



Chapter 6: The Case Study Method

In the academic and research fraternity case study research remains contentious. Purists in social research are convinced that generalisations can only be made from quantitative data and that single case studies especially are not suitable as a basis for theory building. The validity of this approach has always been questioned by the proponents of qualitative research. Although the debate remains, and will possibly continue into the future, since the 1980s convincing arguments have surfaced that support and recognise case study research as a valid form of scientific research and theory building (Eisenhardt, 1989). Authors, researchers and academics who recognise and support the value and use of case study research include Flyvbjerg (2006), Emory (1985), Mitchell (1983), Bromley (1986) Edwards (1989), Eckstein (1975) and Bryman (1988).

During an in-depth study of the main arguments against case study research, Flyvbjerg (2006) provided strong evidence that case study research can be of great value, especially where quantitative assessments are not possible. Flyvbjerg (2006) addresses what he considers to be the five most common myths regarding case study research. These myths argue that:

- theoretical knowledge is more valuable than practical knowledge;
- one cannot generalise from a single case, therefore the single-case study cannot contribute to scientific development;
- the case study is most useful for generating hypotheses, whereas other methods are more suitable for hypothesis testing and theory building;
- the case study contains a bias towards verification; and
- it is often difficult to summarise specific case studies.

Although it is not the purpose of this chapter to enter the debate as to whether case study research is a valid form of social research or not, the observations made by the 'quantitative' school and the arguments of the 'qualitative' school are duly considered in designing the remainder of this research.



In order to provide a valid argument for using case studies in the remainder of this research, the following paragraphs will provide a short overview of where case study research originated as a research method. The background will be followed by an overview of the different types of case studies, the typical process of designing a case study and finally an explanation regarding its validity and suitability as a research strategy for this dissertation.

6.1 The origin and development of case studies

The use of case study research originated in the early 20th century in the field of medicine (Wikipedia, 2 May 2007). The first attempt to create theory from cases studies was fostered by sociologists Barney Glaser and Anselm Strauss in their Grounded Theory concept in 1967. Since then, case studies have been used more frequently in social research but gained extreme popularity in teaching. The Harvard Business School was one of the first tertiary institutions to realise that information contained in text books might not be sufficient to explain grounded theoretical concepts. The first case studies for teaching were based on interviews with leading business leaders and documented in a structured format. In case study teaching, no solution is given and the different cases are mostly used to stimulate discussions.

6.2 Different types of case studies

According to Yin (2003), the case study is one of several ways of doing social science research. Other research methods include experiments, multiple histories, surveys and analysis of historic or archival information. However, case studies have become popular in research topics that have a strong explanatory nature. When questions such as 'how' and 'why' are posted, some in-depth study and search for meaning is sometimes required.

Even within the collective name of 'case studies', various forms of case study methods exist. The first, and probably most widely acknowledged form of case study research is the *descriptive study*. As explained by Page and Meyer



(2005), the descriptive study “sets out to describe a phenomenon or event as it exists, without manipulation or control of any elements involved in the phenomenon or event under study”. In its simplest and most general form, the descriptive study will conduct an in-depth description of an individual, organisation or group of objects to determine whether each case fits a particular theory better than another or to determine whether something makes the specific case, or group of cases, different to similar types of cases. The descriptive study is founded on the phenomenological approach that considers every situation or phenomenon to be unique and that this very uniqueness contributes most to a better understanding of the whole.

Another prominent case study method is the *exploratory study*. This type of study looks for ideas, patterns or themes that may be evident in single or multiple situations (Page & Meyer, 2005). Exploratory studies are most often undertaken as a first step when much uncertainty exists and before a large-scale investigation is launched. One of the pitfalls of exploratory research is the potential for premature conclusions and over-generalisation from specific events.

A third type of case study is the *critical instance* case study (Wikipedia, 2 May 2007). This type of case study research aims to examine one or more sites for one or two purposes. The technique is popular when a situation of unique interest is investigated that can often not be generalised. A second application is when a generally accepted assertion is evaluated against a single, unique instance that could potentially contradict general belief. As an example: In 1650, with the development of the vacuum pump, it was proven in a single case that a feather and a coin fall at the same speed. This confirmed Galileo’s hypothesis and rejected the general belief as proposed by Aristotle.

Other forms of case studies that are not commonly used include program effect case studies, prospective case studies, cumulative case studies, narrative case studies and embedded case studies (Wikipedia, 2 May 2007). However, the decision regarding the type of case study method to be used depends on the case itself as well as on the case study design.



A case study is research in depth rather than in breadth and can contribute to our understanding of a specific phenomenon or construct. In the scientific enquiry after truth, the research design and tools are dictated by the data available. Once the draft CPGF was developed, the need existed to find empirical support for the model and also to find information from practice that would improve the framework. For purposes of investigating project governance, relevant information is available for specific cases and for this exploratory study an in-depth analysis of a few cases was preferred to a survey that would include a large number of cases but would limit the depth of analysis.

The ideal would have been to investigate governance practices of a few highly successful projects as well as of a number of highly unsuccessful projects, but the realism of unwillingness to participate of project managers and others involved in unsuccessful projects was soon realised.

6.3 Designing a case study

In designing a case study, various items and criteria need to be addressed. The most critical item is probably the unit of analysis. Once the unit of analysis is agreed and confirmed the remainder of the design process can commence, namely: the decision regarding single or multiple case studies, the design of the case study process and protocol, the collection of data and the compilation of the case report. The following paragraphs provide an overview of the key areas to be addressed when designing a case study.

6.3.1 Case study criteria

According to Yin (2003), case studies should contain five components, namely:

- The study's questions
- Its propositions (if any)
- Its unit of analysis



- The logical linking of the data to the propositions, and
- The criteria for interpreting the findings.

Of the five components, the unit of analysis most often determines the success and acceptability of the final postulation. If the unit of analysis is clear, the logical linking of the data to the propositions and the criteria for interpretation become less controversial and questionable.

To address the challenge of establishing proper units of analysis, the four main criteria for validity need to be addressed, namely: construct validity, internal validity, external validity, as well as reliability (Yin, 2003). *Construct* validity seems to be the most problematic area in case study research. The element of subjectivity usually comes into being at this point and, if not addressed properly, it can open the research to serious criticism. The most critical items to be addressed to ensure construct validity are the development of a set of sufficient operational measurements and the use of 'subjective' judgement to collect data. Yin (2003) suggests three tactics to increase construct validity, namely:

- The use of multiple sources of evidence,
- Establishing a chain of evidence that supports the overall reasoning with regard to the conclusions, and
- The draft case study report must be reviewed by key informants.

Obviously it will not always be possible to employ all the tactics for construct validation. However, it is believed that at least one tactic should be employed.

Internal validity is mostly concerned with causal relationships and this might not be valid for descriptive and exploratory case studies. *External* validity addresses the generalisation of the findings. According to Yin (2003), the concept of generalisation can be problematic in the case study arena if it is not understood properly. In quantitative studies, surveys are done across a broader audience from which result a statistical generalisation can be made. For case studies, as with experiments, the generalisations are based on analytical results and not survey results.



To ensure *reliability*, the method of data collection and analysis must be such that, if another researcher conducts the same research, he/ she will achieve the same results. In other words, the emphasis is on doing the same case over again, rather than replicating the results by doing another case study. Case study research attempts to generalize to some theory or proposition rather than to some population of which the case would be representative. These four validity checks are critical for any case study research and will be discussed in the context of this dissertation towards the end of this chapter.

6.3.2 Single or multiple case studies

The decision to conduct single or multiple case studies is discussed and debated in fair detail by numerous authors in the field of case study research (Yin, 2003; Eisenhardt, 1989; and Flyvbjerg, 2006). Listed as the second myth in case study research, Flyvbjerg (2006) argues quite convincingly that single cases can be generalised to confirm and falsify generally accepted facts. He illustrates the validity of using single cases by referring to Galileo's rejection of Aristotle's law of gravity. The eventual rejection was based on theoretical and one practical illustration.

Accepting that single case studies are a valid form of case study research, the focus moves towards the selection criteria that determines whether single or multiple case studies will be done.

Yin (2003) refers to a four-quadrant matrix (see Figure 6.1 below) that illustrates the different types of single and multiple case studies:

- Type 1 case studies refers to single-case holistic designs
- Type 2 to single-case embedded designs
- Type 3 to multi-case holistic designs, and
- Type 4 to multi-case embedded designs.

In order to distinguish between the different designs, and decide which design is most suitable for a specific situation, a short description of each design is given below.

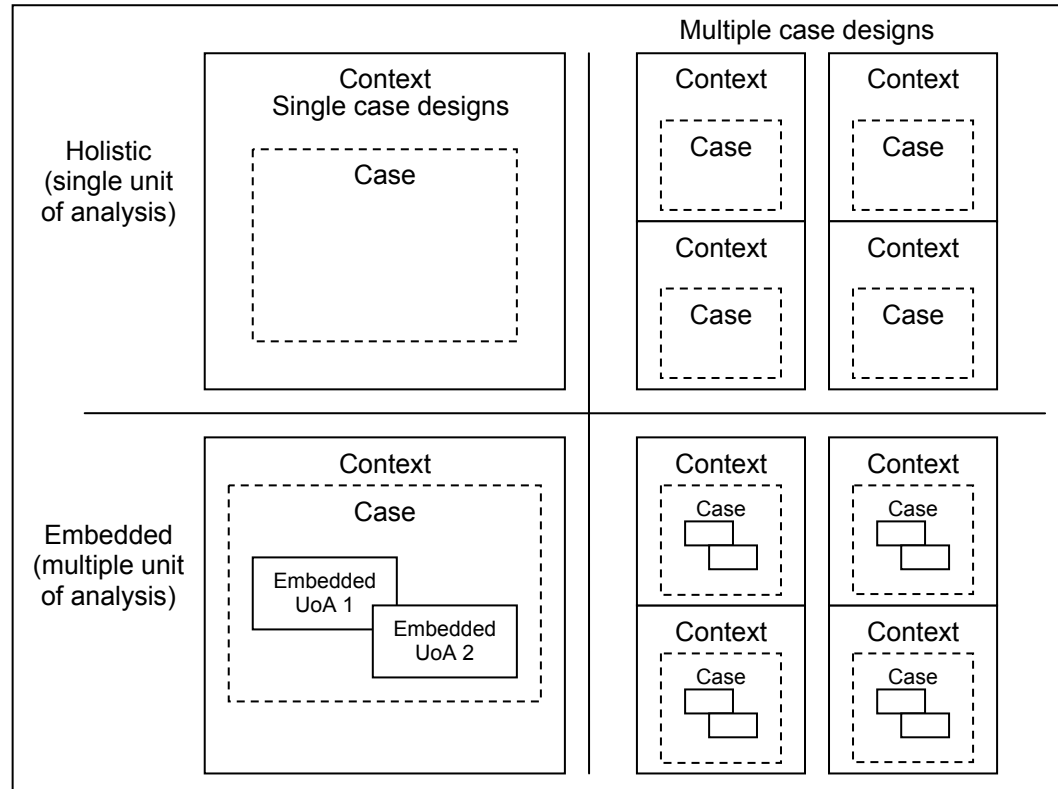


Figure 6.1: Case study design types

Source: COSMOS Corporation, in Yin (2003)

The major decision during case study design is whether to embark on single (Type 1 and 2) or multiple (Type 3 and 4) case design. Yin (2003) provides five conditions for single case study research, i.e.:

- Critical case – used when testing a well-formulated theory,
- Extreme or unique case – especially in clinical psychology where a specific case might be so rare that it warrants specific documenting,
- Representative or typical case – capturing the circumstances and conditions prevalent in everyday life,
- Revelatory case – a situation to be analysed that was previously inaccessible,
- Longitudinal case – studying the same case at different points in time.



In order to differentiate between the holistic and embedded nature of a case study, the units of analysis should be considered. For embedded case studies, the units of analysis might comprise various sub-measurements, whilst for the holistic case study the examination considers only the overall program or organisation.

By implication, multiple case studies involve more than one single case. In general, the evidence of multiple case studies is often more acceptable than single case studies and is regarded as more robust (Herriott & Firestone, 1983). Multiple case studies can be a mammoth task and care should be taken to clearly assess the role of each case study in the overall research objective. According to Yin (2003), in multiple case studies, the focus should be on replication and not sampling logic. With this argument as the point of departure, Yin (2003) provides a strong, and differentiating, argument that sets the context for multiple case study design (and the context for this dissertation's case study component). He argues that an important step in the replication approach is the development of a rich theoretical framework. The framework should clearly state the conditions under which a particular phenomenon can be found. This theoretical framework should become the base or foundation from which generalisations can be made. Furthermore, as with experimental science, if the empirical results do not work as predicted, modifications to the theory must be possible. This bears in mind that theories can be practical and not only academic, something that strengthens the arguments of Flyvbjerg (2006).

6.3.3 Case study process

The process of case study research is described comprehensively by Yin (2003). A simple process, incorporating multiple case studies, outlines the key activities and deliverables in a phased approach. A schematic diagram of the process is given in Figure 6.2.

The process starts with the development of a basic theory or theoretical framework. The next step entails a parallel process during which the research protocol is compiled as well as the appropriate case studies selected. The design and development of the research protocol is a critical component of the case study process and is addressed in more detail in the next paragraph. This is succeeded by the 'prepare, collect and analyse' phase, wherein various cases studies are conducted and the individual reports compiled. Given the results in the reports, cross-case analysis is done to explain why similarities and differences between the various case studies were to be found. The dotted line indicates that there may be situations where certain findings could have an impact on the fundamental theoretical reasoning and potential adjustments need to be incorporated before finalisation. In conclusion, the final theoretical base is established and a final report produced.

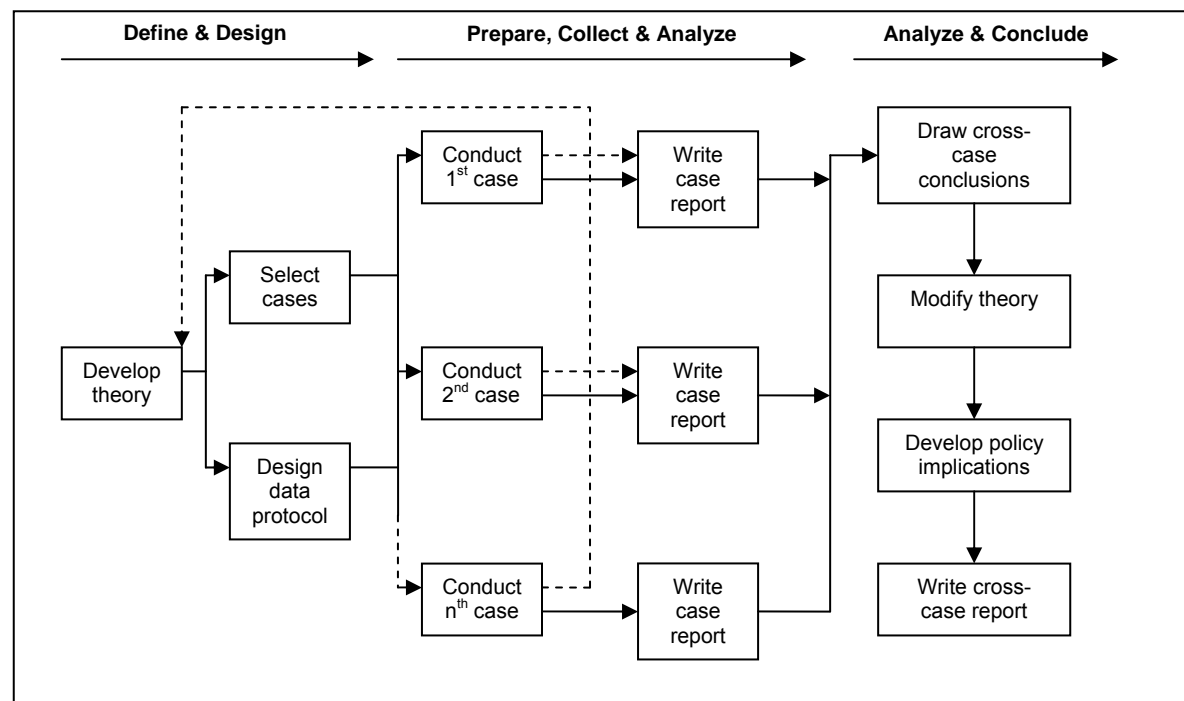


Figure 6.2: Case study process

Source: COSMOS Corporation, in Yin (2003)

6.3.4 Case study protocol

The case study protocol helps to ensure a consistent, coordinated and standardised approach to conducting a case study. A well established case



study is of critical importance, especially in multiple case studies (Yin, 2003). According to Herriott & Firestone (1983), the use of a well defined data collection process (protocol) increases the reliability of case study research, especially for multiple cases.

The protocol recommended by Yin (2003) comprises the following key components:

- A. Introduction to the case study and purpose of the protocol
 - A.1. Case study questions
 - A.2. Theoretical framework
 - A.3. Role of the protocol in guiding the case study
- B. Data collection procedures
 - B.1. Names of sites to be visited and contact people
 - B.2. Data collection plan
 - B.3. Preparation prior to site visit
- C. Outline of case study report
 - C.1. Practice in operation
 - C.2. Innovativeness of the practice
 - C.3. Outcomes of the practice
 - C.4. Any attachments
- D. Case study questions
 - D.1. Aligned with theoretical framework
 - D.2. Evaluation

Although some flexibility is allowed in the case study protocol, the process provides a standardised method that should guide the case study investigation in a more uniform manner.

Finally the unit of analysis were:

- Which of the project governance elements were addressed during the project?
- Were the elements handled formally or informally?
- For those handled informally, would it be advisable to address it formally?



6.3.5 Summary

Even though some criticism towards case study research is still prevalent in the social sciences research fraternity, overall acceptance of case study research as a valid form of research has increased since the 1980s. The increase in acceptance can be attributed to various individuals and proponents of the case study as a research method. Through their efforts and experience, researchers established practical methods, processes and protocols to follow that increase the reliability and rigor of case research.

The validity of case study research begins with a proper definition of the unit of analysis, followed by the decision to embark on either a single or multiple case study approach. A properly structured process is recommended, starting with the development of a theoretical framework, the selection of cases and the drafting of the research protocol. The actual cases are then studied and the results compiled into an individual case study report. The various case results are then cross referenced, analysed and the final report submitted. During the process, opportunities exist to re-evaluate the theoretical framework.

For the research protocol, Yin (2003) provides a structured format of how to establish a standardised case research protocol. The protocol aims to increase the reliability, rigor and common approach toward case study research, especially when performing multiple case studies.

The practical guidelines obtained during the literature review of case studies as research method are used in this chapter to design the research process for this dissertation. In the following paragraphs, the approach taken to conduct the case studies for this dissertation is discussed.



6.4 Designing a case study process for this dissertation

As learned from literature, a properly defined research process and protocol enhances the reliability and rigor of case study research significantly. The following paragraphs address the most important parameters for case study design, as explained in the previous paragraphs, in the context of this dissertation. The parameters include: theoretical framework, unit of analysis, decision regarding single or multiple cases, protocol design, and the research process.

6.4.1 Theoretical framework

The theoretical framework forms the anchor and key point of reference for this research. The initial CPGF was developed from an extensive literature review of LCP performances and characteristics as well as the evolution of corporate governance. Further input for the CPGF was obtained from an extensive Delphi study, which provided information from experienced and knowledgeable project practitioners and academics. Eventually four main areas of assessment were established, namely: (A) Project Steering Committee, (B) Cost and Benefit Management, (C) Project Reviews, and (D) Ethical, Responsible Conduct and Conflict of Interest. In completion of this dissertation, the theoretical framework was updated and finalised in the final version of the CPGF.

Each area of assessment contains several sub-areas against which measurements of compliance can be assessed.

6.4.2 Units of analysis

The primary objective of the case studies was to:

Determine the validity of the initial CPGF and identify areas for improvement.



The results were to provide a clear indication in terms of an answer to the initial research questions, namely:

What should a project governance framework for Large Capital Projects (LCPs) comprise of?

and

To what extent have project governance principles been applied on LCPs, formally or informally in LCP cases, and to what extent can the outcomes be attributed to the presence or absence of governance principles?

The first question was dealt with, to a large extent, during the Delphi study, while the case studies would provide further inputs to, not only the contents, but also to the actual extent of application, as intended in the second research question.

Thus, for the case studies, the units of analysis are:

- To what extent have the assessment areas, as defined in the CPGF, been addressed in each case study?
- Were the assessment areas addressed formally or informally?
- How important are the assessment areas relative to each other?
- What should be included in the assessment areas to make the CPGF content more complete (i.e. what is currently missing)?

The same units of analysis were applied to all the case studies and noted in each case report.

6.4.3 Single or multiple case studies

Due to the exploratory nature of this dissertation, a multiple / embedded case study approach was taken. The objective of this dissertation is to establish something that does not yet exist in its final form (the CPGF), rather than proving a theory right or wrong. The measurements were taken against the

level of project success or failure and then at a lower level where the performance against specific CPGF categories were measured.

Due to the sensitive nature of in-depth case study research, some resistance was to be expected from participants who were involved in cases that were not that successful. To counter this constraint, a secondary case study process was launched that studied cases documented in the literature. This secondary case research attempted to find the root cause of failure or success and tried to map the likely cause against a specific CPGF assessment area.

Table 6.1: Case study protocol

	Protocol guideline (Yin, 2003)	Application to this study
A	Introduction to the case study and purpose of the protocol	
A.1	Case study questions	Case study questions aligned with initial research problem statement, research questions and objective, as explained in Chapter 1.
A.2	Theoretical framework	Rigorous theoretical base portrayed in the CPGF.
A.3	Role of the protocol in guiding the case study	A standard approach was established to ensure reliability and repeatability.
B	Data collection procedures	
B.1	Names of sites to be visited and contact people	List of most senior people on the project (typically project steering committee members) and the responsible project manager. Contact information included mobile phone number and e-mail address.
B.2	Data collection plan	Comprises of literature search on each case study, personal interviews and opportunity for response by participants after interviews.
B.3	Preparation prior to site visit	Formal arrangement for meetings and logistics. Issued formal letters of invitation (see example in Appendix D). Group sessions in the form of the NGT with necessary information forwarded to each participant at least a week before the session.
C	Outline of case study report	

C.1	Practice in operation	Follow CPGF outline to facilitate discussion and structure of final report.
C.2	Innovativeness of the practice	Used formal NGT method. Where allowed, discussions were recorded digitally.
C.3	Outcomes of the practice	Updated CPGF per assessment area.
C.4	Any attachments	Any additional, complimentary information.
D	Case study questions	
D.1	Aligned with theoretical framework	As per CPGF.
D.2	Evaluation	Against CPGF assessment areas. Formal feedback to participants.

6.4.4 Case study protocol

The importance of a case study protocol cannot be over emphasised. Table 6.1 above provides detail of how each component of a typical protocol, as proposed by Yin (2003), is addressed for the case study exercise in this dissertation. The protocol was established for the primary case study research, while the secondary case study research only followed the CPGF assessment criteria.

This tabulated protocol formed the structure of the primary case studies conducted in this dissertation.

For the primary case studies, two projects were selected. The first project comprised an aluminium smelter, namely the Mozal I project in Mozambique. The project was selected due to its multi-component and cross-border component (South Africa and Mozambique), as well as because of the participation by multiple companies from various countries (Japan, Canada, etc.). The project was acknowledged by the Project Management Institute (USA) as “Project of the Year, 2001”.



The second primary project was the Lesotho Highland Water Project, which included multiple dams and water distribution systems. The project was selected due to the complicated political conditions under which it was implemented as well as for its multi-country participation. The project was also easily accessible for the researcher from a logistical point of view.

Apart from the in-depth study into the two primary case studies, a total of 15 secondary cases studies from literature were completed. The purpose of the secondary case studies was to verify and further validate the contents of the CPGF.

The primary case studies are discussed in Chapter 7, while Chapter 8 provides a review of the secondary case studies.



Chapter 7: Case Studies – Nominal Group Technique and Structured Interviews

This section of the research, namely case studies, comprises two main parts. The first part contains detailed case study reviews through structured interviews, utilising the Nominal Group Technique (NGT) to arrive at inputs and adjustments to improve the CPGF content and practical application. The aim of the first part is thus to further develop the CPGF towards a final framework for practical application.

The second part, discussed in the next chapter, reviews case studies available in literature against the CPGF. The aim of this secondary case study review is to assess whether the case projects applied the concepts of the CPGF and what the end result was for each case study.

7.1 Case studies utilising NGT

For this part, two case studies were selected. An attempt was made to select a larger sample with a mix of successful and unsuccessful projects. However, due to the sensitivities in gaining access to troubled projects and their information, as well as people being unwilling to discuss poor performance against a structure CPGF, were problematic. Eventually two large successful projects were selected, namely the Mozal 1 Project and the Lesotho Highlands Water Project (LHWP). For the less successful projects, a literature search was conducted and mini case studies were obtained to test the CPGF (second part of the case study research).

Each project, with the respective results and input to the CPGF, is analysed in the following paragraphs. Each starts with a short background, the NGT group profile and the comments to the CPGF per listed item. For each case study the overall objectives were to:



- Assess to what extent the concepts contained in the CPGF were applied formally and / or informally to each specific case and what the impact thereof was,
- Assess what changes and / or refinements are required to the CPGF to make it more complete, and
- Rank the components in the CPGF from most important to least important.

The results of each case study were reviewed and, where necessary, adjustments and updates were made to the CPGF. The changes proposed from each case study are given in a separate column in the CPGF.

7.2 Case 1 - Mozal 1

The Mozal 1 project is considered to be a very successful project. Multiple countries and companies participated in a region unknown for industrial activity and on its completion the project was presented with the PMI 2001 International Project of the Year award [Mozal Aluminium Smelter, 2001].

The following paragraphs provide a short overview of the project, the NGT panel with their respective roles in terms of the project and the results applied to the study.

7.2.1 Project overview

It would be difficult to overstate the importance of the Mozal project's accomplishments in Mozambique - a country still recovering from two decades of civil war. Not only is it the largest industrial project ever undertaken in this southern African country, it was completed six months ahead of schedule and approximately US\$ 150 million under the originally approved budget of US\$ 1 billion. And this after having to cope with delays caused by lack of public infrastructure, poor geotechnical conditions and a bout of torrential flooding in February of 2000.

The smelter is built about 17 kilometres outside the capital city, Maputo, on a site measuring 1.3 million square metres – equivalent to 340 football fields (Figure 7.1). Its initial production capacity was 245,000 tonnes of aluminium per year, and the first aluminium was produced in June 2000, a mere 25 months after the project had begun. This is thought to be a world record for a smelter of this size [Mozal, 2005].

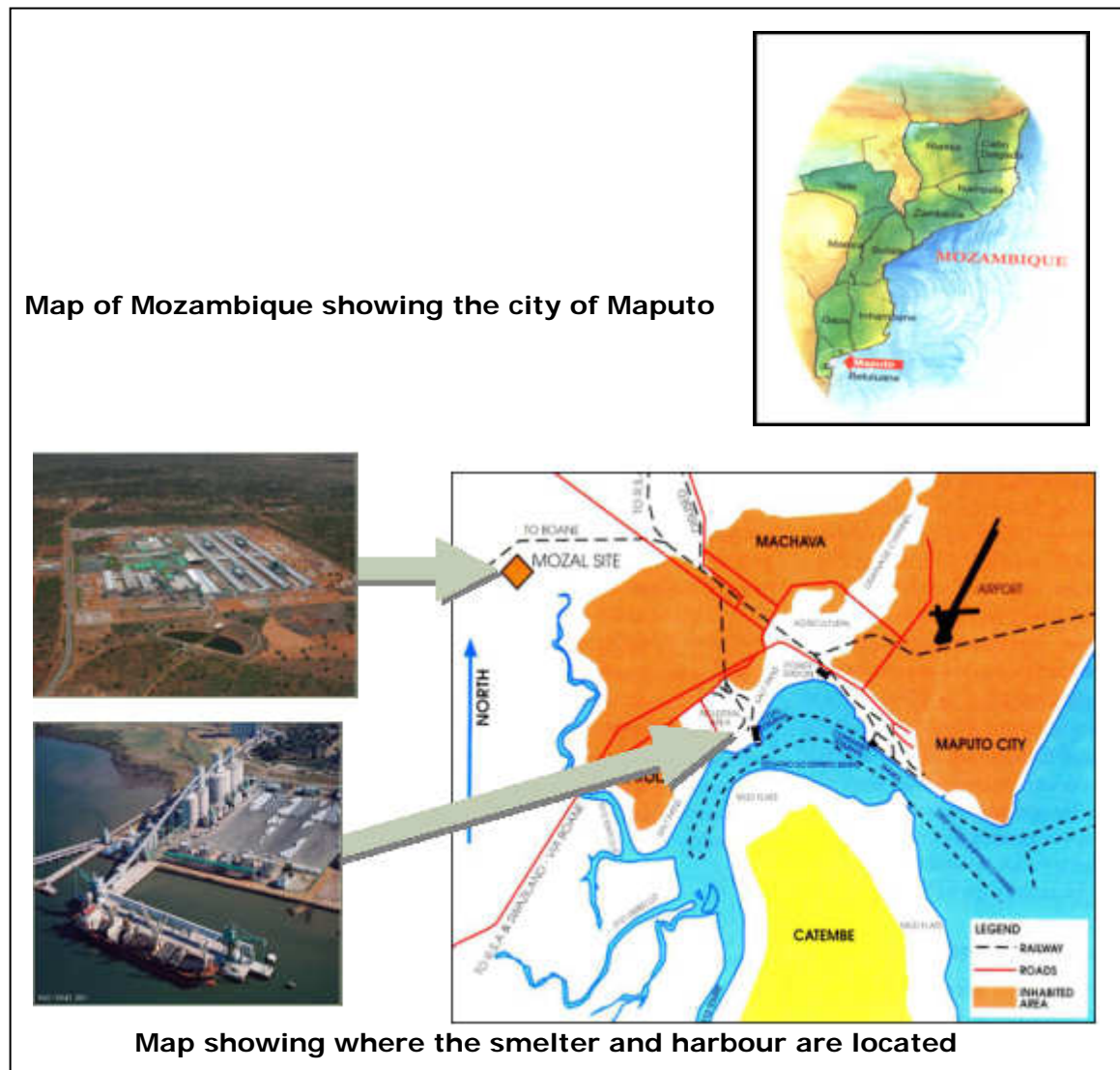


Figure 7.1: Project location

The project was managed by an SNC Lavalin / Murray & Roberts consortium for the shareholders, comprising BHP Billiton (47%), Mitsubishi (25%), IDC (24%) and the Government of Mozambique (4%).



i) Construction

From mid-1998, virgin bush started to make way for massive earthwork and piling machinery and clearing the land for the foundations of Mozal began. A total 25 thousand tons of structural steel formed a skeleton that would be covered by 208 thousand square metres of aluminium cladding. Thereafter the installation of mechanical, electrical and instrumentation equipment followed.

During the course of 1999, a total of 235 thousand cubic metres of concrete were poured and 25 kilometres of roads were laid.

At the same time, construction of the new berth at the port of Matola was taking place, including a new access road and bridge that now connects to the Maputo corridor.

ii) Creating Jobs

Manpower levels on site for both phases of the project, including contractors and management staff, reached a total of 15,000 people, 65% of whom were Mozambicans - confirming that Mozambique was ready to compete at international level. Over 10,000 people were trained during construction at a cost of over 8 million US dollars.

iii) Partnerships

For a large capital project like Mozal, the collaboration and partnering with utility suppliers is critical. Due to its geographical location, Mozal had to establish formal partnerships across country borders. This was done by forming a separate entity in the form of MOTRACO - a publicly owned electricity company comprising Mozambique (EDM), South Africa (Eskom) and Swaziland (SEB) - to deliver Mozal's power requirements.



iv) *Economic Impact*

Rising from many years of civil war, Mozambique was in dire need of progressive economic activity. With a crippled economy, Mozal provided a major injection to country's economy.

Within the country, Mozal's share of contribution to GDP was calculated at 3.2% in 2003, whilst overall contribution to the country's economic growth (of 15%) was 5%. With Mozal, Mozambique export earnings increased from US\$ 220m to around US\$ 1 billion, with exports rising in excess of US\$ 811 million in foreign exchange earnings. The net positive impact on external trade reached a steady state of US\$ 400 million. Other significant economic impacts were:

- Direct impact of 49% on manufacturing industry gross output
- Net positive impact on balance of payments of around \$100 million at steady state
- Direct employment of 1150 people, 1600 contractors and indirect job creation estimated at 10,000 jobs.

Due to its magnitude and its being 'first-of a kind' in Mozambique, the impact of the project should be viewed in a broader context.

v) *Quality of Life*

It is commonly believed that the impact the project has had on the region is remarkable. The quality of life has been improved on virtually every level and in such a way that the advantages will continue to be felt long after the project's completion. Over 5,500 Mozambicans were trained in construction skills and all were issued certificates to help them obtain construction work on future projects. To meet the project's supply needs, transport infrastructure in the area had to be improved and increased. A new three-km access road and a bridge over the Matola River were built and inaugurated in January 2000. In addition, a new aluminium quay, a raw material handling and storage facility,



and a finished-product export yard were opened at the Matola port in March that same year.

vi) *Health and Safety*

The project team also distinguished itself with an excellent occupational health and safety record. The overall 'lost time through injury' rate was only 1.75 – a world-class achievement and one made even more remarkable when contrasted with the South African national average of 10.0. The Mozal Environmental Management plan, which was developed to World Bank standards, implemented numerous programs to preserve and protect the environment. All environmental studies and findings were made fully public and public feedback meetings on environmental performance at the site were held every six months.

One of the main criticisms of the project was the handling of HIV and Aids issues. Initially the impact of HIV and Aids was under estimated – when added to the (extremely high) occurrence of malaria, the effects were mostly fatal. Eventually a special malaria unit was opened, which has diagnosed and treated over 6,600 cases.

Not surprisingly, Mozal has become a showpiece for investment possibilities in Mozambique and the major focus of attention for neighbouring countries and visiting dignitaries. Many foreign guests have toured the site, including 14 heads of the Southern African Development Community (SADC) states, Nelson Mandela, Queen Elizabeth II and several business leaders from around the world.

7.2.2 Project governance

Given the success and high profile enjoyed by the Mozal 1 project, it was selected for review and testing of the contents and validity of the CPGF. The following paragraphs list the NGT participants and their roles on the project, the review and assessment of the project governance against CPGF and a

few general comments and observations made during the NGT session by the various participants.

i) NGT profile for Mozal 1 case study

According to Yin (2003) the validity of a case study is very much dependent on the quality and multiplicity of case information sources. For Mozal 1, the key participants for the investor, contractors and government were involved. Back-up information as well as proof of documentation and claims are available through the BHP Billiton Documentation Centre and can be accessed upon motivation by the author. Further validation was done through a search on the Probe International website (www.probeinternational.com) to determine whether there were any investigations or legal actions on the project. Nothing was found. The structure of information is illustrated below in Figure 7.2.

The participants on the NGT session for the Mozal 1 case study were senior members of the project sponsor and contracting parties. In addition to the researcher, who acted as facilitator, the team included the following people (listed with the positions they held during the project):

- Mr Rob Barbour – Project Director and chairman of the steering committee (BHP Billiton)
- Mr Peter Cowie – In-country Manager responsible for government / community liaison (BHP Billiton)
- Mr Brett Hegger - Project Manager for SNC Lavalin / Murray and Roberts Joint Venture
- Mr Terrence McGowan – Senior Project Consultant to large capital projects (Independent)
- Mr H.E. Dombo – Head of Industrial Free Zones & Special Projects Division, Investment Promotion Centre of Mozambique
- Dr Domingo Chiconela – Quality and Environmental Control for Mozambique Government

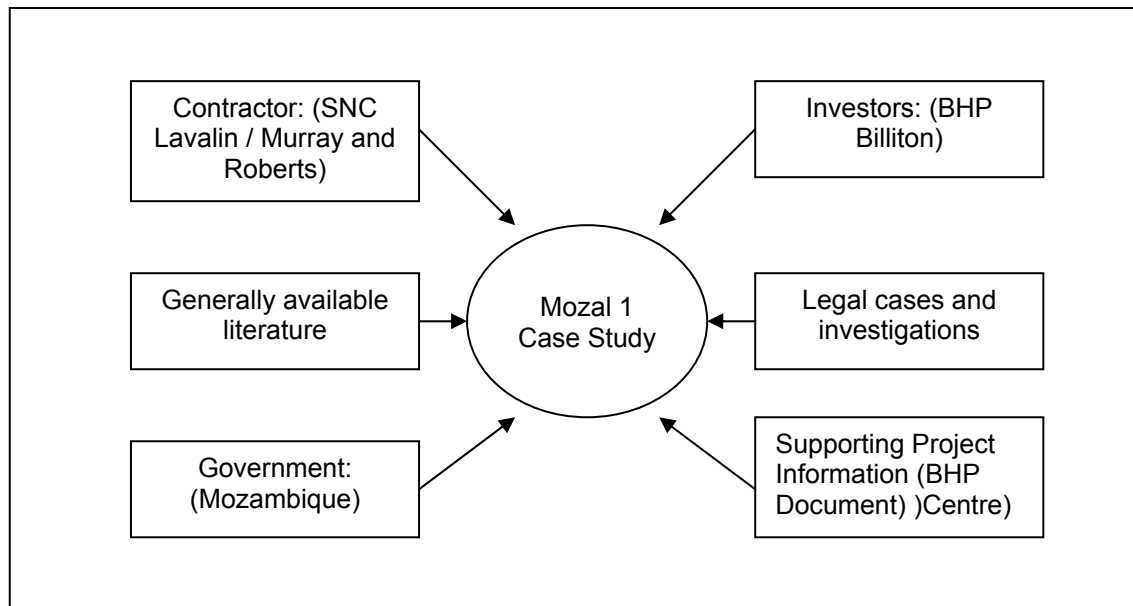


Figure 7.2: Case study sources of information

The purpose and contents of the NGT session were emailed to each participant one week before the session to allow for preparation.

Not all parties were able to attend the session and it was decided to proceed on the scheduled NGT date and follow-up with structured interviews with those that could not attend.

The NGT session commenced at 14h00 and closed at 18h00 on 20 March 2007. The session was attended by all parties except the Mozambican delegation of Mr Dombo and Dr Chiconela. The venue was the conference room at the Graduate School of Technology Management, University of Pretoria. The proceedings were recorded digitally.

The outcome of the NGT session was used to facilitate structured interviews with the two government delegates. The structured interviews with Mr Dombo and Dr Chiconela were conducted at the Polana Hotel, Maputo on 1 and 2 November 2007, respectively.



ii) *Project Governance at Mozal 1 against the CPGF*

After discussing the background of the Mozal project and again emphasising the objectives of the NGT process, the CPGF was projected against an overhead screen and an additional column inserted to indicate the comments and results of the discussions. By viewing the insertions and changes, the NGT participants could immediately indicate their approval of the changes. All changes and additions are indicated in ***italic bold***. Where no comments are given and the phrases are merely copied in *italic*, the NGT panel agreed with the phrases as documented.

The result of the session is provided in Table 7.1 below, with special attention drawn to the last column.

Table 7.1: Concept project governance framework

	P. Project Governance	
	A. Project Steering Committee	A. Project Steering Committee Mozal 1
1. Composition	<p>1. Core Competencies</p> <ul style="list-style-type: none"> • Project finance and cost management • Business / project alignment • Front-end-Loading management • Crises response • Industry knowledge • International experience • Leadership • Strategic alignment capability • Contract management capabilities <p>2. Steering Committee Size Determined by project type, complexity and magnitude</p> <p>3. Member Mix Comprise members with a direct interest as well indirect stakeholder representatives i.e. socio-economic and environmental</p> <p>4. Chairperson Independent The chairperson should be independent from any project stakeholders</p>	<p>1. Core Competencies</p> <ul style="list-style-type: none"> • Project finance • Project control management (Cost / Time) • Risk assessment and contingency management • Business / project alignment • Upfront management of the project and scope robustness • Crises response, including conflict management • Industry knowledge • International experience • Leadership • Strategic alignment capability • Contract management capabilities • Stakeholder management • Political influence • Country and local knowledge • 'Project Champion' • Local legal requirements <p>2. Steering Committee Size Determined by project type, complexity and magnitude Sub-committees - purchasing, finance, audit, social, etc., reporting to Steering Committee</p> <p>3. Member Mix Comprise members with a direct interest as well as indirect stakeholder representatives i.e. socio-economic and environmental (establish appropriate forums to deal with 'other' stakeholders)</p> <p>4. Chairperson Independent The Chairperson should be independent from any project stakeholders (for public projects not private projects - see note 1)</p>
2. Responsibility	<p>1. Committee Accountability</p> <ul style="list-style-type: none"> • Overall accountability • Bridging the gap between project and 	<p>1. Committee Accountability</p> <ul style="list-style-type: none"> • Project promotion and stakeholder enablement • Obtaining finance

	<p>immediate external and statutory environment</p> <p>2. Charter Development and adherence to the project charter</p>	<ul style="list-style-type: none"> • Establish levels of authority • Overall accountability • Bridging gap between project and immediate external and statutory environment. <p>Team development</p> <p>2. Charter Development and adherence to project charter, including project policies</p>
<p>3. Audit Committee to Board of Directors (replace Board of Directors with Sponsor Boards)</p>	<p>1. Levels of Independence The project audit committee should be independent, with the steering committee excluded from the audit committee</p> <p>2. Project Literacy The Audit Committee should have extensive project experience on all aspect of large capital projects</p>	<p>1. Levels of Independence The project audit committee should be independent, with the steering committee excluded from the audit committee</p> <p>2. Project Literacy The auditors should have extensive project experience on all aspects of large capital projects</p> <p>3. Scope of the auditors to be vetted by the steering committee</p>
	<p>B. Cost and Benefit Management</p>	<p>B. Project Finance and Controls</p>
<p>1. Financial Reporting Responsibility</p>	<p>1. Steering Committee Report against approved budget</p> <p>2. Project Governance Charter Report on adherence to the charter</p>	<p>1. Project Governance Charter Report on adherence to the charter and key performance indicators</p> <p>2. Steering Committee Establish reporting structure, priorities and format</p> <p>3. Report against approved budget</p>
<p>2. Financial Disclosures</p>	<p>1. Project Finance For any financial activities outside the GAAP requirements, full disclosure will be required</p> <p>2. Reports Project financial status to be reported on a quarterly basis</p> <p>3. Corrections and Adjustments</p>	<p>1. Project Finance For any financial activities outside the GAAP requirements, full disclosure will be required</p> <p>2. Reports Project financial status to be reported on a quarterly basis</p> <p>3. Corrections and Adjustments To be reported quarterly</p>

	To be reported quarterly	
3. Internal Controls	<p>1. Risk Management Process Formal risk management process should be in place</p> <p>2. Risk Management The steering committee must actively ensure that proper risk identification, quantification and mitigation planning is done on the project, but covering all aspects of the project, not only financial.</p> <p>3. Risk Disclosure Disclosures must be made about all the risks on the project during the total project life-cycle.</p> <p>4. Risk Certification Requirement for monthly certification of disclosure controls and procedures by the chairperson of the steering committee.</p>	<p>1. <i>Risk Management Process</i> <i>Formal risk management process should be in place</i></p> <p>2. <i>Risk Management</i> <i>The steering committee must actively ensure that that proper risk identification, quantification and mitigation planning is done on the project, but covering all aspects of the project, not only financial and cost.</i> <i>Impose risk management to be done by all stakeholders.</i></p> <p>3. <i>Risk Disclosure</i> <i>Disclosures must be made and prioritised about all the risks on the project during the total project life-cycle.</i></p> <p>4. <i>Risk Certification</i> <i>Requirement for monthly certification of disclosure controls and procedures by the Chairperson of the steering committee.</i></p>
	C. Project Reviews and Audits	C. Project Reviews and External Audits
1. Independence	<p>1. Objectivity Independence and objectivity of the project auditors and reviewers must be ensured.</p> <p>2. Scope Project reviews and audits should not be confined to adherence to in-house methodologies and practices, but should include items that the review / audit deems necessary to protect stakeholder interests.</p> <p>3. Rotation Auditors should have no direct or indirect interest in the project or in the</p>	<p>1. <i>Objectivity</i> <i>Independence and objectivity of the project auditors and reviewers must be ensured.</i></p> <p>2. <i>Scope</i> <i>Project reviews and audits should not be confined to adherence to in-house methodologies and practices, but should include items that the review / audit deems necessary to protect stakeholder interests.</i></p> <p>3. <i>Rotation</i> <i>Auditors should have no direct or indirect interest in the project or in the contractors / suppliers involved</i></p>



	contractors / suppliers involved with the project.	<i>with the project.</i>
2. Interaction with Companies	<p>1. Internal Charter The internal charter should include the approach towards the auditing of project management, the adherence to project methodologies, processes and agreed practices and the project team's functioning.</p> <p>2. Communication As with corporate governance, it requires mandatory communication between the external auditor and the audit committee.</p>	<p>1. <i>Internal Charter</i> <i>The internal charter should include the approach towards the auditing of project management, the adherence to project methodologies, processes and agreed practices and the project team's functioning.</i></p> <p>2. <i>Communication</i> <i>As with corporate governance, it requires mandatory communication between the external auditor and the audit committee.</i></p>
3. New Attestation Report	<p>1. Report External auditor must issue an attestation report on the project's internal control report.</p>	<p>1. <i>Report</i> <i>External auditor must issue an attestation report on the project's internal control report.</i></p>
4. Disclosure	<p>1. Non-audit services As with corporate governance, it is required that separate disclosures of the amounts paid to the external auditor for non-audit services is provided, together with a detailed description of the nature of services. ?</p> <p>2. Fees Requires disclosure of fees paid to a company's principal external auditor since project commencement.</p>	<p>1. <i>Non-audit services</i> <i>As with corporate governance, it is required that separate disclosures of the amounts paid to the external auditor for non-audit services is provided, together with a detailed description of the nature of services.</i> ?</p> <p>2. <i>Fees</i> <i>Requires disclosure of fees paid to a company's principal external auditor since project commencement.</i></p>
	D. Ethical, responsible conduct and conflict of interest	D. Ethical, responsible conduct and conflict of interest
1. Code	<p>1. Standards A code of ethics should be established and signed by each member of the steering committee. The</p>	<p>1. <i>Standards</i> <i>A code of ethics should be established and signed by each member of the steering committee. The code should include (as a</i></p>

	<p>code should include (as a minimum):</p> <ul style="list-style-type: none"> • Environment • Social aspects • Socio-economic aspects • Conflict of interest guidelines <p>2. Adherence Adherence to the code of ethics should be disclosed and reported on a monthly basis.</p> <p>3. Disclosure Code should be made publicly available and any changes to the code or waivers from the code must be disclosed.</p>	<p><i>minimum):</i></p> <ul style="list-style-type: none"> • <i>Environment</i> • <i>Social aspects</i> • <i>Socio-economic aspects</i> • <i>Conflict of interest guidelines</i> <p><i>2. Adherence</i> <i>Adherence to the code of ethics should be disclosed - and reported on a monthly basis.</i></p> <p><i>3. Disclosure</i> <i>Code should be made publicly available and any changes to the code or waivers from the code must be disclosed.</i></p>
2. Compensation	<p>1. Performance Performance-related elements of compensation should represent a substantial portion of the total compensation package.</p>	<p><i>1. Performance</i> <i>Performance-related elements of compensation should represent a substantial portion of the total compensation package. (See Note 2).</i></p>
3. SHE	<p>1. Adherence SHE requirements should be to international standard as a minimum and supplemented by host country requirements.</p>	<p><i>1. Adherence</i> <i>SHE requirements must be set and formalised, taking into consideration world best practices and host country conditions and legislation. (See Note 3).</i></p>
4. Social	<p>1. Adherence Social and socio-economic considerations should be to international standard as a minimum and supplemented by host country requirements.</p>	<p><i>1. Adherence</i> <i>Social and socio-economic considerations must be set and formalised, taking into consideration world best practices and host country conditions and legislation.</i></p>

Notes to input:

Note 1 - For privately funded projects, the chairperson will almost always be from the main sponsoring entity. Independence of the chairperson to the steering committee will not be likely in privately funded projects.



Note 2 - It was strongly believed by all participants that a significant portion of remuneration should be performance based.

Note 3 - One of the shortcomings of the Mozal 1 project was the initial lack of planning for HIV / Aids education and treatment. It was strongly advised that these issues be formally addressed, in accordance with international and local best practices.

With respect to the formal and / or informal application of project governance on the Mozal 1 project, nearly all aspects were addressed, but mostly done informally. The only items addressed formally were:

- Auditing procedures and functioning of the audit committee
- All aspects related to projects control.

All other governance items were attended to, but were not formalised during the project initiation stages.

On the question of which items in the CPGF are the most important and how the items should be ranked, the unanimous response was that this is impossible to say and that prioritisation will differ depending on the type and location of the project.

Apart from addressing the specific NGT protocol questions, some significant comments about project governance in general were made. These items are discussed in the next paragraph.

iii) General observations from NGT participants

The NGT session on the Mozal project took longer than expected and triggered some important observations from the participants. The most important observations that could have an impact on formalising a final PGF are listed below:

- The NGT panel agreed that a governance environment for the project manager to function within is usually lacking on LCPs. Thus, the necessity for a formal approach towards project governance cannot be



- disputed and current theories and practices do not cater for these practices.
- Although the Mozal 1 project was a success, project governance was not applied formally in the format proposed in the CPGF. However, most of the items were addressed because of the high level of experience and skill of the senior managers on the project. It was unanimously agreed that a formal project governance framework and guideline would have helped and would have shortened the time spent in addressing the most important items.
 - An item that was discussed at length was the core competency of ‘scope definition’. It was stated that the proper and accurate definition of scope, especially technical scope, should not be hastened. In the case of Mozal 1, the smelter technology was proven and defined in detail, which was a major attribute in successful execution.
 - The most important factor on any project is the quality and capability of the people working on the project. The success of the Mozal 1 project can be attributed to the people who lived the informal ethical and responsible conduct of the project. With the correct mindset and attitude many of the formalities will not be necessary, but unfortunately the luxury of employing the A-team does not always prevail, and for this reason a formal project governance framework is required.

iv) *General comments from structured interviews*

The structured interviews with the two Mozambican delegates followed the same protocol as the NGT session with the only provision being that the outcome of the NGT session was used to facilitate the interviews. The following comments were provided by the interviewees:

- The Mozal 1 management structure and steering committee are considered to be the “model” against which Mozambique measures itself when pursuing future projects. From a government perspective proper representation should be evident from all the relevant departments, especially Labour, Environment, Trade and Industry, Finance, Health



and Foreign Affairs. Day-to-day matters should be handled in work groups with only selective report back to the steering committee.

- Project Charter - important, although common understanding prevailed at Mozal 1.
- Project Reviews and Audits – more of a concern to the investor.
- The Mozambican government holds less than 5% share in the venture and major tax incentives that were granted. The Mozambican government was desperate to attract the investment and, with hindsight, ‘gave too much away’. A recommendation was that a PGF should consider a stipulation of a minimum 10% shareholding for the host country where projects involve the developed world investing in developing countries.
- A major concern was raised regarding sustainable development. Due to contractual supply agreements Mozal cannot supply product to local downstream companies resulting in their having to import steel at high prices. This caused a dampening effect on the sustainable development of new downstream companies in Mozambique. A PGF should include specific provisions for sustainable development.

In summary, the NGT panel and interviewees on the Mozal 1 project unanimously agreed that a formal framework for project governance would greatly assist the senior management and project steering committee on large capital projects to create an environment for effective project management.

Information received during the interviews confirmed two important aspects of the research:

- The structure and content of the proposed CPGF are, to a large extent, sufficient for application to large capital projects. Adjustments were made to some wording and the different needs between private and public investments with respect to board representation, but in general there where overwhelming support from all participants for the current CPGF outline.
- From the response and feedback received is became clear that a formal PGF could greatly assist is formalising project governance and that such



a formal framework is missing in project literature, theory and even legislation.

Clearing the comments received during the Mozal I case study preparations were made for the second primary case study, namely the Lesotho Highlands Water Project.

7.3 Lesotho Highlands Water Project (LHWP)

The LHWP is a good example of a cross-border LCP. The project was initiated in 1986 under difficult and hostile conditions between the RSA and Lesotho. During this time, SA was still under Apartheid Rule, with strong international sanctions imposed on the country, while Lesotho found itself under military rule. While both countries were subjected to the wrath of the international community, the governments of SA and Lesotho were also at political loggerhead.

Despite these conditions, the project was initiated and governed by a Treaty (Treaty, 1986) compiled by the two governments.

The following paragraphs provide an overview of the project history, the life-cycle and specifically the application of project governance principles, as well as the impact of the Treaty on promoting project governance.

7.3.1 Project history and life-cycle

i) Project overview

The Orange (Sengu) River rises in the mountainous region of Lesotho, traversing in a generally westerly direction nearly 2000 km to the Atlantic Ocean and being joined half-way by the Vaal River coming in from the north-east [LHWP, 2005].

Although the mountainous region of Lesotho constitutes only 5% of the total catchment area of the Orange River, it provides about 50% of the total

catchment run-off. The water is characterised by good chemical quality and low sediment content.

The topography of the region allows for the possibility of developing a hydropower generation facility in Lesotho in conjunction with the provision of water supplies to the RSA (Figure 7.3).

In order to exploit this huge potential in water conservation and power generation, the LHWP was initiated more than 50 years ago.

ii) Project objectives

The project was launched with the following clear objectives:

- To provide revenue to Lesotho by transferring water from the catchment area of the Orange River in Lesotho to meet the growing demand for water in the RSA's major industrial and population centres.
- To generate hydroelectric power for Lesotho in conjunction with the water transfer.
- To promote the general development of the remote and under-developed mountain regions of Lesotho.
- To provide the opportunity to undertake ancillary developments, such as the provision of water for irrigation and potable water supply.



Figure 7.3: LHWP

iii) *Lesotho's water resources*

Water is a resource that Lesotho has in relative abundance and water resources far exceed possible future requirements, even allowing for possible future irrigation projects and for general development and improvement of living standards. The sustainability of the water resource was well researched and documented.

The average total available water in Lesotho is about 150m³/s and current national consumption is not more than 2m³/s.

Estimates of the natural mean annual run-off at the sites of the main project are provided below in Table 7.2 (Water availability).

Table 7.2: Water availability

Dam	River	Catchments Area km ²	Mean Annual km ³	Run-Off m ³ /s
Katse	Malibamats'o	1 860	656	20.8
Mohale	Senqunyane	938	367	11,6
Mashai	Orange / Sengu	7 977	1 569	49.7
Tsoelike	Orange / Sengu	10 375	1 891	59.9

The Katse and Mohale dams formed part of the first phase and, as can be seen from the run-off figures, the potential for water capacity increase during Phase II is enormous relative to the previous capacity.

iv) Preliminary studies

The initial survey of the water potential of Lesotho was first introduced by the then British High Commissioner to Lesotho, Sir Evelyn Baring, in the 1950s. Ninham Shand of South Africa was appointed as consulting engineer to study the potential of harnessing the water from the Maluti Mountains for the economic benefit of the Basotho people.

A study of the Oxbow project was undertaken for the Government of Lesotho from 1967 to 1968 (Ninham Shand and Partners, 1968 from LHWP, 2005). The study envisaged storage reservoirs at Oxbow and Pelaneng on the Malibamats'o River with tunnels running northward to convey water to South Africa. In 1971 the Government of Lesotho (GOL) commissioned a further study (Binnie & Partners, 1971, from LHWP, 2005), which concluded that a 94m high Pelaneng dam could be constructed to divert a continuous supply of 8m³/s to South Africa.

In 1974 the RSA appointed Henry Olivier and Associates to carry out studies in connection with water and power projects in neighbouring countries. In a report submitted to the RSA in 1977 (Henry Olivier and Associates, 1977, from LHWP, 2005), ten alternative layouts for diversion of water from Lesotho to the Vaal basin, and for possible hydroelectric projects associated with such projects, were described.



v) *Joint preliminary feasibility study*

A joint preliminary feasibility study of the project was carried out in 1978, with each government appointing its own consultants to assist in the study. A preliminary feasibility report (Olivier and Binnie, 1979, from LHWP, 2005) concluded that a constant flow of some 35m³/s could be transferred to South Africa using a phased construction of five reservoirs at Oxbow, Pelaneng, Soai, Polihali and Taung on the Malibamats'o and Senqu (Orange) Rivers plus approximately 102km of tunnel to transfer water to SA. The generation of hydroelectric power in Lesotho was an integral part of the project proposal.

vi) *Joint detailed feasibility study*

The detailed feasibility studies, to suit the requirements of the two governments, were carried out from August 1983 to December 1985 by Lahmeyer MacDonald Consortium (comprising Lahmeyer International of Germany and Sir Malcolm Macdonald of the UK) for GOL and Olivier Shand Consortium (comprising Henry Olivier and Ninham Shand Inc.) for RSA. The GOL's interests in the technical review field were looked after by the LHWP unit who were assisted by TAMS Pty (Ltd) of the USA. The LHWP unit and TAMS together formed the Study Supervisor for GOL on the feasibility study from 1983 to 1986.

The main objectives of the feasibility study were:

- Selection of the optimal scheme layout acceptable to both governments.
- Demonstrating that the project would be technically, socially, legally, environmentally, economically and financially viable.
- Carrying out of studies, designs and costing that would be used for purposes of preparation of tender designs and associated investigations.

The feasibility study established the economic viability of the project to deliver about 70m³/s of water from the highlands of Lesotho to the Vaal River system by the year 2020. The project was to be developed in a number of phases and



the project was found to be the cheapest option compared to other competing schemes in RSA.

Hydroelectric power was to be generated in Lesotho, which offered Lesotho the opportunity for a substantial element of independence in terms of electricity supplies.

The study confirmed that there were no technical, social, environmental, legal, economic or financial considerations that would invalidate the conclusions that the recommended project would provide considerable benefits for both countries. This observation prompted no further detailed investigation into these aspects, a decision that resulted in some legal repercussions at a later stage.

The recommended feasibility study Phase 1A project components were as follows:

- Main Dam and appurtenant works at Katse
- 48 km long Transfer Tunnel from Ha Rafanyane to Sentelina
- Sentelina Head Pond
- Underground Hydropower Plant
- Tlhaka Tail Pond
- Delivery Tunnel
- Infrastructure facilities, including access roads, construction camps, construction-power, communication and other services.

An independent 3-member international panel of engineering experts was engaged by Lesotho from January 1984 to February 1986 to review the feasibility study work. During this period, the panel made three visits to Lesotho and to the project sites.

vii) LHWP implementation

The signing of the Lesotho Highlands Water Project Treaty by the governments of Lesotho and of the RSA on the 24th October 1986 (Treaty, 1986) established the Joint Permanent Technical Commission (JPTC) to



represent the two countries in the implementation and operation of the LHWP. This Treaty (1986) effectively spelled out governance arrangements between the two countries and will be discussed in more detail in later paragraphs. This was followed by detailed engineering studies and services prior to the award of main works, which were scheduled to commence in early 1990. The treaty commits RSA and Lesotho to implementation of Phase 1A and 1B of the project and provides the options for development of additional phases in the future.

The first phase (1A) of the proposed four phased scheme, comprising: a giant dam at Katse in the central Maluti mountains, an 82 km transfer and delivery tunnel system reaching to the Ash River across the border in RSA, the 'Muela hydropower station and associated structures was commissioned in 1998. This has now been completed and an average 17m³/sec of water is now being delivered to RSA. The total cost of this phase was R11 billion.

Phase 1B, comprising the Mohale dam, a 145 meter high concrete faced rockfill dam on the Senqunyane River some 40 km south-west of Katse, a 32 km long transfer tunnel between Mohale and Katse reservoirs, a 19m high concrete diversion weir on the Matsoku River, and a 5.6 km long tunnel, are under construction. The Mohale reservoir and Matsoku diversion added 9.5 and 2.2 m³/sec to the yield of Katse. The total cost of this phase was estimated at R6.5 billion.

viii) Main construction and contracting parties during Phase I of the LHWP

Various contractors were deployed during the Phase 1A and 1B of the project.

With this project it is important to list the most prominent contracting parties because of the fact that some irregularities took place during the project that resulted in various court cases for bribery and prominent companies being suspended and blacklisted by the World Bank.

During Phase IA, the following main construction activities took place:



- Katse dam
- 45 km Transfer Tunnel
- 'Muela Hydropower Station and Tail Pond
- 15 km Delivery Tunnel –south
- 22 km Delivery Tunnel –north.

The Katse Dam was built by the Highlands Water Venture (HWV) consortium, comprising Hochtief (Germany), Impreglio, Bouygues (France), Stirling International (UK), Kier International (UK), Concor (South Africa) and Group Five (South Africa). The Lesotho Highlands Project Contractors, which built the tunnels in Lesotho, was made up of Spie Batinolles, Balfour Beatty (UK), Compenon Bernard (France), LTA (South Africa), Acres (Canada) and ED Zublin (Germany).

For the building of the 'Muela Hydropower station and the Tailpond dam, the Lahmeyer MacDonald Consortium (LMC), comprising Lahmeyer (Germany) and Mott MacDonald of the United Kingdom, were appointed. They also supervised the two delivery tunnels.

The two transfer tunnels were contracted to the Lesotho Highlands Project Contractors consortium comprising Spie Batignolle (France), Balfour Beatty (UK) LTA (South Africa), Campenon Bernard (France) and Ed Zublin (Germany). The electrical and mechanical work was subcontracted to Neyrpic (France) and SDEM (SA). Deutsche Babcock (SA) supplied steel liners for the under-river crossing, while Krohne Altometer of the Netherlands supplied flow metres in the delivery tunnel south.

vi) Main construction and contracting parties during Phase II of the LHWP

During Phase II, the following main construction activities took place:

- Mohale Dam
- Mphale / Katse interconnecting tunnel
- Matsoku Weir and Tunnel, and
- Mohale Access roads



For the Mohale Dam, comprising a 145m high concrete face rock-fill embankment, the Mohale Consultants Group (MCG) - comprising SMEC (Snowy Mountains Engineering Corp) of Australia, BKS Inc, Melis & Du Plessis and Stewart Scott (SA), Harza Engineering (USA) and Nippon Koei Co (Japan) - were contracted.

MCG supervised Mohale Dam Contractors, a joint venture of Impregilo of Italy, the lead contractor, with Hochtief (Germany) and Concor (South Africa). Concor Engineering and ATB Joint Venture were sub-contracted to undertake mechanical and engineering activities.

For the 32km long Mohale Interconnecting Tunnel to Katse, the Lesotho Highlands Tunnel Partnership (LHTP) was the design and supervising consultant. The team comprised: Lahmeyer (Germany), Mott Macdonald (UK) and Consult 4 of RSA (comprising Ninham Shand, VKE (Van Niekerk Klyn and Edwards), Keeve Steyn and SRK (Steffen Robertson and Kirsten) and Knight Piesold). The contractors comprised a joint venture of Hochtief (Germany), contract leader Impreglio (Italy) and Concor (SA). Concor Engineering was sub-contracted to the mechanical and engineering activities.

The Matsoku Weir and Tunnel were designed and supervised by consultants under the Matsoku Diversion Partnership, whose composition was Consult 4 (SA) comprising: Ninham Shand, VKE Engineers, SRK Consulting and Knight Piesold in a joint venture with the Lescon/ FMA of Lesotho. The construction team, Matsoku Civil Contractors (MCC) comprised a joint venture of Concor (RSA), Hochtief (Germany) as contract leader, and Impregilo (Italy). Concor Engineering of SA and B&W Electrical were awarded sub-contracts in the mechanical and electrical fields respectively.

Finally, the Mohale Access roads were designed and supervised by GIBB (Lesotho) / BS Bergman (RSA) and contracted to LTA / Group 5 Joint Venture.



7.3.2 Project governance

The LHWP was a true cross-border project with the approach that no taxpayers' money, or any other form of subsidisation, should be used. The intention was that end-users should eventually fund the project and that objective was, to a large extent, achieved with limited funding made available by the World Bank during Phase 1B. The LHWP can be regarded as successful in terms of delivery on time, to pre-established capacity and by end April 2007 the cost over expenditure was an 'acceptable' 10% overrun over the 20 year project life.

As opposed to the Mozal 1 project, much time was spent on establishing bi-lateral and governance policies and agreements. The following paragraphs provide not only a review with respect to the CPGF, but also an explanation of how governance was addressed during project initiation and managed throughout the project life-cycle.

i) NGT profile for LHWP Phase 1A/B case study

As with the Mozal 1 case study, an attempt was made to obtain information from multiple sources. Apart from representation from the various stakeholders, general literature was searched and a listing of investigation and court cases was obtained through Probe International and actual project documentation was viewed (see Figure 7.4). The only stakeholders not present were the contractors, who were hesitant to participate in anticipation of future work on Phase 2.

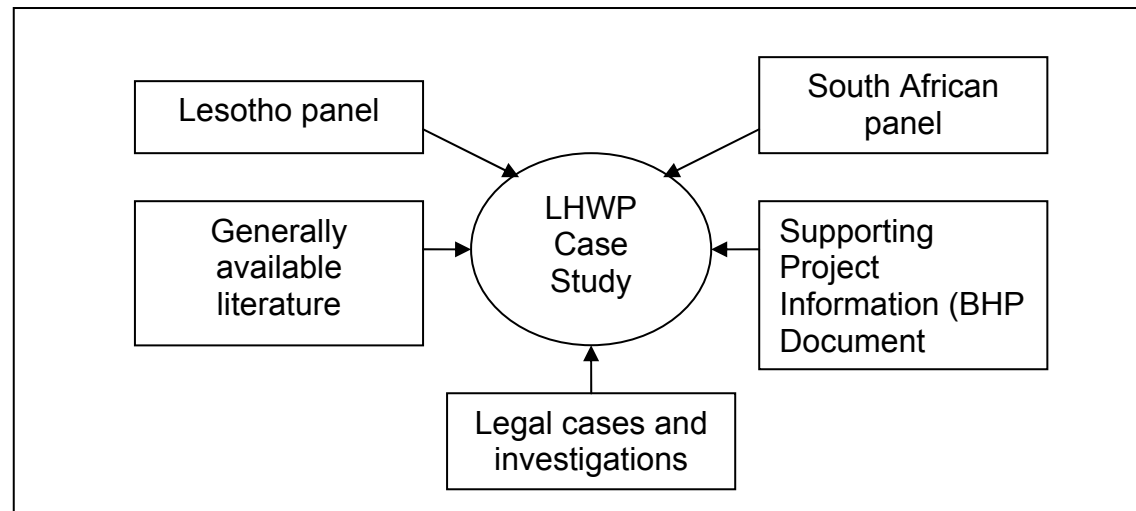


Figure 7.4: LHWP information sources

The NGT panel that participated comprised of senior managers and directors of various stakeholders of the project. The NGT panel showed great interest in this exercise, with the acting CEO of the LHWD attending the whole session. In addition to the researcher, who acted as facilitator, the participants included the following people (listed together with the positions they held during the project):

- Mr Masilo Phakoe – acting Chief Executive Officer for LHDA
- Mr Pieter Swart – Financial Controller for LHWC, RSA Delegation. Mr Swart has been involved with the project for 16 years.
- Mr Leon Tromp – Alternate Delegate for LHWC, RSA Delegation. Mr Tromp has been involved with the project for 22 years and is the author of two sections of the Treaty. Mr Tromp oversaw the technical developments at senior level.
- Mr B.T. Khatibe – CFO for LHWC, Lesotho Delegation.
- Mr Charles Mwakalumbwa – Company Secretary, LHWC.

The purpose and contents of the NGT session were emailed to each participant one week before the session to allow for preparation.

The NGT session commenced at 09h00 and closed at 13h00 on 2 April 2007. The venue was the conference room at the LHWC Board Room, Standard

Bank Building, Maseru, Lesotho. Due to sensitivity, the proceedings were not digitally recorded.

ii) *Project governance at LHWP Phase 1A/B*

After discussing the background of the LHWP project, and again emphasising the objectives of the NGT process, Mr Tromp suggested an overview of how governance was established on the project in 1986, how it was amended in 1999, and the lessons learned. Afterwards the CPGF was projected against an overhead screen and an additional column inserted to indicate the comments and results of the discussions. By viewing the insertions and changes, the NGT participants could immediately indicate their approval of the changes. All changes and additions are indicated in ***italic bold***. Where no comments are given and the phrases are merely copied in *italic*, the NGT panel agreed with the phrases as documented.

Formulating governance on the LHWP

Due to the complexity of cross-border projects, and especially the difficult political conditions RSA and Lesotho found themselves in during the 1980s, much effort went into compiling the governance principles. It is not clear whether the hostility between the two countries benefited or hampered the development of a governance document in the form of the Treaty (1986). Nevertheless, the end result was a well documented agreement intended to be valid for 50 years. The drafting of the Treaty took approximately 18 months and contains a clause for review after 12 years (1999).

The Treaty clearly spells out the formal relationships between the various stakeholders as well as key responsibilities and accountabilities. Although it is not the intention of this dissertation to review the complete document, attention should be given to the formal organisational structure and reporting lines. The function of the structure had limitations and was about the only aspect of the Treaty that was substantially changed in 1999. The original structure had a negative impact on the manageability of the project, a key element of this research.

The original organisational structure is given below in Figure 7.5. The structure provides for independent, parallel reporting lines from the implementation agencies, LHDA and Trans Caledon Tunnel Authority (TCTA), to the respective governments as well as via the JPTC.

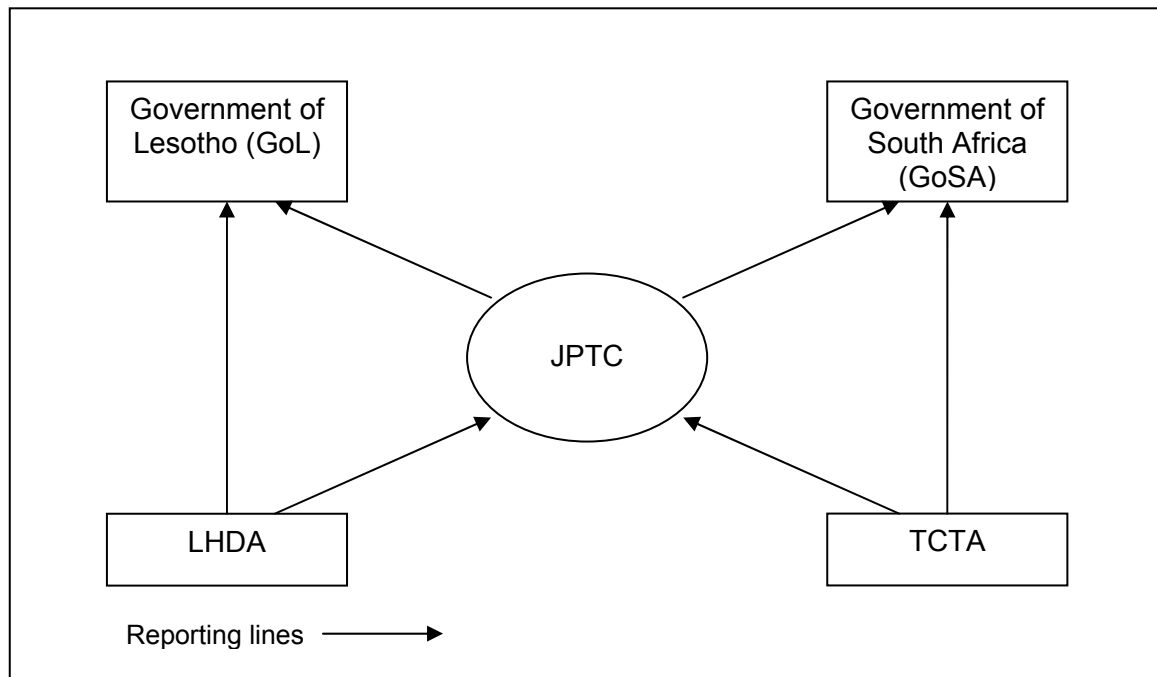


Figure 7.5: Original governance structure

As per Article 7, paragraph 1 of the Treaty (1986), the LHDA “shall have the responsibility for the implementation, operation and maintenance of that part of the Project situated in the Kingdom of Lesotho, in accordance with the provisions of this Treaty, and shall be vested with all powers necessary for the discharge of such responsibilities”.

Similarly, for the South African section, Article 8, paragraph 1 of the Treaty (1986), the TCTA “shall have the responsibility for the implementation, operation and maintenance of that part of the Project situated in the Republic of South Africa, in accordance with the provisions of this Treaty, and shall be vested with all powers necessary for the discharge of such responsibilities”.

The JPTC was established to serve as the combined governing body reporting to the main stakeholders, namely GoL and the government of SA (GoSA). In the context of the study, the JPTC can be considered as the 'steering committee'. As per Article 9, paragraph 1 of the Treaty (1986), the JPTC "was composed of two delegations, one from each Party (LHDA and TCTA). Each Party shall nominate three representatives constituting its delegation, as well as an alternative for each of the nominated representatives. At least one member of each delegation shall be permanently resident in Maseru. Each delegation shall alternately nominate a chairman for meetings of the JPTC".

The governance structure depicted in Figure 7.3 was operational from inception in 1986 until 1999 when it was due for review. From the NGT, panel the following shortcomings and main areas for improvement were identified:

- 1) Due to the dual reporting structure, there were often conflicting messages conveyed to the respective governments.
- 2) Decision-making and turnaround time for major queries took between 10 and 12 days.
- 3) The function of the JPTC was marginalised due to the direct access of LHDA and TCTA to their respective governments.

Reviewing governance on the LHWP

During 1999, the governance arrangements, as described in the Treaty (1986), were reviewed against the experience gained over a 12 year period. Given the areas for improvement identified, revised arrangements were promulgated under Protocol VI to the Treaty on the LHWP (1999). The changes resulted in:

Article 1 - Definitions

Article 2 - Changing the name of the JPTC

Article 3 - Restructuring the functions, powers and obligations of the LHDA

Article 4 - Institutional arrangements in the RSA

Article 5 - Restructuring the functions, powers and obligations of the LHWC

Article 6 – The prevention and settlement of disputes

Article 7 – Privileges and immunities

Article 8 – Entry into force

For the purpose of this research, the changes contained in Articles 2, 3 and 5 will be described.

The changes proposed in the Protocol VI (1999) resulted in a change to the governance structure, as provided in Figure 7.6 below.

The JPTC was renamed the Lesotho Highlands Water Commission (LHWC) and became the overall governing body with equal representation for the two respective governments as well as LHDA and TCTA. A single line of reporting was established via LHWC. The role of TCTA was redefined as maintenance and operations on the South African side while LHDA continued implementation and maintenance / operations activities in Lesotho.

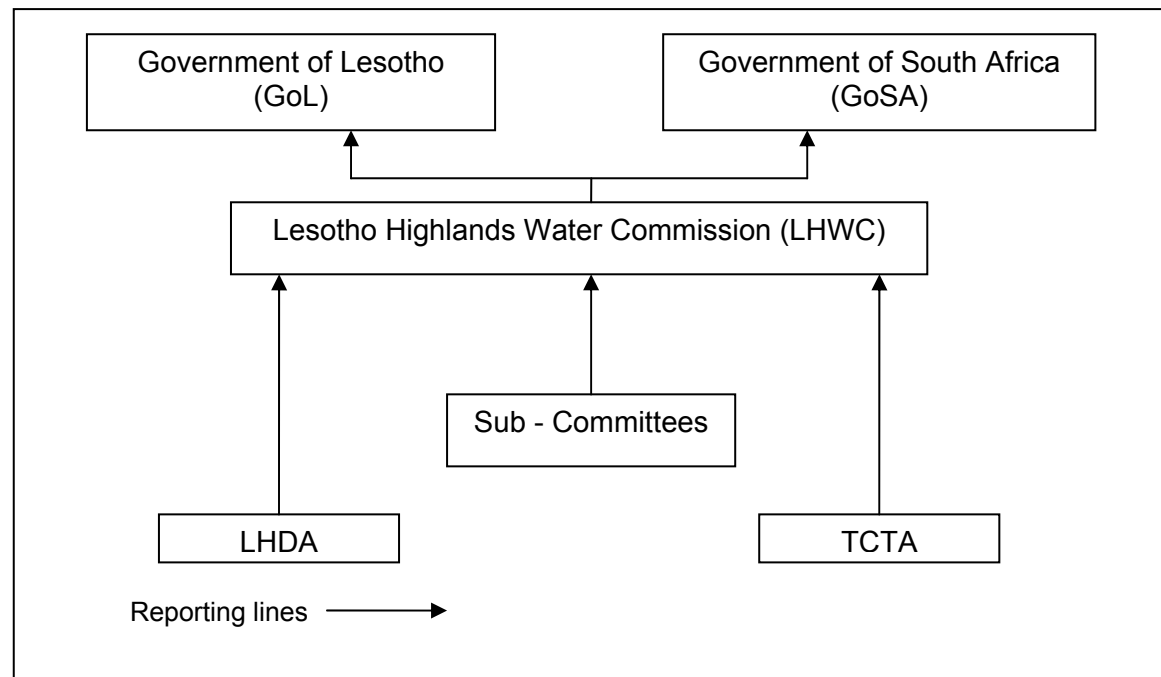


Figure 7.6: Revised organisation for improved governance

According to the NGT group, the new structure resulted in:

- A decision turnaround time of 3 to 4 days, and
- No conflicting messages to the respective governments.



Some criticism was received regarding the effectiveness of the LHDA Board, with a separate enquiry launched in 2005. The actual capability of the LHDA Board members was questioned and the draft report by Philip Armstrong (2005) recommended the inclusion of LHWC board members on the LHDA board to assist with the managerial problems, but the overall structure and defined responsibilities and accountabilities remained as is.

A significant observation made during the assessment by Armstrong (2005) is found in paragraph 2 of the Executive Summary, where it is stated that:

“While an appropriate, international standard corporate governance system should be in place given the nature and significance of the LHWP, it was important also to focus on core strategic and operational objectives given that the institutional arrangement for the LHWP do not naturally follow the more conventional corporate arrangements against which typical governance arrangements would be structured (for example, in the private sector)”.

This observation once again highlights the need to look at the unique challenges facing project governance, as opposed to corporate governance.

In support of the actions claimed by the panel towards the formation and functioning of the project governance principles, the following documentation was reviewed:

- Selection criteria and formal letters of application and appointment to the LHDA Board. These included:
 - M. Matsoso (15 December 2005)
 - T. Nkhahle (9 December 2005)
 - Dr M. Marake (14 December 2005)
 - A.L. Giani (7 December 2005)
 - J. J. Eager (9 May 2001)
 - Prof L. Qalinge (6 December 2005)
- Report of Panel of Experts (No 15), 07 August 2002
- Internal Audit Report (SEC/LHDA/2690), 23 March 2005
- LHDA Bank Signature & Expense Authority Limits

- Mohale Dam, Monthly Progress Report No. 19, October 1999
- Implementation Completion Report, Phase 1B, 1998 – 2006

iii) *Project governance at LHWP against the CPGF*

After discussing the background and context of the LHWP, and again emphasising the objectives of the NGT process, the CPGF was projected against an overhead screen and an additional column inserted to indicate the comments and results of the discussions. By viewing the insertions and changes, the NGT participants could immediately indicate their approval of the changes. All changes and additions are indicated in ***italic bold***. Where no comments are given and the phrases are merely copied in *italic*, the NGT panel agreed with the phrases as documented.

The result of the session is given below in Table 7.3, with special attention drawn to the last column.

Table 7.3: Concept project governance framework

	P. Project Governance	
	A. Project Steering Committee	A. Project Steering Committee (LHWC) – see note 1
1. Composition	1. Core Competencies <ul style="list-style-type: none"> • Project finance and cost management • Business / project alignment • Front-end-Loading management • Crises response • Industry knowledge • International experience • Leadership • Strategic alignment capability • Contract management capabilities 2. Steering Committee Size Determined by project type, complexity and magnitude	1. <i>Core Competencies (Original Technical – complimented by others in 1999)</i> <ul style="list-style-type: none"> • <i>Project finance and cost management</i> • Project definition and requirements • <i>Business / project alignment</i> • <i>Front-end-Loading management</i> • <i>Crises response</i> • <i>Industry knowledge</i> • <i>International experience</i> • <i>Leadership</i> • <i>Strategic alignment capability</i> • <i>Contract management capabilities</i> • Social and Environmental capabilities (see note 2) 2. <i>Steering Committee Size</i>



	<p>3. Member Mix Comprise members with direct interest as well indirect stakeholder representatives i.e. socio-economic and environmental</p> <p>4. Chairperson Independent The Chairperson should be independent from any project stakeholders</p>	<p><i>Determined by project type, complexity and magnitude</i></p> <p><i>3. Member Mix Comprise members with direct interest as well indirect stakeholder representatives i.e. socio-economic and environmental</i></p> <p><i>4. Chairperson Independent Chair role alternating between SA and Lesotho – not compromising mutual agreement</i></p>
2. Responsibility	<p>1. Committee Accountability</p> <ul style="list-style-type: none"> • Overall accountability • Bridging gap between project and immediate external and statutory environment. <p>2. Charter Development and adherence to project charter</p>	<p><i>1. Committee Accountability</i></p> <ul style="list-style-type: none"> • Overall accountability • Bridging gap between project and immediate external and statutory environment. <p><i>2. Charter Development and adherence to project charter (Treaty – formal – very successful)</i></p>
3. Audit Committee to Board of Directors	<p>1. Levels of Independence The project audit committee should be independent, with the steering committee excluded from the audit committee.</p> <p>2. Project Literacy The audit committee should have extensive project experience on all aspects of large capital projects</p>	<p><i>1. Levels of Independence The project audit committee should be independent, with the steering committee excluded from the audit committee.</i></p> <p><i>2. Project Literacy The audit committee should have extensive project experience on all aspect of large capital projects. (Utilise panel of experts for project management)?</i></p>
	B. Cost and Benefit Management	B. Cost and Benefit Management
1. Financial Reporting Responsibility	<p>1. Steering Committee Report against approved budget</p> <p>2. Project Governance Charter Report on adherence to the charter</p>	<p><i>1. Steering Committee Report against approved budget Reporting to lenders (i.e. World Bank criteria)</i></p> <p><i>2. Project Governance Charter Report on adherence to the Treaty</i></p>

<p>2. Financial Disclosures</p>	<p>1. Project Finance For any financial activities outside the GAAP requirements, full disclosure will be required</p> <p>2. Reports Project financial status to be reported on a quarterly basis</p> <p>3. Corrections and Adjustments To be reported quarterly</p>	<p>1. <i>Project Finance</i> <i>For any financial activities outside the GAAP requirements, full disclosure will be required</i></p> <p>2. <i>Reports</i> <i>Overall project status to be reported on a quarterly basis</i></p> <p>3. <i>Corrections and Adjustments</i> <i>To be reported quarterly</i></p>
<p>3. Internal Controls</p>	<p>1. Risk Management Process Formal risk management process should be in place</p> <p>2. Risk Management The steering committee must actively ensure that proper risk identification, quantification and mitigation planning is done on the project, not only on financial aspects, but covering all aspects of the project</p> <p>3. Risk Disclosure Disclosure must be made about all the risks on the project during the total project life-cycle</p> <p>4. Risk Certification Requirement for monthly certification by the chairperson of the steering committee of disclosure controls and procedures</p>	<p>1. <i>Risk Management Process</i> <i>Formal risk management process should be in place. (Was not done formally on the LHWP, but is highly recommended)</i></p> <p>2. <i>Risk Management</i> <i>The steering committee must actively ensure that that proper risk identification, quantification and mitigation planning is done on the project, not only on financial aspects, but covering all aspects of the project. (Was not done formally on the LHWP, but is recommended)</i></p> <p>3. <i>Risk Disclosure</i> <i>Disclosure must be made about all the risks on the project during the total project life-cycle. (Was not done formally on the LHWP, but is highly recommended)</i></p> <p>4. <i>Risk Certification</i> <i>Requirement for monthly certification by the chairperson of the steering committee of disclosure controls and procedures. (Was not done formally on the LHWP, but is highly recommended)</i></p>
	<p>C. Project Reviews and Audits</p>	<p>C. Project Reviews and Audits</p>
<p>1. Independence</p>	<p>1. Objectivity Independence and objectivity of the project auditors and reviewers must be ensured</p>	<p>1. <i>Objectivity</i> <i>Independence and objectivity of the project auditors and reviewers must be ensured</i></p>

	<p>2. Scope Project reviews and audits should not be confined to adherence to in-house methodologies and practices, but should include items that the review / audit deem necessary in order to protect stakeholder interests</p> <p>3. Rotation Auditors should have no direct or indirect interest in the project or in the contractors / suppliers involved with the project.</p>	<p>2. Scope <i>Project reviews and audits should not be confined to adherence to in-house methodologies and practices, but should include items that the review / audit deem necessary in order to protect stakeholder interests. (LHWC and JPTC formally utilised panels of experts: engineering panel, social and environment panel)</i></p> <p>3. Rotation <i>Auditors should have no direct or indirect interest in the project or in the contractors / suppliers involved with the project. (Done formally on LHWP)</i></p>
2. Interaction with Companies	<p>1. Internal Charter The internal charter should include the approach towards the auditing of project management, the adherence to project methodologies, processes and agreed practices and the project team's functioning.</p> <p>2. Communication As with corporate governance, it requires mandatory communication between the external auditor and the audit committee</p>	<p>1. Internal Charter (Policies & procedures) <i>The internal charter should include the approach towards the auditing of project management, the adherence to project methodologies, processes and agreed practices and the project team's functioning. (Done very formally – plus sub-committees)</i></p> <p>2. Communication <i>As with corporate governance, it requires mandatory communication between the external auditor and the audit committee</i></p>
3. New Attestation Report	<p>1. Report External auditor must issue an attestation report on the project's internal control report</p>	<p>1. Report <i>External auditor must issue an attestation report on the project's internal control report</i></p>
4. Disclosure	<p>1. Non-audit services As with corporate governance, it is required that separate disclosure of the amounts paid to the external auditor for non-audit services is made, together with a detailed description of the nature of services</p>	<p>1. Non-audit services <i>As with corporate governance, it is required that separate disclosure of the amounts paid to the external auditor for non-audit services be made, together with a detailed description of the nature of services</i></p>

	<p>2. Fees Requires disclosure of fees paid to a company's principal external auditor since project commencement</p>	<p>2. Fees <i>Requires disclosure of fees paid to a company's principal external auditor since project commencement</i></p>
	<p>D. Ethical, responsible conduct and conflict of interest</p>	<p>D. Ethical, responsible conduct and conflict of interest</p>
1. Code	<p>1. Standards A code of ethics should be established and signed by each member of the steering committee. The code should include (as a minimum):</p> <ul style="list-style-type: none"> • Environment • Social aspects • Socio-economic aspects • Conflict of interest guidelines <p>2. Adherence Adherence to the code of ethics should be disclosed and reported on a monthly basis.</p> <p>3. Disclosure Code should be made publicly available and any changes to the code or waivers from the code must be disclosed</p>	<p>1. Standards <i>A code of ethics should be established and signed by each member of the steering committee. The code should include (as a minimum):</i></p> <ul style="list-style-type: none"> • <i>Environment (not done formally)</i> • <i>Social aspects (not done formally)</i> • <i>Socio-economic aspects (not done formally)</i> • <i>Conflict of interest guidelines (not done formally)</i> • <i>Communication to external parties</i> • <i>Office conduct</i> <p>2. Adherence <i>Adherence to the code of ethics should be disclosed and reported on a monthly basis. (Not formal – done on a by-exception basis)</i></p> <p>3. Disclosure <i>Code should be made publicly available and any changes to the code or waivers from the code must be disclosed</i></p>
2. Compensation	<p>1. Performance Performance-related elements of compensation should represent a substantial portion of the total compensation package</p>	<p>1. Performance <i>Performance-related elements of compensation should represent a substantial portion of the total compensation package</i></p>
3. SHE	<p>1. Adherence SHE requirements should be to international standards as a minimum, supplemented by host</p>	<p>1. Adherence <i>SHE requirements should be to international standards as a minimum, supplemented by host country requirements. (Not done)</i></p>

	country requirements	<i>formally on LHWP – see note 2)</i>
4. Social	1. Adherence Social and socio-economic considerations should be to international standards as a minimum, supplemented by host country requirements	<i>1. Adherence Social and socio-economic considerations should be to international standards as a minimum, supplemented by host country requirements. (Not done formally on LHWP – see note 2)</i>

Notes to input:

Note 1 - Initially the JPTC, and later the LHWC, effectively fulfilled the function of 'steering committee' on the LHWP. In hindsight, project governance was well defined and applied on the project, although not in so many words. To develop the governance principles in the form of the Treaty took approximately 18 months and is a well thought through document with an excellent description of the project scope.

Note 2 - A prominent feature of the project was the lack of attention to health and environmental issues. This was partly due to the fact that safety, health and environmental issues were not such a critical issue during the mid 1980s and few legal requirements on the subject existed.

Again, on the question of which items in the CPGF are the most important and how the items should be ranked, the unanimous response was that this is impossible to say and that prioritisation will differ depending on the type and location of the project. However, the panel highlighted the benefits of having a well-defined scope of work and a technical / managerial component in people on the steering committee.

Due to the capital size and duration of the project, many opportunities presented themselves that tested the effectiveness of governance principles contained in the Treaty. The next paragraph addresses some of the issues that arose and which are still being addressed.



iv) *Legal actions and activities against LHWP*

Various legal actions have been taken against, and by, the LHWP. Some of the actions include:

- Investigations into corruption / bribery allegations were launched against: Spie Batignolles (France); Lahmeyer (Germany); Dumez (France); ABB (Sweden); Impreglio (Italy); Cegelec (France); Gibb (UK) and Sogreah (France). The parties apparently paid bribes to former LHWA CEO, Masupha Sole (Zhuwakinyu, 2003).
- Also likely to be charged are members of the Highlands Water Venture (HWV) consortium – which built the Katse dam and comprised: Hochtief (Germany), Impreglio, Bouygues (France), Stirling International (UK), Kier International (UK), Concor (South Africa) and Group Five (South Africa) – and the Lesotho Highlands Project Contractors, which built the tunnels in Lesotho and was made up of Spie Batinolles, Balfour Beatty (UK), Compenon Bernard (France), LTA (South Africa) and ED Zublin (Germany)(Zhuwakinyu, 2003).
- In 2004 Acres were found guilty of bribery and had to pay a fee of US\$ 2.2 million to the Lesotho High Court. In the same year the company was also blacklisted on the World Bank's list of suppliers and contractors (McClearn, 2004)
- Masupha Sole was found guilty and imprisoned for 18 years (McClearn, 2004)
- In 2006 the German firm Lahmeyer was also found guilty of bribery, fined R12 million and blacklisted on the World Bank list of suppliers and contractors (Engineering News, 2006).
- Other companies found guilty were Schneider Electric SA (fined R10 million) and Impreglio (Zhuwakinyu, 2004).

Apart from the above cases, the LHWP also had to deal with claims against a potential river diamond mining operation, destruction of the habitat of indigenous fish species and rebuilding of local housing after destruction during earth movement caused by the water fill.

In the Treaty it appears that issues of potential misconduct and unethical behaviour as well as the environment were not dealt with in as much detail as managerial arrangements and thus could have benefited from a formal project governance framework.

Apart from addressing the specific NGT protocol questions, some significant comments about project governance in general were made. These items are discussed in the next paragraph.

iii) General observations from NGT participants

Again the NGT session on the LHWP project took longer than expected and triggered some important observations from participants. The most important observations, that could have an impact on formalising a final PGF, are listed below:

- Again the NGT panel agreed a governance environment for the project manager to function within is usually lacking on large capital projects. Thus, the necessity of a formal approach towards project governance cannot be disputed and current theories and practices do not cater for these practices.
- The importance of skilled personnel, consultants and contractors cannot be over emphasised. As with the Mozal I project, most of the items were addressed because of the high level of experience and skill of the senior managers on the project.
- Clarity of scope is a determining factor. If the scope is clear, the manageability of the project increases drastically, thereby simplifying the establishment of a project governance framework. The core competency of scope development listed in the CPGF is of critical importance.
- The LHWP had the luxury of ample time to develop the Treaty. Not all projects have this luxury and therefore some guideline will be beneficial.

In summary, the NGT panel on the LHWP project unanimously agreed that a formal framework for project governance would greatly assist the senior



management and project steering committee on LCPs to create an environment for effective project management.