



Mid Year 2005 Final Examination

University of South Australia

Student ID:		Student Name:	
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SCHOOL OF NATURAL & BUILT ENVIRONMENTS

Master of Project Management Graduate Diploma in Project Management Graduate Certificate in Building & Planning
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Subject Area:	BUSS	Catalogue Number:	5143
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Project Procurement

Examination Day: Saturday	Examination Date: 18 June 2005
Examination Time: 9AM	Length of Exam: 3 Hours of Exam time preceded by 10 minutes of Reading time – a total of 3 hours 10 Minutes. For ENTEXT students there is 10 minutes of Reading time plus 3.5 Hours of Exam time – a total of 3 Hours 40 Minutes.

Examination Venue:	RAS/Ridley Centre
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Instructions to Candidates



This is a closed book exam.
You must answer each of the three questions.

Question 1 is worth 40 marks
Question 2 is worth 40 marks
Question 3 is worth 20 marks

Question 1 (Multiple choice questions)

For each of the twenty (20) questions, circle the *most* correct answer: (a), (b), (c), or (d). Each question is worth 2 marks.

1. A ***Contract Management Plan*** includes which of the following sections

- (a) Transition
- (b) Performance measures
- (c) Contingencies
- (d) All the above

2. ***DBO*** as used by Seattle means

- (a) Detailed Buyer's Option
- (b) Design Build Own
- (c) Design Buy Operate
- (d) None of the above



3. An **alliance contract**

- (a) Is the special form of contract developed to implement Public Private Partnerships
- (b) Is not legally enforceable
- (c) Is another name for a Partnering arrangement
- (d) None of the above

4. An **acquisition strategy** includes

- (a) The proposed contract terms and conditions
- (b) The contract management plan
- (c) The evaluation methodology/plan
- (d) None of the above

5. **Design and construct** when compared with traditional contracting has

- (a) Longer time to complete the project
- (b) More variations
- (c) Fewer disputes
- (d) All of the above

6. **Conditions of tendering** should include

- (a) Tender evaluation criteria
- (b) The tender procedures
- (c) Industry briefing details
- (d) All of the above

7. What is the **contract management** objective?

- (a) To ensure that contractors are fairly rewarded
- (b) To bring contracts to a satisfactory conclusion
- (c) To ensure all stakeholders are consulted
- (d) All of the above

8. **Fast-tracking** means simultaneous

- (a) Management and construction of a contract
- (b) Design and construction of a contract
- (c) Design and management of a contract
- (d) None of the above



9. A **design and build** project
- (a) Does not have competitive design
 - (b) Is outcome driven and fit for purpose
 - (c) Is different to a turnkey project
 - (d) None of the above
10. With **General or Traditional Contracting**
- (a) Relations between contractor and owner are frequently adversarial
 - (b) Fast tracking occurs
 - (c) Constructability is enhanced
 - (d) None of the above
11. **Guaranteed Maximum Price** projects
- (a) Have a maximum price which cannot be exceeded for any reason
 - (b) Are based on shared pain and gain principles
 - (c) Comprise adjustable and non-adjustable parts
 - (d) All of the above
12. A **BOO strategy**
- (a) Requires a lump sum contract to implement it
 - (b) Facilitates infrastructure development without government funds
 - (c) Means build outsource operate
 - (d) All of the above
13. **Lump sum** contracts
- (a) Result in few variations
 - (b) Rarely use standard conditions of contract
 - (c) Provide opportunities to eliminate waste
 - (d) None of the above.
14. When a **Management Contractor** is used
- (a) Contracts for the works are with the management contractor
 - (b) The management contractor manages the construction
 - (c) The management contractor does some of the work himself
 - (d) All of the above



15. When a **Construction Manager** is used
- (a) The construction manager does some of the work himself
 - (b) Contracts for the works are with the construction manager.
 - (c) The construction manager acts as a consultant to the owner
 - (d) All of the above
16. A **Public Private Partnership** is
- (a) A contractual method used for financing joint research
 - (b) A strategy for financing large infrastructure projects
 - (c) A legal entity, a Partnership, jointly owned by Government and a private company
 - (d) None of the above
17. **Life cycle costing**
- (a) Considers only real cash flows
 - (b) Considers only the total discounted cost of alternatives over the life of the project
 - (c) Compares only the total discounted operating costs over the project life of alternatives
 - (d) None of the above
18. An effective **communication strategy** in contract management includes which of the following
- (a) Contract clauses that protect the interests of the Principal
 - (b) Conditions of tendering including evaluation criteria
 - (c) Conveying clear and prompt information on performance to the contractor
 - (d) All of the above
19. A contract price that is **fixed** for the term of the contract means
- (a) The contract price will not be altered during the term of the contract.
 - (b) The contract price may change during the term of the contract as a result of any approved variation to the contract.
 - (c) The contract price may change during the term of the contract but only in accordance with a pre-agreed pricing formula.
 - (d) The contract price may change during the term of the contract but only if there is an agreed change of scope



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20. A contract price that is ***firm*** for the term of the contract means
- (a) The contract price will not be altered during the term of the contract.
 - (b) The contract price may change during the term of the contract but only because the contractor's costs have risen
 - (c) The contract price may change during the term of the contract but only in accordance with a pre-agreed pricing formula.
 - (d) The contract price is reviewed at the end of each financial year.
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Question 2 (Case Study)

Select **one** (1) scenario, that is, **either** Scenario A **or** Scenario B. Do **not** answer both scenarios. Do **not** answer part from Scenario A and part from Scenario B.

You should address the scenario you have chosen (do not just provide a theoretical list of points without relating them to the situation) and answer all parts of the question.

1.1. Scenario A: Infrastructure Development

A state Government has recently announced a comprehensive water supply solution for its principal metropolitan area and major regional cities. The Government intends to develop a major water desalination plant as part of the program.

Details of the water desalination project are to be finalised but the key program elements have been agreed and planners and Government are currently considering a range of strategies before announcing the specific construction program and procurement process.

In terms of infrastructure elements, the program includes:

1. The water desalination plant, which will be the largest in the southern hemisphere located adjacent to the ocean at a site carefully selected on environmental grounds,;
2. 250 kilometres of pipelines (three major lines) linking the plant to the metropolitan area and the two regions involved;
3. A series of pumping stations (12 in total), and
4. A small reservoir, 8 kilometres from the water desalination plant, which will ensure a continuous supply of water and allow for sudden changes in demand. The reservoir includes earthworks, construction of a small dam, and construction of a small water filtration plant.

The pipeline corridors, reservoir, and the location of the desalination plant and the pumping stations have all been defined.

The Government has defined the following criteria for the program:

- Value for money;
- Financial certainty - maximum capital outlay other things being equal, low capital outlay preferred; reliable annual cost through project life important;
- Water quality and supply certainty; and
- Early completion.

THE MINISTRY OF INFRASTRUCTURE, WHICH IS RESPONSIBLE FOR THE WATER SUPPLY, HAS OUTSOURCED MOST OF THE WATER SUPPLY FUNCTIONS. IT HAS NO IN-HOUSE DESIGN CAPABILITY AND NO CONSTRUCTION CAPACITY. IT DOES, HOWEVER, HAVE A VERY STRONG PROJECT MANAGEMENT CAPABILITY.



THE GOVERNMENT HAS A VERY LOW LEVEL OF STATE DEBT AND HAS A CAPACITY TO FUND MAJOR PROJECTS. THIS, HOWEVER, IS A VERY, VERY LARGE INFRASTRUCTURE PROGRAM.

IN THIS CASE STUDY YOU WILL CONSIDER THE FOUR KEY QUESTIONS WITH WHICH THE GOVERNMENT IS FACED IN BRINGING THE PROGRAM TO REALITY. THE QUESTIONS ARE POSED IN THE LOGICAL SEQUENCE COMMENCING WITH THE OVERARCHING PROCUREMENT STRATEGY, THEN ADDRESSING CONTRACTING STRATEGY, THEN THE PROCUREMENT PROCESS CONCLUDING WITH THE EVALUATION PROCESS. THE FOUR QUESTIONS ARE INDEPENDENT AND EACH ANSWER SHOULD NOT REFER TO OR RELY ON THE ANSWERS TO THE OTHER PARTS.

2A.1 Procurement strategies (10 marks)

Briefly discuss two or three alternative procurement strategies available to the Government (note; do **not** discuss every possible procurement strategy).

Your discussion should address the packaging of the components of the program i.e. how the work could be packaged and what financing models could apply (owner financed, contractor-financed and/or hybrid options).

You should define how each strategy would work and identify the advantages and disadvantages and key risks associated with each.

You do **not** have to recommend which strategy should be adopted.

2A.2 Contracting strategies (10marks)

Assume that the Government has decided to develop each of the four infrastructure elements in a separate package. It is now considering the contracting strategy for the desalination plant.

Briefly discuss the merits and disadvantages of the following three contracting strategies for the desalination plant which are being considered by the Government:

- (a) A single contract **Design and Construct** contracting strategy using a lump sum contract covering the entire desalination plant design and construction;
- (b) Having the design and specifications developed by a firm with international experience in water desalination plant design, then having a competitive tender to let a **Traditional** lump sum contract with a construction company for the desalination plant construction; and
- (c) A **Novated** contract in which the concept design is prepared by the same firm with international experience in water desalination plant design, enabling lump sum tenders to be submitted by construction contractors,



[similar to the Traditional approach (b)], but on the basis of the design team being novated to the successful contractor.

2A.3 Market Approach and Tender Documentation (10 marks)

Assume that the Government has determined that the desalination plant will be a design & construct project and you have been appointed as the Procurement Manager.

Discuss the following aspects of the market approach and tender documentation for this project:

- i. Which one of the following market approaches would you recommend for this project (provide reasons for making this recommendation);
 - open tender,
 - selective tender, or
 - Expression of Interest?
- ii. List the probity principles & objectives, identify possible matters of probity associated with this procurement project and how best probity could be managed.

2A.4 Tender Evaluation (10 marks)

Assume now that it has been decided that a two-stage procurement process will be used to select the design and construct contractor for the desalination plant. Stage one will be an Open Expression of Interest, and stage two will be closed to the firms shortlisted in the first stage.

- i. List two evaluation techniques that could be used during stage two for assessing offers, and recommend the most appropriate technique,
- ii. List the evaluation criteria for Stage 1 and Stage 2 and your rationale for selecting these criteria,
- iii. Define the word *veracity* as a key issue in tender evaluation and how you would manage veracity in the evaluation of offers for this project.



1.2 Scenario B: The Light Rail Project

The Government has decided to build a new light rail system comprising two tracks with a total length of 36 kilometres. The project for the construction of the track has already commenced.

The Government is now considering how to procure, maintain and operate the tramcar sets over their proposed 30 year life.

The tramcar sets comprise 5 major components:

1. The tramcar bodies fitted out with seating and complete interiors;
2. The electric power units which drive the trams;
3. The underbodies – chassis frame, wheels and axles;
4. The air conditioning systems; and
5. The control system including brakes.

Each of these component systems is manufactured by different international companies and for each major component there are at least 4 suppliers and all are used somewhere in the world today. Usually these companies make to the design supplied by the buyer.

It is possible to engage specialist designers to design the complete tramcars specifically suited to the city's environment and geography. It is also possible to buy sets of each different component made to the designer's specification from manufacturers of the five different components.

It is also considered feasible to arrange a contract locally with a company to assemble the tramcar sets if the Government decided it wanted to completely control the project.

Over and above the component manufacturers, there are at least 5 companies who design and assemble their own tramcars – that is, they supply a fully built tram. In some other cities these companies also provide a complete through life maintenance service for the tramcars but in no city have they operated the trams.

The Government is also considering how it can operate the trams over the 30 year life and how it can ensure they keep running efficiently – how will maintenance be provided, and where will spare parts come from especially when the trams are older.

The Government is concerned about the level of funds required to procure the trams because the construction project is running over budget so the funds left to buy the trams have been reduced. It is not known if any manufacturer of tramcars would be prepared to fund them.

IN THIS CASE STUDY YOU WILL CONSIDER THE FOUR KEY QUESTIONS WITH WHICH THE GOVERNMENT IS FACED IN BRINGING THE PROGRAM TO REALITY. THE QUESTIONS ARE POSED IN THE LOGICAL SEQUENCE COMMENCING WITH THE OVERARCHING PROCUREMENT STRATEGY, THEN ADDRESSING CONTRACTING STRATEGY, THEN THE PROCUREMENT PROCESS CONCLUDING WITH THE EVALUATION PROCESS. THE FOUR QUESTIONS ARE



INDEPENDENT AND EACH ANSWER SHOULD NOT REFER TO OR RELY ON THE ANSWERS TO THE OTHER PARTS.

2B.1 Procurement and contracting strategies (10 marks)

Briefly discuss two or three alternative procurement strategies available to the Government which address the whole of life issues, that is, the procurement of the tramcar sets, the operation and the maintenance of the trams over the thirty year life (note; do **not** discuss every possible procurement strategy).

Your discussion should address the packaging of the components of the program i.e. how the work could be packaged and what financing models could apply (owner financed, contractor-financed and/or hybrid).

You should define how each strategy you have chosen would work and identify the advantages and disadvantages and key risks associated with each option.

You do **not** have to recommend which strategy should be adopted.

2B.2 Contracting Strategy (10 marks)

Assume that the Government has decided to fund the project itself. However, it does not insist on having absolute control of the project although it would consider a shared risk option. The contracts to be arranged, therefore, are for the supply of the tramcar sets plus 30 years of spare parts.

Briefly discuss the merits and disadvantages of the following three contracting strategies for the supply of tramcar sets and spare parts:

- (a) A single **Design, Build and Maintain Contract** contracting strategy covering the entire supply of tramcars, spare parts and maintenance for the 30 year life;
- (b) Having the design and specifications developed by an international design expert, then having a competitive tender to let a **Traditional** lump sum contract (that allows for variations) with a local assembly company for the tramcar construction. The assembler would be responsible for obtaining the components from the component suppliers in line with the design for both the original equipment and for spare parts through the life of the contract. (With this strategy, a separate contract for Maintenance support would be arranged at a later point in time); and
- (c) An **Alliance** contract in which the Government and a local assembler work together to share the risks and work to reduce costs in building the tramcars which have been designed by an expert designer. (In this option it is planned to establish a joint maintenance department to maintain the trams).



2B.3 Market Approach and Tender Documentation (10 marks)

Assume that the Government has determined that the tramcar supply will be via a design, build & maintain contract and you have been appointed as the Procurement Manager.

Discuss the following aspects of the market approach and tender documentation for this project:

- i. Which one of the following market approaches would you recommend for this project (provide reasons for making this recommendation);
 - open tender,
 - selective tender, or
 - Expression of Interest?
- ii. List the probity principles & objectives, identify possible matters of probity associated with this procurement project and how best probity could be managed,

2B.4 Tender Evaluation (10 marks)

Assume now that it has been decided that a two-stage procurement process will be used to select the design, build and maintain contractor for the tramcars. Stage one will be an Open Expression of Interest, and stage two will be closed to the firms shortlisted in the first stage.

- i. List two evaluation techniques that could be used during Stage two for assessing offers, and recommend the most appropriate technique,
- ii. List the evaluation criteria for Stage 1 and Stage 2 and your rationale for selecting these criteria,
- iii. Define the word veracity as a key issue in tender evaluation and how you would manage veracity in the evaluation of offers for this project.



Question 3 – (Short answers)

Answer each part of this question. Each answer should be brief (maximum half a page). Each question is worth **5 marks**

- 3.1 In the **Asset Specificity Model**, under what circumstance does Professor Cox suggest that (a) an alliance is appropriate, (b) that a buyer's leverage should be exercised through competitive market bidding?
- 3.2 What advantages are there in using a **matrix organization** strategy for project procurement?
- 3.3 What are the main differences between a **procurement strategy** and a **contracting strategy**?
- 3.4 What is the essential difference between the Jim Ross **Alliance Contract Model** and the Evans and Peck **Competitive Alliance Model**?

****End****