'. Framework agreements, which are entered into following a competitive selection process, allow the employer to procure work on an as-instructed (call-off) basis over a set term without necessarily committing to any quantum of work.

Framework agreements need as a minimum the following items (OGC, 2008):

- the term of the agreement
- the period during which a package order may be issued
- the scope of work which may be included in a package order
- the basis by which contractors will be remunerated for instructed work, and
- where a framework contract is entered into with more than one contractor, the manner in which competition between framework contractors for a package order is to be conducted

A framework agreement can be based on a design by employer, develop and construct or design and construct contracting strategy. A package order is an instruction to carry out a work package falling within the scope of the agreement and may only be issued within the term of the framework agreement.

The challenge with framework agreements is to decide on how contractors are to be remunerated for broadly defined work which is not sufficiently scoped to enable it to be priced at the time when the framework agreement is entered into. Cost-based pricing strategies are well suited to framework agreements as:

- a cost-reimbursable pricing strategy linked to the management contractor contracting strategy allows the cost of the project to unfold as the bulk of the works and services that are provided by the contractor is subcontracted on a competitive or market related basis; and

- the target price in the target cost contract can be agreed before the issuing of a package order or to proceed with the construction of the works associated therewith.

Cost-based pricing strategies enable a framework agreement to be entered into with a single contractor. Such pricing strategies enable a series of packages within a programme to be constructed by a single contractor who can be provided with a continuous stream of work over the term (see Figure 4). This enables lessons learned in one package to be taken to the next and enables a team to work together on an integrated approach over a period of time. The promotion of secondary procurement objectives in this contracting arrangement is also very flexible and, unlike most other delivery models, allows the employer to change the deliverables associated with such a policy over time in response to emerging needs and changing circumstances. This enables meaningful development of local enterprises and labour to take place over the term of the contract (Watermeyer and Thumbiran, 2009).

It is possible to enter into framework agreements with a number of contractors for a well defined scope of work involving a limited number of repetitive items in a specific geographic area e.g. provision of sidewalks within a local authority. In such cases, contractors can be contracted on the basis of a tendered price list. Framework contractors must, however, be invited to compete for package orders and base their prices for each package order on their tendered price list – they may reduce but not increase these prices when tendering for a package order.

7. PROCUREMENT PROCEDURES

A procurement procedure is according to ISO 10845-1 the 'selected procedure for a specific procurement'. ISO 10845-1 provides for:

- eleven generic procurement procedures associated with procurements other than those relating to disposals by auction and framework agreements (see Table 5) ,
- four generic evaluation methods (see Table 6), and
- eligibility criteria which have to be satisfied in order for a submission to be evaluated, which may form part of a procurement procedure.

ISO 10845-1 makes provision for the evaluation on the basis of the financial offer (least cost) or on a combination of financial offer and quality (most economically advantageous). It also makes provision for the inclusion of preferences should an organisation's policy or prevailing legislation permit such a practice.

Combinations of the generic procedures and methods, with or without eligibility criteria (i.e. stated criteria which need to be satisfied as a precondition for the evaluation of a submission), can be used to simulate most international and national procurement procedures and methods applicable to goods, services and engineering and construction works (Watermeyer, 2004b).

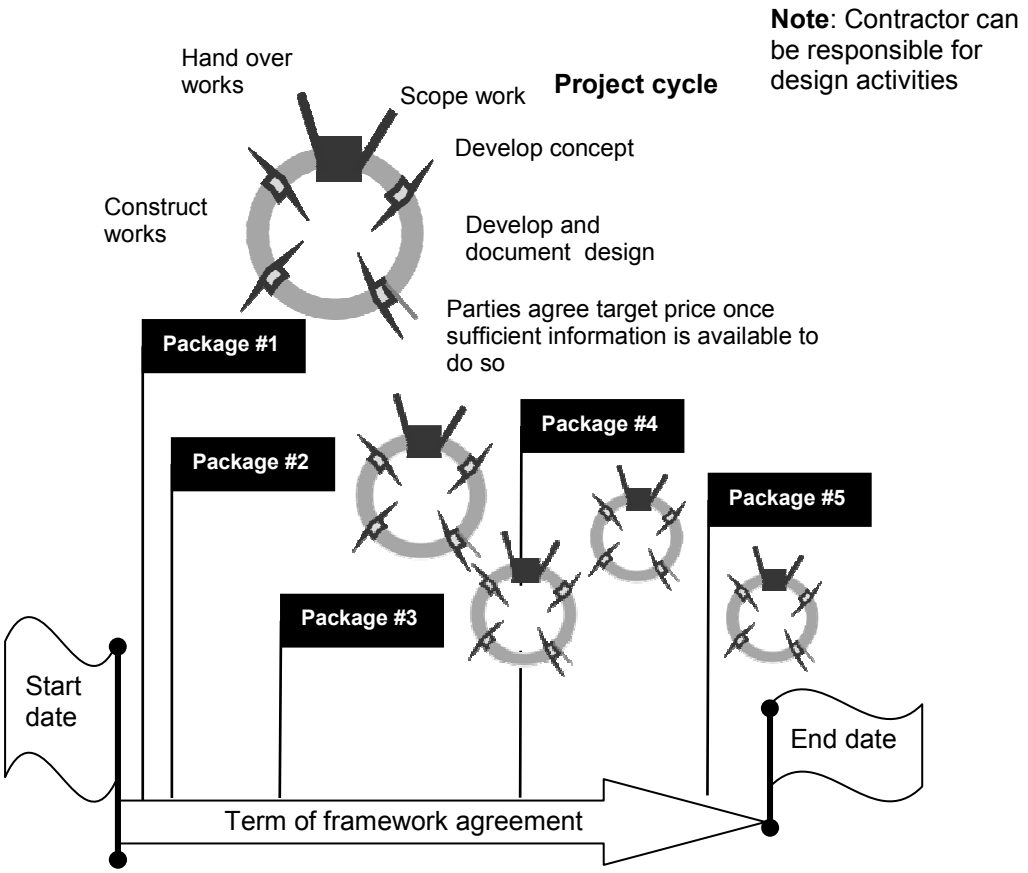


Figure 4 – Series of package orders executed in terms of a framework agreement based on a target contract (Adapted from Watermeyer, 2010)

8. DEVELOPING A CONSTRUCTION PROCUREMENT STRATEGY

A construction procurement strategy can be developed for a single project, a programme of projects or a portfolio of projects to identify the best way of achieving objectives and value for money, while taking into account risks and constraints (see Figure 5) (Watermeyer, 2010). Construction procurement strategy is the combination of the delivery management strategy, contracting arrangements and procurement arrangements for a particular procurement (see Figure 1). It necessitates that a number of choices be made from the available options and can be used to translate a programme or a portfolio of projects into a series of packages for delivery under a single contract or a package order issued in terms of a framework agreement.

Choices are informed by project objectives, namely the reason for undertaking the project as well as broader societal objectives. Project objectives need to be translated into procurement objectives. Procurement objectives may relate to either the delivery of the product (primary objectives) or what can be promoted through the delivery of the product (secondary objectives). Primary objectives typically relate to budget, schedule, quality / performance, rate of delivery, environmental / health and safety aspects, buildability, relationships (e.g. long term relationship, early contractor involvement, integration of design and construction etc.), client involvement in the project, end-user satisfaction and maintenance and operational

responsibilities. Secondary objectives typically relate to the promotion of sustainable development objectives which commonly relate to the following objectives (Watermeyer, 2004a):

- alleviation and reduction of poverty,
- minimisation of the harmful effects of development on the local environment,
- establishment and strengthening indigenous building materials and methods,
- promotion of construction technologies that increase employment, and
- promotion of increased use of environmentally sound goods, building materials and construction technologies.

Table 5 — Standard procurement procedures (ISO 10845-1)

Procedure			Description
1	Negotiation procedure		A tender offer is solicited from a single tenderer.
2	Competitive selection procedure		Any procurement procedure in which the contract is normally awarded to the contractor who submits the lowest financial offer or obtains the highest number of tender evaluation points.
	A	Nominated procedure	Tenderers that satisfy prescribed criteria are entered into an electronic database. Tenderers are invited to submit tender offers based on search criteria and, if relevant, their position on the database. Tenderers are repositioned on the database upon appointment or upon submission of a tender offer.
	B	Open procedure	Tenderers may submit tender offers in response to an advertisement by the employer to do so.
	C	Qualified procedure	A call for expressions of interest is advertised and thereafter only those tenderers who have expressed interest, satisfy objective criteria and who are selected to submit tender offers, are invited to do so.
	D	Quotation procedure	Tender offers are solicited from not less than three tenderers in any manner the employer chooses, subject to the procedures being fair, equitable, transparent, competitive and cost-effective.
	E	Proposal procedure using the two-envelope system	Tenderers submit technical and financial proposals in two envelopes. The financial proposal is only opened should the technical proposal be found to attain the minimum threshold score.
	F	Proposal procedure using the two-stage system	Non-financial proposals are called for. Tender offers are then invited from those tenderers that submit acceptable proposals based on revised procurement documents. Alternatively, a contract is negotiated with the tenderer scoring the highest number of evaluation points.
	G	Shopping procedure	Written or verbal offers are solicited in respect of readily available goods obtained from three sources. The goods are purchased from the source providing the lowest financial offer once it is confirmed in writing.
3	Competitive negotiation procedure		A procurement procedure which reduces the number of tenderers competing for the contract through a series of negotiations until the remaining tenderers are invited to submit final offers.
	A	Restricted competitive negotiations	A call for expressions of interest is advertised and thereafter only those tenderers who have expressed interest, satisfy objective criteria and who are selected to submit tender offers, are invited to do so. The employer evaluates the offers and determines who may enter into competitive negotiations.
	B	Open competitive negotiations	Tenderers may submit tender offers in response to an advertisement by the employer to do so. The employer evaluates the offers and determines who may enter into competitive negotiations.
4	Electronic auction procedure		Tender submissions are initially evaluated using stated methods and criteria. All tenderers who submit responsive tenders are invited simultaneously by electronic means to submit new evaluation parameters and have their evaluation scored, without having their identity made known to other tenderers. Tenderers may amend their offers up until such time as the auction is closed.

Table 6 — Standard tender evaluation methods

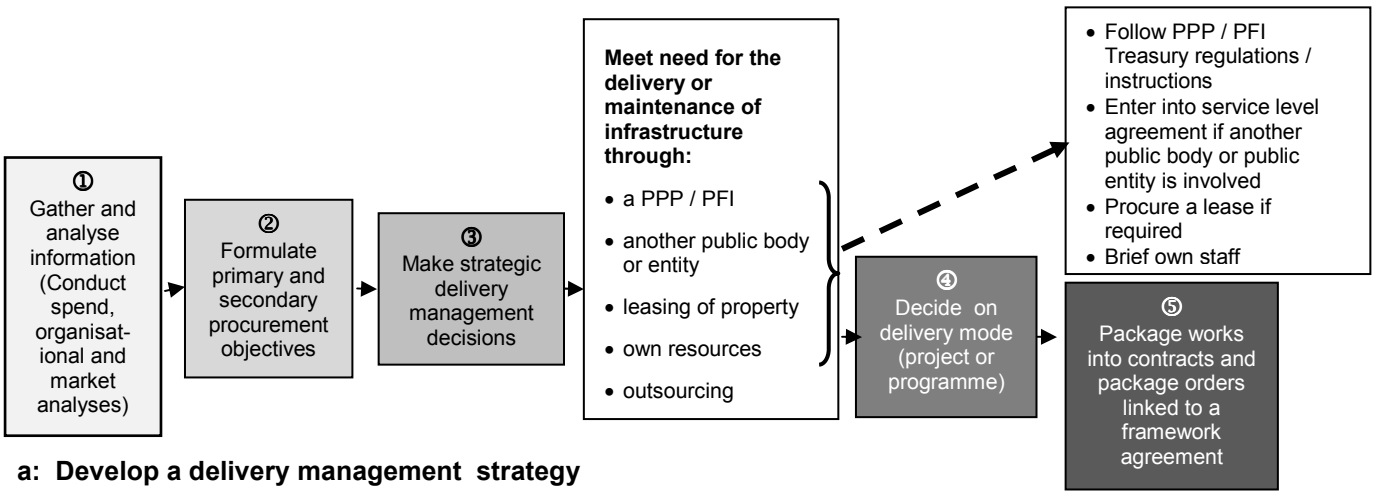
Method	Procedure
Method 1: Financial offer	1) Rank tender offers from the most favourable to the least favourable comparative offer. 2) Recommend highest ranked tenderer for the award of the contract.
Method 2: Financial offer and quality	1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the tender data, if any. 2) Score tender evaluation points for financial offer. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract.
Method 3: Financial offer and preferences	1) Score tender evaluation points for financial offer. 2) Confirm that tenderers are eligible for the preferences claimed and if so, score tender evaluation points for preferencing. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract.
Method 4: Financial offer, quality and preferences	1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the tender data, if any. 2) Score tender evaluation points for financial offer. 3) Confirm that tenderers are eligible for the preferences claimed and if so, score tender evaluation points for preferencing. 4) Calculate total tender evaluation points. 5) Rank tender offers from the highest number of tender evaluation points to the lowest. 6) Recommend tenderer with the highest number of tender evaluation points for the award of the contract.

The framework set out in Figure 5 enables choices to be made and aligned with project objectives in the development of a construction procurement strategy to be systematically developed and documented (see Table 7) (Watermeyer, 2010, Construction Industry Development Board, 2011). The application of the framework can rationalise the delivery of projects within a programme or portfolio of project and minimise the contractual realtionships which are entered into. This can be used to address public sector capacity constraints in spending budgets as it can be used to reduce the number of contracts that need to be procured and managed and tap into the resources of the private sector without compromising objectives. The application of the framework can also be used to improve upon secondary procurement outcomes.

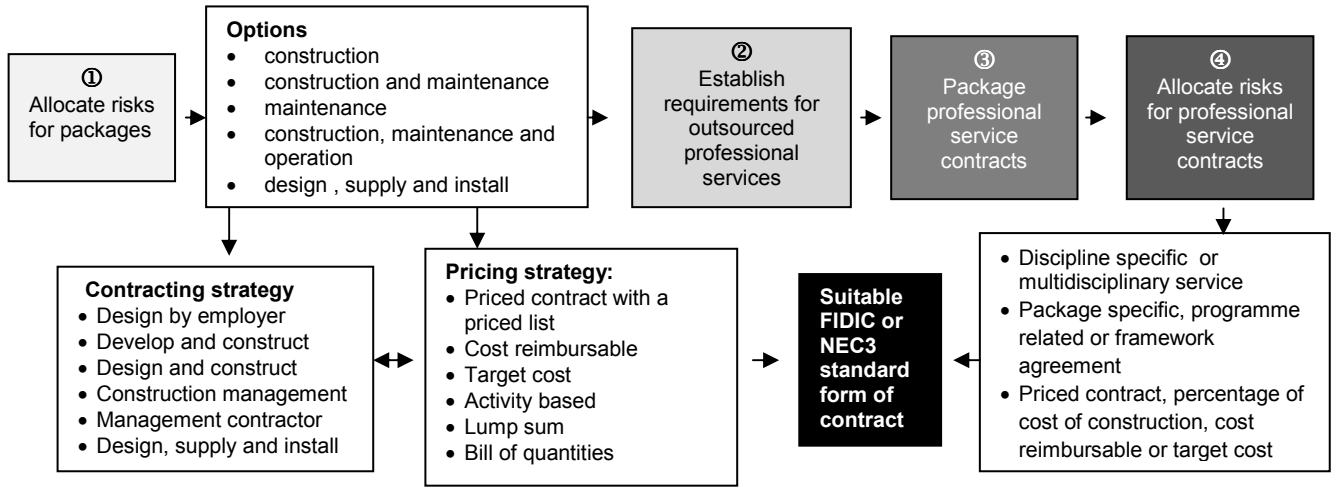
9. CONCLUSION

The range of options provided in ISO 10845 standards for the procurement of construction projects and the promotion of secondary procurement objective when linked to the contracting and pricing strategies embedded in the FIDIC and NEC3 families of standard contracts has the potential to delivery and maintain infrastructure more efficiently and in a manner which closely aligns with project objectives and is more likely to deliver value for money. The framework for the development of a construction procurement strategy presents a systematic and strategic approach to match resources and objectives (both primary and secondary) to the choices made regarding the manner in which needs are to be met and the range of contracting and procurement options that are available.

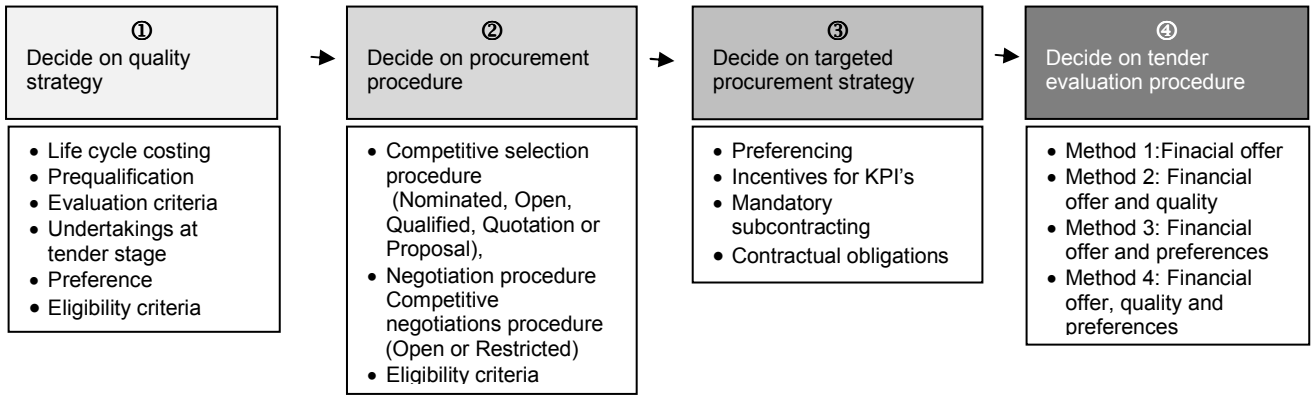
This approach to delivering and maintaining infrastructure can reduce the number of relationships which have to be managed which in turn can overcome capacity constraints and reduce the potential for corrupt activities in the procurement process.



a: Develop a delivery management strategy



b: Decide on the contracting arrangements



c: Decide on the procurement arrangements

Figure 5: Framework for developing a construction procurement strategy (Adapted from Watermeyer, 2010)

REFERENCES

APM (Association for Project Managers). *APM Body of Knowledge Definitions. 2006*. For further details see www.apm.org.uk/sites/default/files/Bok%20Definitions.pdf (accessed 06/06/2011).

Bower, D (2003). *Management of procurement.* Thomas Telford, London, UK.

CIDB (Construction Industry Development Board). *Scaling up Delivery and Accelerating Empowerment.* CIDB Inform Practice Note #1, August, 2006. For further details see www.cidb.org.za/Documents/KC/cidb_Publications/Prac_Notes/prac_notes_01.pdf. (accessed 06/06/2011).

CIDB (2011). *Delivery Management Guidelines Practice Guide 2 - Construction Procurement Strategy.* Construction Industry Development Board and National Treasury, 2011. For further details see http://www.cidb.org.za/_layouts/toolkit/data/ai_docs/IDM-Toolkit-DMG-6-PG2-ConstructionProcurementStrategy-V11-2011-04-20.pdf. (accessed 10/06/2011).

Foster, V.(2008). *African Infrastructure Country Diagnostic*: *Overhauling the Engine of Growth: Infrastructure in Africa*. World Bank, New York, USA.

FIDIC (International Federation of Consulting Engineers) (2010). Conditions of Contract for Construction MDB Harmonised Edition for Building and Engineering Works Designed by the Employer. FIDIC, Geneva, Switzerland, 2010.

ISO (International Organization for Standardization).(2010) ISO 10845-1:2010: Construction Procurement – Part 1: Processes, methods and procedures, ISO, Geneva, Switzerland,

ISO (2011a). ISO 10845-5:2011: Construction Procurement – Part 5: Participation of targeted enterprises in contracts, ISO, Geneva, Switzerland.

ISO (2011b). ISO 10845-6:2011: Construction Procurement – Part 6: Participation of targeted partners in joint ventures in contracts, ISO, Geneva, Switzerland

ISO (2011c) ISO 10845-7:2011: Construction Procurement – Part 7: Participation of local enterprises and labour in contracts, ISO, Geneva, Switzerland.

ISO (2011d) ISO 10845-8:2011: Construction Procurement – Part 8: Participation of targeted labour in contracts, ISO, Geneva, Switzerland.

Kershaw, S. & Hutchison, D. (eds) (2009). *Client Best Practice Guide*. Institution of Civil Engineers, Thomas Telford, London, UK.

Kinder C, & Wright, D (2009). *Better Public Service Delivery through Public Private Partnerships: a new approach to infrastructure development.* Commonwealth Business School, Seer Green, UK.

Lawless, A (2005). *Numbers and needs: Addressing imbalances in the civil engineering profession*. South African Institution of Civil Engineering, Midrand, , pp 5, 223, 229 – 232.

Lichtig, WA. (2006). The Integrated Agreement for Lean Project Delivery. *Construction Law*yer, 26(3) pp 1-8, Summer.

OGC (Office of Government Commerce) (2008). *Framework Agreements OGC Guidance on Framework Agreements in the Procurement Regulations.* OGC, Norwich, UK.

Watermeyer, R.B., Gounden, S., Letchmiah, D.R. & Shezi, S. (1998). Targeted Procurement: a means by which Socio-Economic Objectives can be realised through Engineering and Construction Works Contracts. *Journal of the South African Institution of Civil Engineering*, vol.40, no.4,.15-25.

Watermeyer, R.B and Thumbiran I. Delivering infrastructure at scale in developing countries: numbers or systems? *The Fourth Built Environment Conference hosted by ASOCSA,* Livingston, Zambia, May. 2009.

Watermeyer, R.B. (1995). Community-Based Construction: A Route to Sustainable Development and Job Creation. *Journal of the South African Institution of Civil Engineers*, vol.36, no.1, pp.6-10.

Watermeyer, R.B.(2000). The use of Targeted Procurement as an instrument of Poverty Alleviation and Job Creation in Infrastructure Projects. *Public Procurement Law Review*, no.5,.201-266.

Watermeyer, R.B. (2004a). Tools and techniques to facilitate the alignment of public and donor procurement systems to promote sustainable development objectives. *Public Procurement Law Review*, 30 to 55, No 1.

Watermeyer, R.B.(2004b). *Project Synthesis Report: Unpacking Transparency in Government Procurement-Rethinking WTO Government Procurement Agreements,* CUTS Centre for International Trade, Economics and Environment, Unpacking Transparency in Government Procurement, CUTS International, Jaipur, India, pp.1-50.

Watermeyer, R.B. (2009). Getting to grips with the NEC3 ECC target contract with activity schedule. *Civil Engineering,* January / February.Vol 17, No 1, pp 26-33

Watermeyer, RB. (2010). Alternative models for infrastructure delivery, *IMIESA*, 68, October.

World Bank. *Africa Regional Strategy*. *African Region, World Bank, March*, 2011.

World Federation of Engineering Organisations. *Guidebook for Capacity Building in the Engineering Environment.* Committee on Engineering Capacity Building, First edition. WFEO, Paris, 2010.