PART E - SERVICES REQUIREMENTS

E1. DESCRIPTION OF THE SERVICES

The Professional Services to be performed by the Contractor are stated hereunder, however the statement of purposes set out in this specification is not intended to be an exhaustive list of the purposes required by this Contract. The Contractor shall undertake all works that are required to complete this contract in totality.

E1.1 Purpose

The principal purpose of the work under the Contract is to undertake comprehensive dam safety reviews of Cataract and Cordeaux dams to comply with the requirements of NSW Dams Safety Committee (DSC) and ANCOLD. The safety reviews are proposed to be divided into two parts. Part one will be essential and Part two will be optional depending on the review outcomes from Part One. Details are listed in the following tasks:

Part One:

- Review of Existing Information
- Site Inspection
- Geological/Geotechnical Assessment
- Electrical and Mechanical Assessment (including Operational Preparedness Testing of critical flow control equipment)
- Flood Study Review
- Review of Design, Construction Aspects
- Review of Surveillance and Monitoring Data
- Dambreak Study / Review
- Flood Security Review
- Failure Mode Analysis
- Workshop and Meeting
- Dam Safety Review Report

Part Two:

- Dambreak Study and Inundation Maps
- Seismic Assessment
- Stability / Structural Adequacy Assessment for Flood and Earthquake and Other Static Failure Modes
- Workshop and Meeting
- Dam Safety Review Report

E1.2 Background

Cataract dam is located on the Cataract River about 80 km south of Sydney. The dam wall is a straight mass gravity section constructed of cyclopean masonry with a layer of precast concrete blocks on the upstream face and between 1 m and 2 m thickness of concrete on the downstream face. The dam was originally constructed in 1907 and strengthened in October 1987 with post-tensioned anchors. The length of wall measured along the crest is 247 m and at the maximum cross section the height of the crest above the foundation is 56

m. The dam was designed by the Department of Public Works and was constructed by contractors, Lane and Peters, in 1907. The strengthening works were designed and constructed in 1987 by the Metropolitan Water, Sewerage and Drainage Board.

No inspection gallery or contraction joints were provided in the original design of the dam wall. There is an access tunnel/gallery connecting the lower valve house and the shaft for the town water supply pumps near the right abutment.

The dam wall was strengthened in 1987 by a system of post-tensioned anchors to cater for a 1985 estimate of the Probable Maximum Flood (PMF). The system of post-tensioned anchors used in the dam consist of forty-four vertical anchors. Each anchor is restressable and load monitorable and utilises polyethylene and cement grout to ensure maximum protection against corrosion.

A general arrangement of the dam is shown in Figs. 1 and 2.

Basic Data on the dam is as follows:

Year completed/upgraded	1907/1987
Height of dam crest above lowest foundation	56 m
Length of dam crest	247 m
Radius of curvature of upstream face	365.75 m
Crest parapet top level	RL 293.37 m AHD
Dam crest roadway level	RL 292.00 m AHD
Spillway crest level (Full Supply Level)	RL 289.87 m AHD
Length of spillway crest along upstream face	480 m
Catchment area	13,000 ha
Volume of dam wall and aprons	112,000 m ³
Volume of storage (FSL)	94,300 MI
"Sunny Day" Consequence Category	Extreme
Flood Consequence Category	Extreme

The spillway is sited on the left (western) abutment and is ungated and unlined. The whole channel is approximately 480 m long and discharges into the river about 450 m downstream from the dam.

The spillway weir is a 3 m high masonry structure constructed on a curved alignment with concrete facing and has an ogee type cross section.

A program of works (completed in 1983) was undertaken to upgrade the channel capacity and generally rehabilitate the channel and weir crest. The main item of work was the construction of a new prestressed concrete training wall approximately 250 m long, along the eastern side of the channel. The wall is up to 5.8 m high, and is anchored to the foundation rock by 38 mm dia. post-tensioned steel bars. The loads in these anchors can be monitored.

The wall has been designed to contain floods up to 1,550 m³/s without overtopping. Rarer floods of greater magnitude would overtop the wall, primarily at its downstream end, with a maximum of 1 metre of overtopping occurring under PMF conditions at that time. The foundations at the toe of the training wall have been adequately protected against scour by construction of a reinforced concrete slab.

Other works completed in 1983 included strengthening the ogee weir structure by untensioned anchor bars grouted into the rock foundation, stabilising a local area of the western side of the channel by shotcreting and removal of loose blocks of rock from the top of the spillway channel along its western side.



General View of Cataract Dam

No formal dam safety review has been carried out since 1996. A preliminary Consequence Category assessment has assessed Cataract Dam as EXTREME in the 2006 Annual Inspection and Monitoring Report. A dambreak and flood inundation study was carried out in 1998.

The estimated Probable Maximum Flood (PMF) was revised in 1995 for Cataract Dam based on final estimates (GSAM) of the Probable Maximum Precipitation (PMP) supplied by the Bureau of Meteorology. The PMF has an inflow of 3,290 m³/s, an outflow of 2,430

 m^3 /s, with a surcharge of 4.01 m above the spillway crest. This surcharge would result in 0.51m of water over the upstream parapet wall level for a duration of approximately 8 hours.

A stability analysis of the composite dam wall was carried out in 1996 using a simple two dimensional model. The stability results indicated that the dam was satisfactory under PMF loading and could withstand an earthquake pseudo-static load of at least 0.55 g under the extreme loading combination.

An Earthquake Hazard Analysis of Cataract Dam undertaken by Seismology Research Centre (SRC) in September 2003 is available.

Cordeaux Dam

Cordeaux Dam is located on the Cordeaux River approximately 70 km south-west of Sydney. Its storage is used for water supply to the Macarthur area and, via the Upper Canal, to Prospect/Sydney.

The dam is a mass gravity cyclopean masonry dam, curved in plan, which was constructed in 1926. The dam wall was upgraded in 1988 by a system of wall and foundation drains. It is 56 m high and has a crest length of 404.5 m. The dam was designed and constructed in 1926 by the Department of Public Works. The upgrading works were designed and constructed in 1998 by the Metropolitan Water, Sewerage and Drainage Board.

The spillway is located on the left (south) abutment and is ungated and unlined. The weir is of ogee cross-section constructed of cyclopean masonry keyed into the rock foundation and has a length of 152.4 m along the upstream vertical face. It follows the same curved alignment as the dam wall.

Training walls extend from both ends of the weir for some distance down the channel. On the left side of the spillway weir, beyond the training wall, the approximate crest level of the dam is continued by a concrete core wall/embankment, which merges into the adjoining hillside.

The spillway weir was stabilised in 1986 by 36 mm diameter deformed anchor bars grouted in place at 1.52 m centres along the full length of the weir.

A general arrangement of the dam is shown in Fig. 3 & 4 and a Dam Data Sheet is attached in Appendix A.

Basic Data on the dam is as follows:

Year completed/upgraded	1926/1988
Height of dam crest above lowest foundation	56.5 m
Length of dam crest	404.5 m
Radius of curvature of upstream face	875 m

Crest parapet top level	RL 306.93 m AHD
Dam crest roadway level	RL 305.87 m AHD
Spillway crest level (Full Supply Level)	RL 303.73 m AHD
Type of Spillway	Ogee Section
Catchment area	9,100 ha
Volume of dam wall	167,000 m ³
Volume of storage (FSL)	93,600 ML
"Sunny Day" Consequence Category	Extreme
Flood Consequence Category	Extreme



General View of Cordeaux Dam

No formal dam safety review has been carried out since 1996. A preliminary Consequence Category assessment has assessed Cordeaux Dam as EXTREME in the 2006 Annual Inspection and Monitoring Report. A dambreak and flood inundation study was carried out in 1997.

The estimated Probable Maximum Flood (PMF) was revised in 1995 for Cordeaux Dam based on final estimates (GSAM) of the Probable Maximum Precipitation (PMP) supplied by the Bureau of Meteorology. The PMF has an inflow of 3,340 m³/s, an outflow of 2,110

 m^{3} /s, with a surcharge of 3.08 m above the spillway crest. This surcharge would result in 0.12m of free board to the crest parapet level.

A stability analysis of the dam wall was carried out in 1996 using a simple two dimensional model. The stability results indicated that the dam was satisfactory under PMF loading and could withstand an earthquake pseudo-static load of at least 0.4 g under the extreme loading combination.

E1.3 Scope of Professional Services

The Services to be provided in accordance with the Contract shall include, but not be limited to, the following:

E1.3.1 Objectives

The objectives of these works are to assess the integrity of the dam against all potential failure modes and mechanisms for the various loading conditions in terms of safe acceptance criteria (engineering standards, dam safety guidelines). The dam safety review shall be undertaken in accordance with the procedures defined in ANCOLD Guidelines as modified by the DSC or other agreed international standards or guidelines.

E1.3.2 Scope

The safety review should assess the current safety of Cataract and Cordeaux dams under all loading conditions, and include a detailed review of structural, hydraulic, hydrologic and geotechnical design aspects, the review of records and reports from surveillance activities and dambreak studies (under sunny day and flood failure conditions), completion of operational preparedness testing and Failure Modes Analyses.

E1.4 Specifications

E1.4.1 Project Inception Meeting

The Contractor shall arrange to meet with the SCA Project Manager (Client's Representative) at a time suitable to both parties at the SCA's Penrith Office. This meeting shall be held within two (2) weeks after commencement of the Contract, following receipt of the Letter of Acceptance.

At this meeting, the Contractor shall present a draft Work Plan for discussion and agreement with the SCA Project Manager that includes, but is not limited to:

- Project plan, outlining time frames and milestones for key deliverables required under the contract, including an assessment of the most appropriate timing for the Failure Modes Analysis workshop;
- Detailed methodology for completing all requirements outlined in the contract, including the report and workshop;
- Any other matters or issues that the Contractor considers relevant to the project.

The Contractor shall make the agreed changes to the Work Plan discussed at the Project Inception Meeting and submit the final Work Plan to the SCA Project Manager within three (3) days after the Inception Meeting.

It is expected that a Project Inception Meeting will be held at the same time for both Cataract and Cordeaux Dams.

E1.4.2 Review of Existing Information

The Contractor shall collect and review all relevant information identified in the Project Plan referred to in S-03.1.

Relevant documents available in SCA's office can be provided to the successful Contractor for review. The documents are listed in Appendix A.

E1.4.3 Site Inspection

Following review of relevant information available and prior to commencing the dam safety review, the Contractor shall undertake a site inspection.

The inspection team shall comprise at least an experienced dam engineer, geological/geotechnical engineer, electrical and mechanical engineer. The following areas shall be included:

- Inspection of concrete dam, including all relevant areas in the vicinity of the dam
- Inspection of all external parts of the dam, spillway and outlet facilities
- Inspection of all electrical and mechanical installations related to dam safety operations
- Inspection of surveillance and monitoring instruments

The Contractor shall evaluate the results of the inspections in regard to the performance of the dam and appurtenant structures in respect of safety issues.

E1.4.4 Geological/Geotechnical Assessment

Geological and geotechnical conditions shall be assessed to determine if there is any potential effect on the dam's structural stability including the foundation and abutments. The assessment will be based on the review of the relevant reports and other information available and the site inspection.

E1.4.5 Electrical and Mechanical Assessment

Based on review of the existing information and previous reports, the Contractor shall assess current condition and operability under both normal operation and emergency conditions.

The latest Operational Preparedness Test at Cataract and Cordeaux Dam were undertaken in May 2000. Therefore, an Operational Preparedness Test of all dam safety critical items at Cataract and Cordeaux Dam shall be included as part of this safety review. The operating status of the mechanical and electrical equipment shall also be assessed in accordance with the ANCOLD guidelines and DSC's requirements. A separate report for the Operational Preparedness Test shall be prepared and submitted for review and comments.

E1.4.6 Flood Study Review

PMF / PMP design flood shall be reviewed and revised as follows, before commencing the dambreak study.

- Review of estimation of the Probable Maximum Flood (PMF) inflow hydrographs to the reservoir. These PMF hydrographs shall be based on current estimates of Probable Maximum Precipitation (PMP).
- The prediction of design hydrographs entering the reservoir for the 100, 200, 500, 1000 and 10000 year Average Recurrence Interval (ARI) events.
- Carry out reservoir routing studies for each of the design floods (100 years ARI to the PMF including PMPDF) assuming the initial reservoir level as Full Supply level (FSL).

Data and information to be provided to the successful Contractor include:

- Previous Report
- RORB Model files used for previous study
- Rainfall, water level and stream flow for recent flood events
- Storage-Elevation and spillway rating tables

There is no direct inflow measurement to either of these storages. Inflow hydrographs for the observed floods will need to be reconstructed by a reverse routing process.

A gauging station is installed immediately downstream of Cordeaux Dam.

The Contractor shall review the data available, check the calibration against the recent floods and recalibrate if necessary, undertake the flood study review based on the current practice and methodology (ANCOLD's guideline and DSC's Requirements).

The outcome of the flood study review to be provided by the Contractor should include, but not limited to the following:

- Assumptions
- Limitation
- Methodology and model
- Inflow and outflow hydrograph
- Flood frequency curve
- Stage-Storage curve

These outcomes are to be incorporated into the Dam Safety Review Report Part One.

E1.4.7 Review of Design, Construction and Performance

The Contractor shall review, analyse and evaluate all available data relating to design, construction, and operation of the dam and appurtenant features. With this background, the Contractor shall be fully acquainted with the dam and its history of operation and

maintenance so that they may effectively examine and evaluate its capacity to perform as expected in the future.

- Review design and design data (i.e. plans, reports)
- Review construction methods/report
- Review O & M Manual and Operating Procedures
- Review operational and maintenance history, photographs and reports
- Examine the performance and condition of the existing structure
- Identify any potential deficiencies

E1.4.8 Surveillance and Monitoring Data Review

The Contractor shall review the historical operational surveillance and monitoring records and reports. The results should be analysed for any long term trends that may indicate abnormalities or trends which are indicative of adverse processes at the dam. SCA will provide graphs of monitoring data. The findings of the review should be considered in the assessment of the loading conditions for the stability analysis.

The Contractor shall review outcomes and evaluate existing conditions and performance based on analysis of surveillance and monitoring data.

E1.4.9 Review of Dambreak Study and Consequences of Failure

Sydney Water Corporation completed a dambreak and inundation study of Cataract Dam in December 1998.

Lawson and Treloar Pty Ltd completed a dambreak and inundation study of Cordeaux Dam in November 1997 under contract to Sydney Water Corporation.

The existing dambreak studies shall be reviewed as to their compliance with the latest ANCOLD's guidelines and DSC and SES requirements.

A preliminary assessment also needs to be made as to whether the downstream consequences have changed since the previous studies.

The Contractor shall make recommendation for any further dambreak study and mapping requirements, and provide a fee estimate for undertaking dambreak study revision and mapping in Part Two.

E1.4.10 Flood Security Review

Based on the flood study review undertaken under S03.6, both dams' flood security shall be assessed to determine if both dams can safely pass the acceptable flood capacity (AFC) floods. The assessment shall be deterministically based and undertaken in accordance with the ANCOLD Guidelines and DSC requirements. A recommendation shall be made of the need for any further detailed analysis and if a risk based approach to flood assessment is considered necessary and/or warranted.

The consultant needs to identify any overtopping or other stability issues that may arise from flood discharges over the dam crest or down the spillways.

E1.4.11 Failure Mode Analysis (FMA)

The methodology will generally follow the processes for potential failure mode analysis outlined in the relevant sections of Chapter 14 of the FERC Guidelines for Evaluation of Hydropower Projects, and also as described in the current ANCOLD Guidelines on Risk Assessment.

A detailed methodology of how the FMA will be undertaken needs to be agreed with the Principal prior to the workshops being conducted.

The failure mode analysis will generally consist of a site inspection, workshop and reporting. This site inspection will be incorporated as part of overall dam safety review site inspection refereed to in S-03.3.

The failure modes shall be identified for various initiating load cases such as flood, normal operating level, and earthquake. As a minimum, for each possible failure mode identified, the following issues are to considered, assessed and documented on tabular proforma as the workshop proceeds:

- Type of failure mode.
- Description of the failure mode processes leading to dam failure
- Ranking/classification of each failure mode
- Identification of possible intervention strategies and options for risk reduction that may be available for each failure mode
- Evaluation of adequacy of current surveillance and monitoring program in terms of detecting and monitoring the progress of the failure mode.
- Identification of any modifications necessary to the current surveillance and monitoring program to assist in managing the risk associated with the identified failure modes (i.e. are any of the current programs no longer relevant or are additional programs deemed appropriate).

A report shall be produced on the FMA following the workshops. The report shall generally follow the recommendations for reporting in Chapter 14 of the FERC Guidelines and also ANCOLD's Guidelines.

The findings and conclusions of the FMA shall be assessed in detail in finalising the overall safety review and recommendations.

E1.4.12 Approval for Part Two Works

Following completion of all above work, the Consultant shall recommend whether all or sections of Part Two need to be undertaken to complete the safety review. This will depend upon an approval from the Principal.

Consultant shall provide a provisional lump sum fee at this stage for all the Part Two works.

Part Two:

Part Two will broadly require the consultant to undertake a Dambreak Study, Seismicity Review and a Structural Stability Adequacy Assessment.

The final scope of work under Part Two is dependent upon the outcomes of Part One and will be agreed once Part One work is complete.

E1.4.13 Dambreak Study

Depending on the study outcomes and recommendations in Part One, the following works may be required to be undertaken:

- Dambreak modelling
- Inundation mapping
- Consequence Category Re-assessment

Dambreak Modelling:

Two scenarios of failure are recognised for the purposes of determining a dam's Consequence Category:

- "Sunny Day" Consequence Category (SDCC)
- "Incremental Flood" Consequence Category (IFCC)

The consultant will need to model both scenarios as part of the Dambreak study.

For the "Sunny Day" dambreak scenario a flood discharge at Full Storage Level (FSL) should be considered.

For the "Incremental Flood" dambreak scenario, the DSC requires that at least two states of flood discharge (the AEP 1 in 100 flood and the PMF) should be considered to assess the highest incremental Population-At-Risk (PAR), and to define the maximum limits for inundation mapping. An assessment will need to be made as to whether the PMF is the flood that is likely to produce the highest incremental PAR.

As part of the modelling an assessment will be required on what downstream tributary flooding should be applied and at what flood stage the dambreak should occur.

As Cataract & Cordeaux Dams flow into the Nepean River the recent dambreak model developed by Department of Commerce for Nepean Dam will be provided to the Consultant. This should significantly assist the consultant in developing the dambreak model as it may only need the addition of a Dambreak structure and possible additional cross-sections upstream to Cataract or Cordeaux Dams.

Inundation Mapping

The IFCC is based upon the "worst case" consequences that result from failure of a dam during a flood. The consequences to be taken into account are similar to those for the

SDCC case but include consideration of the dambreak wave front effect on the areas inundated before failure, as well as the additional areas of inundation after failure.

The consultant is to prepare an inundation map for the SDCC scenario and, to enable the determination of the IFCC is required to prepare inundation maps for:

- a) Flooding with the dam intact for the PMF or other agreed flood;
- b) Flooding after dam failure for the PMF or other agreed flood.

New dambreak inundation mapping is only required if the PMF significantly changes or the nature of the inundation area has changed since the previous mapping was done. The Contractor shall provide an optional fee estimate for new mapping.

Maps are to comply with the requirements of the NSW Dams Safety Committee (DSC) and the NSW State Emergency Service (SES). Maps should be suitable for direct incorporation into the DSEP.

Inundation maps produced should be in GIS Format.

Consequence Category Review

The consequence category of the dam will need to be re-assessed after finalising inundation mapping.

The consultant is required to provide a Consequence Category Assessment Report incorporating the revised outcomes for:

- "Sunny Day" Consequence Category (SDCC)
- "Incremental Flood" Consequence Category (IFCC)

Both total and incremental PAR should be assessed and reported.

E1.4.14 Seismicity Review

A Seismic Hazard Analysis of the dam was undertaken by Seismological Research Centre of Melbourne in September 2003 to define the return period of earthquake events. The seismic assessment report will be made available to the successful Contractor. The Contractor should review the seismicity assessment to define the return period of earthquake events and the loadings that would be applied to the dam for the Operating Basis Earthquake (OBE) and Maximum Design Earthquake (MDE).

E1.4.15 Stability / Structural Adequacy Assessment

The stability and structural adequacy assessment of the dam, spillway weir and spillway training walls shall include, but not be limited to, the following:

- Define the currently accepted criteria for design of the dam. Submit these to SCA for endorsement prior to undertaking stability analyses.
- Structural analyses of the dam including static and earthquake loading. The analyses should include the load cases for Full Supply Level, Probable Maximum Flood, Dam Crest Level (Top of parapet wall), Operating Basis

Earthquake and Maximum Design Earthquake. The dam limiting stability shall also be assessed by withstanding possible highest reservoir level or no greater than top of parapet wall. A stability analysis of the parapet wall shall be included.

- Review appurtenant structures (e.g. spillway, chute structure, retaining walls, outlet works, valve house) based on tasks S-03.2, S-03.3, S-03.4, S-03.7, S-03.8, S-03.10, S-03.11. The review shall include an assessment of any potential issues to jeopardise the security of the dam under flood and seismic loading conditions.
- Assess the need for modifying the existing dam, spillway and appurtenant works as necessary to meet full safety requirements for the dam.

The Contractor shall submit a design criteria report for SCA endorsement prior to undertaking stability analysis.

It is proposed that two-dimensional (2D) modelling of the structural analysis will be undertaken. The effect of the post-tensioned anchors for Cataract Dam shall also be included in the stability analyses. Conclusions and recommendations should be made after the analyses.

All electronic files (input and output) of stability analyses shall be provided to SCA after completing the study.

GENERAL

E1.4.16 Workshops

The Contractor shall prepare for and facilitate workshops to be conducted at a venue provided by the Principal. Three (3) workshops will be required at the following stages respectively:

- Failure Mode Analysis (FMA) Workshop
- Workshop One End of Part One
- Workshop Two End of Part Two

The FMA workshop is to facilitate the discussion and carrying out of the FMA and include the involvement of appropriate technical experts for the various aspects e.g. Risk, concrete dam, geotechnical etc.

Workshop One will discuss the findings and recommendations based on outcomes of Part One of this overall review.

Workshop Two will discuss the findings and recommendations based on outcomes of the further study and overall review from Part Two.

The Contractor shall:

- Present the findings of the safety review
- Discuss issues and concerns of the dams safety
- Facilitate the workshop.
- Finalise draft report incorporating the findings of the workshop

E1.4.17 Report Deliverables

The Contractor shall prepare and submit monthly Progress Reports to the SCA's Project Manager.

The following Table provides a summary of the Report Deliverable required for both Cataract and Cordeaux Dam safety review. Separate reports shall be prepared for the two dams except the work plan which can be a single document.

Report Deliverables

Section No.	Deliverables	No of Reports	Hardcopy	
		Draft	Final	
	Part One			
3.01	Work Plan ⁽¹⁾	1	1	
3.05	Operational Preparedness Test	1	3	
3.11	Failure Mode Analysis Report	1	3	
	Dam Safety Review Report – Interim ⁽²⁾	2	2	
	Part Two			
3.13	Dambreak Study Report (including inundation maps, consequence category assessment report)	2	6	
3.15	Design Criteria Report	1	2	
	Dam Safety Review Report - Final	2	6	

⁽¹⁾ Work Plan is a single document incorporating both dams

⁽²⁾ The Interim Report at end of Part One of the Safety Review is to be submitted and reviewed by SCA prior to decision on whether to proceed with Part Two. However, if Part Two does not proceed this will become the Final Report and six (6) copies are then to be provided.

The failure mode analysis report shall be submitted separately for review prior to finalising the overall safety review.

The Contractor shall also provide SCA with an electronic copy. Electronic copies shall be in MS Word with tables and/or calculation attachments in MS Excel. Any drawings produced shall be compatible with Autocad 2007. All final versions shall also be submitted electronically in PDF files.

E1.4.18 Timetable

The services to be provided under Part One of the contract are to be completed by 30 June 2008. The Contractor shall provide a detailed project schedule in the Schedule for Tender Programme, using the following as a guide to delivery of each item:

Part One

- Project Inception Meeting
- Draft Report
- Interim Final Report

Part Two

- Project Inception Meeting
- Draft Report
- Final Report

End January 2008 End April 2008 End June 2008

End July 2008 End September 2008 End October 2008

E2. OHS & R

E2.1 General Requirements

- (a) The Occupational Health and Safety Act 2000 requires that employers and employees ensure the health, safety and welfare of persons in the workplace. The Service Provider is required to observe all statutory/regulatory safety requirements and to provide for the protection of persons and property as part of the Contract.
- (b) While working on SCA's premises and/or worksites the Service Provider shall also comply with SCA's occupational health, safety & rehabilitation (OHS&R) policies and Corporate Instructions as well as SCA directions.
- (c) The Service Provider shall, at all times, exercise any other necessary and reasonable precautions appropriate to the nature of the Services and the conditions under which the Contract is to be performed for the safety of all persons involved in or affected by that Services.
- (d) The Service Provider shall immediately notify WorkCover and the SCA of any serious accident or dangerous occurrence. The Service Provider shall then formally notify WorkCover in accordance with the *Occupational Health and Safety Regulation 2001*, using the prescribed form, and immediately supply an additional copy to the SCA.

E3. ENVIRONMENTAL REQUIREMENTS

E3.1 Noiseworks Requirements

Equipment supplied and installed may need to provide a quiet working environment for SCA personnel and others such as nearby residents. The Service Provider shall comply with the OH&S Regulation 2001 and WorkCover Code of Practice: Noise Management and Protection of Hearing at Work.

E3.2 Purchasing

The Service Provider shall purchase and use recycled content products where appropriate.

E3.3 Waste Management

- (a) The SCA promotes use of the recycled paper to protect the environment. The Service Provider shall print all documents and reports required by the Authority **on a minimum 50% recycled content paper**.
- (b) Where it is not practical for the Service Provider to use recycled paper for printing of reports and documents, the Service Provider shall obtain written approval from the SCA before printing reports or documents on non-recycled paper.

E3.4 Energy Management

- (a) All equipment used in or supplied in the provision of the Services under this Contract should minimise energy use. Equipment should meet best practice in energy management by being the most efficient of its class, and by using the most appropriate energy source for the application (whether that be electricity, natural gas or LPG, a renewable energy source, or any other fuel). This is to ensure low ongoing costs for the operation of the installation.
- (b) Energy star for office equipment and energy ratings for (usually household) appliances can be used where appropriate.

E4. SPATIAL DATA REQUIREMENTS

- (a) All spatial data will be supplied to the Service Provider in ESRI personal geodatabase format in Geographic Coordinate System (GCS) and Geocentric Datum of Australia 1994 (GDA94).
- (b) All spatial data supplied to the SCA by the Service Provider shall be in Geographic Coordinate System (GCS) and Geocentric Datum of Australia 1994 (GDA94) in ESRI personal geodatabase format.

All geographical information systems or components of spatial tools must conform to the SCA Corporate GIS standards. All software must be coded in ArcObjects and/or be compatible with the latest ESRI ArcGIS products. All spatial software products shall be capable of reading and writing vector and raster data to ESRI ArcSDE in a Microsoft SQLServer environment.

PART F - ATTACHMENTS

F1. ANNEXURE TO PART C

Item

1.	Date for Completion:	Part One: 30 June 2008			
	(clause C1.1(b)(iii))	Part Two: 31 October 2008			
2.	Time by which Service Provider must provide a Services Program:	7 days from the Date of the Letter of Acceptance			

3. Liquidated Damages Not used (clause C6.3)

F2. HAZARD RISK IDENTIFICATION

CLIENT'S HAZARD IDENTIFICATION (PRE-TENDER)

Project/Tender Title: Cataract and Cordeaux Dam Safety Review (T02450520)

Completed by:

Tony Qiu..... (Name)

Date 3/10/2007

Senior Engineer Surveillance.

(Position)

.....

(Signature)

.....

(Signature of Client / Client's Representative)

This document represents the Client's (pre-tender) Hazard Identification on:

Tender No: T T02450520.. Tender Title Cataract and Cordeaux Dam Safety Review

It consists of three parts as follows:

- Part 1: Generic Hazards
- Part 2: Hazards Specific to the Sydney Catchment Authority Operating Environment
- Part 3: Hazard Control Plan

WARNING NOTE TO TENDERERS:

This document is not intended to be a comprehensive or exhaustive hazard survey of the work. The purpose is to highlight actual or potential hazards which:

- may be associated in general with the work which forms the basis of the attached Tender document; and/or
- are specific to the Sydney Catchment Authority operating environment in which the work will be undertaken.

Tenderers should not rely solely on the information contained herein and should undertake independent assessment of the hazards and risks associated with the subject work. Hazards identified in this checklist should be taken into consideration by the Tenderer initially in the development of a Hazard Control Plan and subsequently by the successful Tenderer in the development of a full Project Safety Plan.

CLIENT'S HAZARD IDENTIFICATION (PRE-TENDER) - Continued

PART 1: Generic Hazards Associated With The Work

The purpose of this list is to notify Tenderers of general hazards associated with the work, including the site or sites on which the work is to be carried out.

HAZARD	Y	Ν	See Part 2	HAZARD	Y	Ν	See Part 2
ACCESS & EGRESS	\checkmark			HOT WORK		\checkmark	
ASBESTOS		\checkmark		HYDRAULIC PRESSURE		\checkmark	
BIOLOGICAL		\checkmark		MANUAL HANDLING	\checkmark		\checkmark
CONFINED SPACE			\checkmark	MOVING MACHINERY		\checkmark	
CROSS-BUSINESS INTERFACE	\checkmark			MULTIPLE CONTRACTORS		\checkmark	
DANGEROUS GOODS		\checkmark		NOISE & VIBRATION		\checkmark	
DEMOLITION ACTIVITY		\checkmark		OVERHEAD HAZARDS	\checkmark		
DUST		\checkmark		PORTABLE TOOLS		\checkmark	
ELECTRICITY (INCL STATIC)		\checkmark		RADIATION (INCL SOLAR)		\checkmark	
ENVIRONMENT:				REMOTE LOCATION	\checkmark		
HOT	\checkmark			STEAM		\checkmark	
COLD	\checkmark			TOXIC MATERIALS		\checkmark	
WET	\checkmark			TRAFFIC & VEHICLES		\checkmark	
DARK	\checkmark			TRAPPED HEAT		\checkmark	
NIGHT		\checkmark		UNDERGROUND ACTIVITY	\checkmark		
EXCAVATION		\checkmark		UNDERGROUND SERVICES		\checkmark	
FIRE & EXPLOSION	\checkmark		\checkmark	WASTE DISPOSAL/MGMT		\checkmark	
FLOODING & OVERFLOW		\checkmark	\checkmark	WORKING AT HEIGHT		\checkmark	\checkmark
GAS, FUMES & FOUL AIR		\checkmark	\checkmark	WORKING DOWNSTREAM OF WATER STORAGE	\checkmark		\checkmark
HAZARDOUS EQUIPMENT		\checkmark		WORKING OVER, NEAR, ON, IN OR UNDER WATER	\checkmark		\checkmark
HAZARDOUS SUBSTANCES/ CHEMICALS		✓		OTHER			
HOT METAL		\checkmark		OTHER			
HOT SURFACES		✓		OTHER			

CLIENT'S HAZARD IDENTIFICATION (PRE-TENDER) - Continued

PART 2: Site Specific Hazards in the Sydney Catchment Authority Operating Environment

The purpose of this Schedule is to notify potential tenderers of site-specific 'special' hazards, ie. hazards particular to Sydney Catchment Authority's physical and operating environment which require controls to be put in place.

CATEGORY A: 'Special' hazards which require the contractor to put in place controls, or to check or participate in Sydney Catchment Authority controls, include:

- Working at height
- Confined space
- Fire and explosion risk due to potential for methane gas
- Gas, fumes and foul air
- Interfacing with other Contractors working on site
- Working over, near, on, in or under water
- Working downstream of water with flooding and overflow potential
- Manual handling

<u>CATEGORY B: 'Special' hazards which are fully under Sydney Catchment Authority</u> <u>control, and are notified to potential tenderers for their information, include</u>:

• None

F3. SITE REQUIREMENTS FOR CONTRACTORS

Under the Occupational Health and Safety Act 2000 and the Protection of the Environment and Operations Act 1997, while the Service Provider has primary responsibility for ensuring the health and safety of the Service Provider's employees, SCA may be responsible for the actions of Service Providers performing work on its premises. The Service Provider and any of the Service Provider's employees and sub-contractors are expected to abide by the following minimum requirements:

- (a) The Service Provider must report to the designated SCA supervisor prior to commencement, and on completion, of the Services.
- (b) The Service Provider must give reasonable prior notice to the designated SCA supervisor of who will be on Site, at what times, doing what Services (see specific details below).
- (c) The Service Provider must keep a current daily attendance register of persons working on Site.
- (d) The Service Provider must only carry out work for which it is licensed and must make available competency certificates or relevant licenses for inspection by the designated SCA supervisor on request. The Service Provider must ensure that all personnel engaged by it in connection with the Services are appropriately qualified, licensed, competent and experienced in the provision of the type of Services required by SCA.
- (e) The Service Provider must carry out all work in accordance with the *Occupational Health and Safety Act 2000*, associated Regulations and standards and any other relevant Guidelines or Codes of Practice as amended from time to time.
- (f) The Service Provider must, on request, produce evidence of satisfactory insurance cover for Workers Compensation, Third Party Property Damage, Industrial Special Risks/Services, Comprehensive Motor Vehicle, Motor Vehicle CTP as appropriate.
- (g) The Service Provider must exercise care to ensure that any danger to SCA employees and visitors as a result of the work is minimised through the use of appropriate hazard controls to the satisfaction of the designated SCA supervisor.
- (h) The Service Provider must not, without the prior approval of the designated SCA supervisor, bring onto SCA premises any dangerous goods. (Approval will only be given on the understanding that all dangerous goods will be transported, handled and stored in the accordance with the *Dangerous Goods Act 1975*, the Australian Dangerous Goods Code and any relevant Australian Standards).

- (i) The Service Provider must not without prior approval from the designated SCA supervisor undertake any hot work or work involving noxious fumes, dust, excessive noise or water-borne pollutants.
- (j) The Service Provider must not allow any contaminated water or other trade waste to enter stormwater drains, sewerage lines or watercourses.
- (k) The Service Provider must report immediately to the designated SCA supervisor any accident, hazard, leak, spill or fire.
- (I) The Service Provider must establish and maintain a mechanism for its employees to regularly discuss and resolve OH&S problems and to relay this information to SCA Site management and OH&S representatives.
- (m) The Service Provider will be responsible for the good and proper conduct of its personnel while on SCA premises. The Service Provider must maintain good order and discipline amongst its personnel particularly while on SCA premises and must not employ in connection with the Services anyone not skilled in the task assigned.
- (n) The Service Provider will ensure that no personnel under the influence of alcohol or drugs are permitted on SCA premises. The Service Provider shall ensure that no alcoholic liquor or alcoholic beverage or illegal drugs are brought onto or consumed while on SCA premises by the Service Provider's personnel in the course of performing the Services. Smoking of any substance will not be permitted in SCA's buildings or vehicles. Smoking on SCA's premises will only be permitted in designated smoking areas.
- (o) The Service Provider will ensure that all its personnel while on SCA premises carry and display an identity card provided by the Service Provider. The Service Provider must instruct all its personnel to wear and present their identity cards, upon request, to the SCA personnel at Site.
- (p) Services locations have First Aid kits (and in some cases rooms) stocked and attended as per the Occupational Health and Safety Regulation 2001. By agreement with the designated SCA supervisor small contractors may rely upon these facilities. Larger contractors (especially those undertaking particularly hazardous work) will have to provide their own First Aid facilities in conformance with the provisions of the above and any other relevant Regulations.
- (q) Services locations have specific OHS&R requirements which must be adhered to at all times. In particular the Service Provider should be familiar with the following SCA policies and procedures:
- (r) In addition, the Service Provider must comply with any other OH&S instructions given by the designated SCA supervisor.
- (s) On completion of the Services, the Service Provider must report to the designated SCA supervisor to have the Site inspected to confirm the Service Provider has restored the Site to the satisfaction of SCA.

- (t) Failure to comply with any of the above may result in SCA directing the Service Provider to cease work or remove employees from the Site.
- (u) Whilst working on Site the Service Provider's primary responsibility at all times is the safety of its personnel and SCA staff. All decisions regarding the Services must take into account this primary responsibility.
- (v) The Service Provider shall also take all required precautions so as not to damage any of SCA's property. If any damage is caused to SCA's property such damage shall be reported to the designated SCA supervisor.
- (w) Many SCA sites include fuel storage and vehicle refuelling facilities. The Service Provider will not, unless specifically authorised to do so, carry out any work or enter any area near or adjacent to any fuel storage or refuelling facility.
- (x) The Service Provider must provide a copy of these requirements to all of its personnel prior to commencement of the Services.
- (y) Where the Services are carried out over more than one (1) day, the Service Provider must at the conclusion of work each day secure the Services in a safe manner and such that the Services are protected.