

University of Southern Queensland
Faculty of Engineering and Surveying

**Investigation of the Quality Management
System at Lockyer Valley Regional
Council**

A dissertation submitted by

Mr Mitchell Neil Bichel

In fulfilment of the requirements of

**Courses ENG4111 and 4112 Research
Project**

towards the degree of

**Bachelor of Engineering / Bachelor of
Business**

Submitted: October, 2009

Abstract

This project involves an investigation into the quality management system used at Lockyer Valley Regional Council (LVRC) for the construction and maintenance of civil infrastructure, which includes roads, drainage structures and bridges.

The aim of the project is to investigate the quality management system used at Lockyer Valley Regional Council and make recommendations for improvements to the system. The improvements to the system will be achieved by conducting a comparative review of the existing quality management systems and ensuring that all quality policies and management plans are in accordance with AS/NZS ISO 9001:2008 requirements.

After conducting a literature review, it was found that the current quality management systems, which are in practice today, are the result of extensive work within the field of quality, which began with Walter Shewart, who introduced the term quality assurance to improve quality through the use of statistical control methods' (Russell & Taylor, 2007). Over time, these processes were eventually developed into a series of standards and requirements that were necessary for an organization to achieve effective quality management.

The ISO series of standards are developed by the International Organisation for Standardisation. The ISO 9000 series of quality management requirements and in particular ISO 9001 are used throughout the world as the required quality management standard and have also been wholly adopted by the Australian and New Zealand Standards.

According to AS/NZS ISO 9001:2008, the quality management system documentation shall include a quality policy and quality objectives, a quality manual, documented procedures and records of quality and documents, including records, determined by the organization to be

necessary to ensure the effective planning, operation and control of its processes.

A comparative review of the existing quality management system at Lockyer Valley Regional Council was undertaken against other Council's quality management system as well as the requirements of other government departments such as the Queensland Department of Main Roads. The existing quality management system at Lockyer Valley Regional Council was also reviewed against AS/NZS ISO 9001:2008 to ensure that it complies with the requirements specified within the standard.

After conducting a review of the existing systems at the former Laidley Shire Council and Gatton Shire Council, it was found that some sections of the existing systems were compliant, while others were in need of improvement or were non-compliant. Recommendations for improvements to the existing systems were then determined for the areas where a deficiency occurs. The main areas where recommendations for improvements can be made include: documenting existing internal processes; improving procedures for conducting audits and management reviews; identifying the competency of the workforce and future training needs; and improving communication processes between Council and its customers to ensure their requirements are met and that they are satisfied with the outcomes.

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Mitchell Neil Bichel

Student Number: 0050025713



Signature

29 October 2009

Date

Acknowledgments

This dissertation has been a significant and challenging task to undertake and would not have been made possible without the support and guidance from the staff and management of the Engineering Operations department at Lockyer Valley Regional Council.

Thanks must also go to my family and friends for their love and support over the past year.

In particular, I would especially like to thank my fiancée, Nicole, without her by my side to provide love, support, help and the motivation to keep going, this project would have almost been impossible.

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Glossary of Terms

Quality degree to which a set of inherent characteristics fulfils requirements.

Note: The term “quality” can be used with adjectives such as poor, good or excellent.

Requirement need or expectation that is stated, generally implied or obligatory.

Customer Satisfaction customer's perception of the degree to which the customer's requirements have been fulfilled.

Capability ability of an organization, system or process to realize a product that will fulfil the requirements for that product.

Competence demonstrated ability to apply knowledge and skills.

Quality Management System management system to direct and control an organization with regard to quality.

Quality Policy overall intentions and direction of an organization related to quality as formally expressed by top management.

Quality Objective something sought, or aimed for, related to quality.

Quality Management coordinated activities to direct and control an organization with regard to quality.

NOTE: Direction and control with regard to quality generally includes establishment of the quality policy and quality objectives, quality planning, quality control, quality assurance and quality improvement.

Quality Planning part of quality management focused on setting quality objectives and specifying necessary operational processes and related resources to fulfil the quality objectives.

Quality Control part of quality management focused on setting quality objectives and specifying necessary operational processes and related resources to fulfil the quality objectives.

Quality Improvement	part of quality management focused on increasing the ability to fulfil quality requirements.
Quality Assurance	part of quality management focused on providing confidence that quality requirements will be fulfilled.
Continual Improvement	recurring activity to increase the ability to fulfil requirements.
Effectiveness	extent to which planned activities are realized and planned results achieved.
Efficiency	relationship between the result achieved and the resources used.
Process	set of interrelated or interacting activities which transform inputs into outputs.
Product	result of a process.
Project	unique process, consisting of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time, cost and resources.
Procedure	specified way to carry out an activity or a process.
Traceability	ability to trace the history, application or location of that which is under consideration.
Conformity	fulfilment of a requirement.
Non-conformity	non-fulfilment of a requirement.
Defect	non-fulfilment of a requirement related to an intended or specified use.
Preventative Action	action to eliminate the cause of a potential nonconformity or other undesirable potential situation.
Corrective Action	action to eliminate the cause of a detected nonconformity or other undesirable situation.
Correction	action to eliminate a detected nonconformity.
Quality Manual	document specifying the quality management system of an organization.

Quality Plan	document specifying which procedures and associated resources shall be applied by whom and when to a specific project, product, process or contract.
Record	document stating results achieved or providing evidence of activities performed.
Inspection	conformity evaluation by observation and judgement accompanied as appropriate by measurement, testing or gauging.
Test	determination of one or more characteristics according to a procedure.
Verification	confirmation, through the provision of objective evidence, that specified requirements have been fulfilled.
Review	activity undertaken to determine the suitability, adequacy and effectiveness of the subject matter to achieve established objectives.
Audit	systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled.
Auditor	person with the demonstrated personal attributes and competence to conduct an audit.

Chapter 1 Introduction

1.1 Introduction

This project involves an investigation into the quality management system used at Lockyer Valley Regional Council (LVRC) for the construction and maintenance of civil infrastructure. This includes roads, drainage structures and bridges. This quality management system is used by Lockyer Valley Regional Council for the construction and maintenance of its own works and for other government departments, such as the Department of Main Roads, as well as for private works, such as subdivision development.

This dissertation provides an introduction to the project, a comprehensive review of the literature on quality management systems, the methodology for conducting a comparative review and gap analysis of the existing systems and an analysis and discussion of the results. This chapter will provide a background to the organisation, an introduction to the problem, and the aim and objectives for conducting the research.

1.2 Organization Overview

Lockyer Valley Regional Council is a medium sized local government situated in South East Queensland. The newly formed Council is the result of the amalgamations of local governments, which occurred state-wide in Queensland in March 2008. Lockyer Valley Regional Council is made up of the former Laidley Shire Council and Gatton Shire Council.

The Council covers an area of 2273 km² and provides services for a population of approximately 36,000 people. The Lockyer Valley is bounded by Toowoomba, Ipswich and Somerset regions. The township of Gatton, which has a population of around 6,500 people, is the main business centre

of the region and also serves as the sub-regional centre of the Lockyer Valley. The smaller towns of Laidley, Forest Hill, Grantham, Helidon and Withcott are also found within the boundaries of Lockyer Valley Regional Council. As it is located within the western corridor and on the urban fringe of Brisbane, Ipswich and Toowoomba, it is rapidly growing with both rural residential allotments and urban expansion of its town centres. (Lockyer Valley Regional Council 2009)

Lockyer Valley Regional Council's roadworks and drainage section, which carries out both construction and maintenance, consists of eight gangs and three smaller crews. Therefore, there is potential for up to eleven projects to be in construction at any one time, which require quality management procedures to be in place and functioning effectively. Council's 2009-2010 budget for roads and drainage is \$19.4 million for capital expenditure and \$14.6 million for operational expenditure. This funding allows Council's to maintain its 1,300 kilometre road network.

Council's road construction and maintenance gangs also carry out additional works for other organisations. Council conducts works for the Department of Main Roads and Transport, which includes capital road upgrades. Council also has a road maintenance contract with the Department of Main Roads and Transport, which involves maintenance of the state controlled road network within the Lockyer Valley Regional Council area. Other works undertaken by Council include subdivision works undertaken for developers.

1.3 The Problem

As a result of the amalgamations of the two former Councils, the new Council now has two outdated quality management systems that need to be either joined or a new system to be put into place. Neither of the two former systems were functioning as effectively as needed. The major problems encountered with the former systems, is the lack of planning in relation to

quality assurance and the poor record keeping and traceability of quality documents. The poor planning and record keeping results in poor communication and this reflects badly on Council as it shows a lack of process. A negative image results in a lack of confidence from both clients, who include developers and government departments, and Council's "shareholders", who are the community itself.

1.4 Project Aim

The aim of the research project is to investigate the former quality management systems used at Laidley Shire Council and Gatton Shire Council and make recommendations for the joining of the two systems, as well as making improvements to the new system. The improvements to the system will be achieved by conducting a comparative review of the organisations quality management systems and ensuring that all quality policies and management plans are in accordance with quality management standards such as, AS/NZS ISO 9001:2008 – Quality Management Systems - Requirements and the Queensland Department of Main Roads and Transport specifications. This will be achieved by undertaking a gap analysis to identify any deficiencies between the existing quality management systems and the AS/NZS ISO 9001:2008 standard.

1.5 Research Objectives

The following list identifies the specific objectives that were deemed necessary to conduct an investigation into the quality management system used for construction at Lockyer Valley Regional Council. The research objectives are:

1. Research the background information relating to quality assurance systems and the requirements defined in AS/NZ ISO 9000 family of Australian Standards for quality management.

2. Research the Quality Assurance systems used by other governments and the requirements of state departments such as the Department of Main Roads and Transport.
3. Conduct a comparative review of the existing systems used for the construction and maintenance of civil infrastructure.
4. Analyse the current system against AS/NZ ISO 9000 series.
5. Make recommendations for improvements to the current system.

1.6 Conclusions

This dissertation aims to analyse and review the current quality management systems in place and make recommendations for improvements to the new Lockyer Valley Regional Council quality management system. This will be achieved by undertaking a gap analysis to identify deficiencies between the existing systems and the ISO 9001:2008 standard. The outcomes from this research are expected to result in the exposure of substandard procedures or processes, within the existing systems. The recommendations for improvements to the system are expected to result in improvements in the efficiency of the new system and greater confidence in the quality of Council's product for the customer.

This chapter has given a brief overview of why this research project has been undertaken. It has provided a background to the organisation and the problems encountered within the current quality management system, namely the fact that there are currently two outdated systems in place. The aim and objectives of the project, which set out the guidelines for undertaking this research project, have also been documented. The following chapter contains the literature review that was conducted to provide an insight into the current literature offered on the subject matter and the associated quality management standards that exist.

Chapter 2 Literature Review

2.1 Introduction

This chapter provides a review of the literature that can be found on quality management systems and how to implement and improve those systems. The review centres on the standards that have been developed by the International Organisation for Standardisation, which is the ISO 9000 series for quality management systems. It has been found that there is extensive literature available on the subject matter however; it has been found that a majority of this literature focuses on how to interpret and understand the ISO 9000 standards and how to implement these standards so that your quality management system complies.

2.2 Early History of Quality Management

Quality management systems have been around for centuries. In the days of the Egyptian Pharaohs, there was an extensively documented quality system relating to the burial of the nobility, which was known as the *Book of the Dead* (Durant in Stamatis 1995). Quality management was also found in early Chinese history as well. According to Durant (in Stamatis 1995), ‘the first Emperor of China, Qin Shi Huangdi, who was responsible for the vast, underground, terra-cotta army at Mount Li, decreed that all goods supplied for use in the imperial household should carry a mark that identified the maker so that if an item proved faulty he could be identified and punished’. The same technique was also found later in stone European buildings, where stone masons would use a registered mark to identify their work and the quality of the product used (Allcock and Unsworth in Stamatis 1995).

Quality management principles were also used in the Roman era and the Byzantine Empire. Both governing bodies had external auditors that were

appointed by the local governors. Their role was to regulate the procedures and inspect the quality of the works and the operations performed. (Corns 1968; Guerdan 1956).

Therefore, it can be seen from the above examples that quality management has been a part of many societies for centuries. It also shows that the principles used in these early days are still relevant in today's society. The above examples identify that proper quality procedures, identification and traceability and conducting inspections and audits of the works are all required to ensure that quality is maintained.

2.3 History of Current Quality Management Systems

Although quality management systems can be found in early history, the current quality management systems, which are in practice today, are the result of the extensive work within the field of quality, which began with Walter Shewart while he was working at Bell Laboratories in the 1920s. According to Russell & Taylor (2007), Walter Shewart 'developed the technical tools such as control charts that formed the basis of statistical quality control; he and his colleagues at Bell Labs introduced the term quality assurance for their program to improve quality through the use of statistical control methods'.

However, it has been the work of W. Edward Demming, who was a disciple of Walter Shewart, which has been the most prominent. Demming introduced the use of statistical process control to monitor the operation of punching data from census questionnaires onto millions of punch cards. However, it was his work during World War II, which gave Demming his international reputation. Demming taught his statistical quality control techniques to over 10,000 engineers and executives of military suppliers of the American and Allied forces. (Russel & Taylor 2007)

Other notable figures, who have contributed to the improvement in quality management systems over the years, are: Joseph M. Juran, Armand V. Feigenbaum, Philip Crosby and Kaoru Ishikawa. Joseph Juran focused on strategic quality planning within an annual quality program. Armand Feigenbaum introduced the concept of total quality control and continuous quality improvement as a companywide strategic commitment. Philip Crosby emphasized that the cost of poor quality control far outweighs the cost of preventing poor quality. Kaoru Ishikawa developed the “fishbone” (cause and effect) diagram to diagnose quality problems. (Russell & Taylor 2007)

2.4 Quality Management Standards and Specifications

This project requires a review of the quality management system at Lockyer Valley Regional Council and the main component of the review is an analysis of the quality management system against the specified standards. The most common standards are the ISO 9000 series of quality management requirements and in particular ISO 9001, which is the standard that an organisation gains certification for. The ISO series of standards have been developed by the International Organisation for Standardisation, which is based in Geneva, Switzerland and was founded in 1947 (Lamprecht in Bellamy et al 2001). The standard, ISO 9000, was first published in 1987, and was based on BS5750, which was developed by the British Standards Institution (Moatazed-Keivani et al 1998). Since that first publication, the standards have had a number to reviews and now consist of the following quality standards:

- ISO 9000:2006 – Quality management systems – Fundamentals and vocabulary.
- ISO 9001:2008 – Quality management systems – Requirements.
- ISO 9004:2000 – Quality management systems – Guidelines for performance improvements.

- ISO 10001:2007 – Quality management systems – Customer satisfaction – Guidelines for codes of conduct for organizations.
- ISO 10002:2004 – Quality management systems – Customer satisfaction – Guidelines for complaints handling in organizations.
- ISO 10003:2007 – Quality management systems – Customer satisfaction – Guidelines for dispute resolution external to organizations.
- ISO 10005:2006 – Quality management systems – Guidelines for quality plans.
- ISO 10006:2003 – Quality management systems – Guidelines for quality management systems in projects.
- ISO 10007:2003 – Quality management systems – Guidelines for configuration management.
- ISO 10012:2003 – Measurement management systems – Requirements for measurement processes and measuring equipment.
- ISO/TR 10013 – Guidelines for quality management system documentation.
- ISO 10014:2006 – Quality management systems – Guidelines for realizing financial and economic benefits.
- ISO 10015:1999 – Quality management – Guidelines for training.
- ISO/TR 10017:2003 Guidance on statistical techniques for ISO 9001:2000
- ISO 19011:2003 – Guidelines for quality and/or environmental management systems auditing.

As can be seen above there are a number of quality management standards that exist. The abovementioned standards have been wholly adopted by Standards Australia and Standards New Zealand, which are the governing councils for standards here in Australia and New Zealand. The Department of Main Roads, Queensland also has a specification on the requirements for quality management systems, which is MRS11.50 – Specific Quality System Requirements. However, the auditing process by Main Roads still

refers to ISO 9001 as the standard for which quality management systems are assessed against.

2.5 Quality Management Systems – General Requirements

The first step in reviewing the literature of quality management systems is to first define what a quality management system is. According to AS/NZS ISO 9000:2008, a quality management system is the management system used ‘to direct and control an organisation with regard to quality’ and the ‘direction and control with regard to quality generally includes establishment of the quality policy and quality objectives, quality planning, quality control, quality assurance and quality improvement’.

Kanter (1994) describes a quality management system as ‘the organisational structure, responsibilities, procedures, processes, and resources needed to implement quality management’. Therefore, Kanter describes the quality management system as a scheme that encompasses the whole organisation. This is also shown in the following figure from Queensland Transport, which tries to illustrate how a quality management system encompasses the whole organisation and includes the attitudes and culture as well as the documents and procedures:

Figure 2.1 – Total Quality Management System Diagram



(Source: Queensland Transport, 1994)

The above definitions illustrate what a quality management system is, whereas Pheng (1993) states why it is implemented by saying that ‘QA is basically a management process implemented to enhance confidence in a product or service by consistently achieving previously stated quality objectives set out in writing’.

2.6 Quality Management Systems – Documentation Requirements

There are a range of documents that make up the quality management system. According to AS/NZS ISO 9001:2008, ‘the quality management system documentation shall include:

- a) documented statements of a quality policy and quality objectives,
- b) a quality manual,

- c) documented procedures and records required by this International Standard, and
- d) documents, including records, determined by the organisation to be necessary to ensure the effective planning, operation and control of its processes’.

These documents are also identified as the necessary documentation for quality management by Clements (1993), who breaks the documents into three separate levels. The levels are: Level I – Strategic Documents; Level II – Tactical Documents; and Level III – Operational Documents.

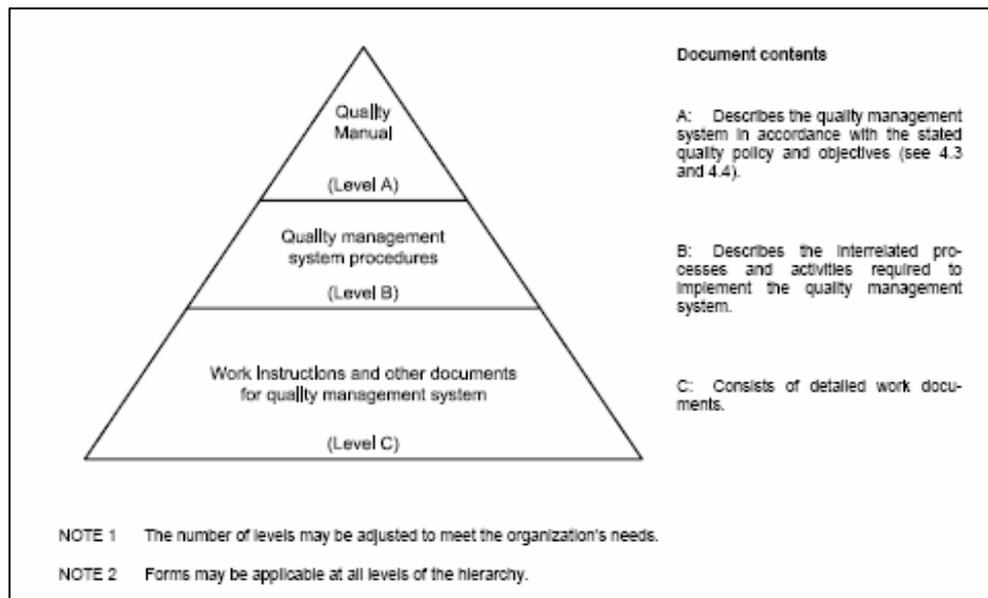
The Level I documents are identified as the strategic documents and includes the policy statements and objectives required to accomplish a specific goal, which is issued by management.

Level II documents are described as tactical documents, which are considered to be the quality manual or plan, and are the procedures that are written to carry out the stated policies.

Level III documents are the operational documents, which are the written work instructions that are issued in order to carry out the Level II procedures as well as the records of previous an implemented procedure or corrective action checklist.

The above sets of documents are also described in a similar manner in Kanter (1994), and shown in the following figure, which can be found in ISO10005:2005

Figure 2.2 - Typical Quality Management System Document Hierarchy



(Source: ISO 10005:2005 Quality Management Systems – Guidelines for Quality Plans)

2.6.1 Quality Policy

As described above a quality policy is considered a strategic document and should be used as an equal and consistent part of an organisation's overall policies and strategy. AS/NZS ISO 9004:2000 states that 'top management should use the quality policy as a means of leading the organisation toward improvement of its performance'. This is also stated by Stamatis (1995), who describes a quality policy as 'the overall quality intentions and direction of an organisation as regards to quality, as formally expressed by top management' and 'is only one element of the corporate policy'.

The requirements of AS/NZS ISO 9001:2008 states that, 'top management shall ensure that the quality policy:

- a) is appropriate to the purpose to the organisation,
- b) includes a commitment to comply with requirements and continually improve the effectiveness of the quality management system,

- c) provides a framework for establishing and reviewing quality objectives,
- d) is communicated and understood within the organisation, and
- e) is reviewed for continuing suitability’.

2.6.2 Quality Manual and Quality Procedures

The Quality manual is the second document that is required as part of the quality management system and as described by Kanter (1994) is a tactical document. AS/NZS ISO 9001:2008 states that, ‘the organisation shall establish and maintain a quality manual that includes:

- a) the scope of the quality management system, including details of and justification for and exclusions,
- b) the documented procedures established for the quality management system, or reference to them, and
- c) a description of the interaction between the processes of the quality management system’.

AS/NZS ISO 10005:2006 goes into further detail on the requirements and content to be included in a quality plan. The following list indicates the content required by this standard, which will be used for the development of a quality manual for Lockyer Valley Regional Council:

- Scope
- Management Responsibility
- Competence, Awareness and Training
- Infrastructure
- Work Environment
- Planning of Product Realisation
- Customer Related Processes
- Design and Development
- Purchasing
- Production and Service Provision

- Identification and Traceability
- Customer Property
- Preservation of Product
- Calibration of Monitoring and Measuring Devices
- Customer Satisfaction
- Monitoring and Measurement of Processes
- Monitoring and Measurement of Product
- Analysis of Data
- Continual Improvement

There are also a number of the items that may be included in the quality manual or developed as separate quality procedures. AS/NZS ISO 9001:2008 states that there must be a documented procedure within the organisation for the items listed below:

- Control of documents and data
- Control of records
- Control of a non conforming product
- Internal audits
- Improvements through corrective action
- Improvements through preventative action

2.7 Conclusion

The central focus on writing this literature review on the subject matter was the identification of the quality standards that exist and how they are applied. It can be reasonable to state that there is a large amount of literature available on quality management and within that literature there is a significant amount that refers to the ISO quality management standards. The following chapter outlines the methodology used to achieve the project aim and objectives.

Chapter 3 Research Methodology

3.1 Introduction

This chapter outlines the research methodology, which is used in this research project to improve the quality management system at Lockyer Valley Regional Council. After developing the specific objectives for this research project; researching the relevant Australian Standards and background information on quality management systems; and conducting a literature review on the subject matter, the following methodology has been developed in order to complete the broad aim and specific objectives of this research project.

The objective is to establish whether any deficiencies exist in the former quality management systems and where deficiencies exist with the AS/NZS ISO 9001:2008, make recommendations for improvements to the system. This has been achieved by reviewing the former quality management systems used at Laidley and Gatton Shire Councils and also the quality management systems at other local governments and the requirements of state departments and comparing each of their systems against each other. After conducting a comparative review of the systems, they will then be reviewed against the quality management standards and specifications to identify any gaps and deficiencies. The final step was to then use the results obtained from the comparative review and gap analysis and make recommendations for improvements to the system.

3.2 Overview of Quality Management Systems

The first step was to describe and define the former quality management systems that were in place at Laidley Shire Council and Gatton Shire Council. This step involved obtaining access to the documentation of the

two former systems, which was readily accessible. The second step was to then research the quality management systems of other local government departments. The quality management system of Goondiwindi Regional Council was obtained for this purpose.

3.3 Gap Analysis

A gap analysis is an examination of an existing system that is then compared to a specified standard in order to identify any deficiencies or gaps between the existing situation and the standard. Therefore, for this project, a gap analysis has been performed by examining the existing quality management systems against AS/NZS ISO 9001:2008 Quality Management Systems – Requirements.

After conducting the literature review on the subject matter, it was found that there were a number of checklists available from various organisations that could be used to perform a gap analysis. Each gap analysis checklist was based upon AS/NZS ISO 9001:2000 Quality Management Systems – Requirements, which is not the current standard. However, there are no differences between the structure of the 2000 and 2008 standard. The objective of the 2008 revision of the standard was for improved clarity. Therefore, gap analysis checklists of the outdated standard were still relevant. Gap analysis checklists were obtained from the following organisations:

- The ISO 9000 Store Website
- The Queensland Department of Main Roads
- The Queensland Department of Public Works
- The New South Wales Department of Commerce

As there are four gap analysis checklists and it is was only suitable to use one, a review of each of the checklists was undertaken to determine the most appropriate.

The ISO 9000 Store's checklist was found to be less detailed than the other checklists and was therefore discarded. The remaining three checklists were obtained from state government departments in Queensland and New South Wales and all related to the construction industry. All three gap analysis checklists were developed by these departments to help their service providers develop appropriate quality management system in accordance with ISO 9001. It was found that all three checklists were similar in structure and relevance with ISO 9001. It was determined that the checklist developed by the Queensland Department of Main Roads would be used. This is because Lockyer Valley Regional Council provides services to the Queensland Department of Main Roads and is required to have a quality management system that is approved by the Department.

When conducting the gap analysis on the existing systems, the systems were reviewed and identified as either compliant (C), need improvement (NI), or non-compliant (NC).

3.4 Comparative Review

The next step was to then conduct a comparative review of the quality management systems of the government departments by comparing and contrasting the results of the gap analysis. This will then be used to obtain an overall insight into the areas of compliance and non-compliance or where improvements can be made.

3.5 Analysis and Discussion of Results

An examination of the results obtained from the gap analysis will then be undertaken to identify the main areas where a gap between the existing systems and the ISO 9001:2008 standard occurs. Recommendations will then be made for improvements to the current systems based on the analysis undertaken and where the deficiencies occur. The challenges of implementing these changes to the quality management system at Lockyer Valley Regional Council will also be highlighted. This will be carried out by looking into the potential impacts that these changes may have on the organisation and the workforce.

3.6 Conclusion

This chapter has identified the research methodology that has been followed so that improvements to the quality management system at Lockyer Valley Regional Council can be achieved. A comparative review has been undertaken along with a gap analysis. The results are contained within the following chapter with a discussion and the recommendations for improvements to the system contained within the subsequent chapter.

Chapter 4 Results

4.1 Introduction

This chapter presents the results obtained from conducting the gap analysis and comparative review of the local government quality management documents. The gap analysis and comparative review have been undertaken in accordance with the methodology outlined in Chapter 3. The first step in the process is to provide an overview of the quality management systems that will be used in conducting the gap analysis and comparative review.

4.2 Overview of the Quality Management Systems

An overview of the quality management systems from the following Councils are shown below:

- Laidley Shire Council;
- Gatton Shire Council; and
- Goondiwindi Regional Council.

A quality management system was also developed by the Workplace Health and Safety department of Lockyer Valley Regional Council, however upon closer review; it was found to be similar to the former Gatton system and was therefore discarded as these same results would have been achieved.

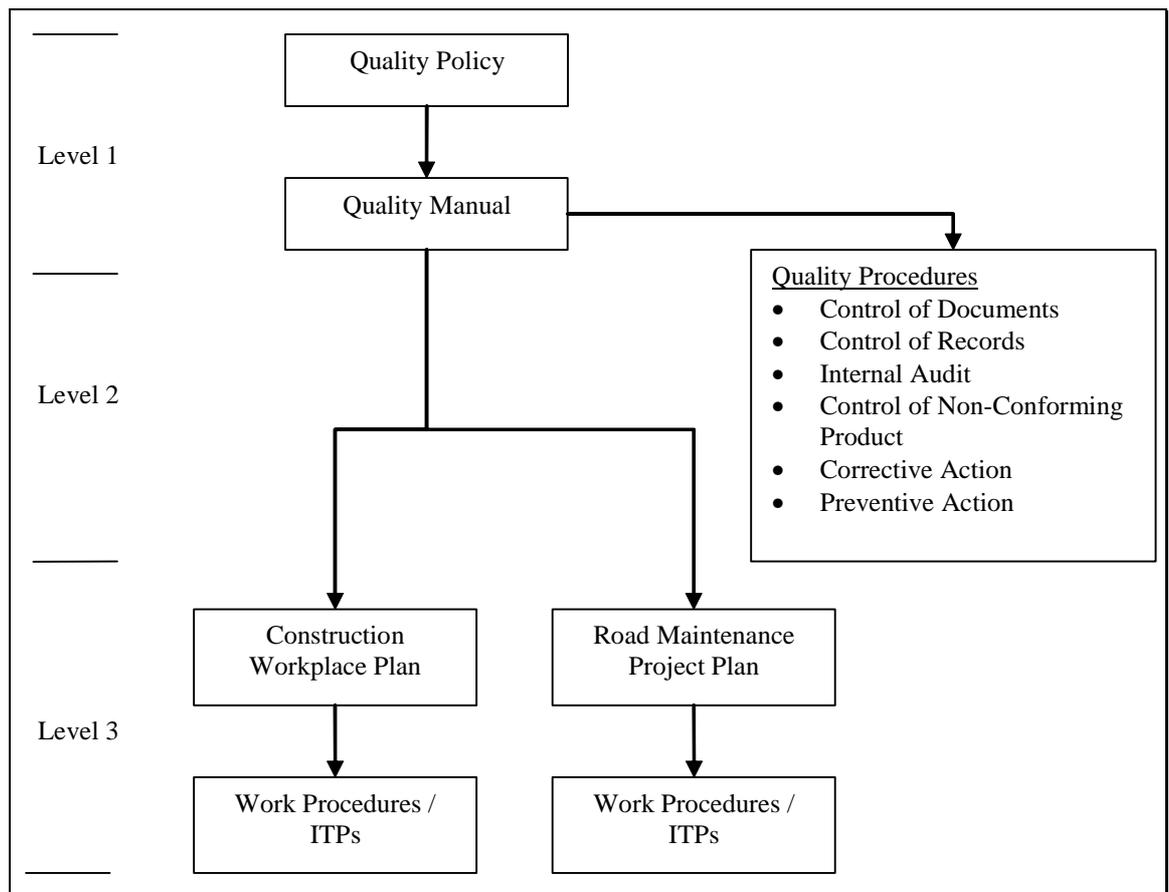
4.2.1 Laidley Shire Council

Laidley Shire Council's quality management system, which is used for construction and maintenance, can be categorised into the three general levels of documentation, which were discussed in the literature review.

At the top of the quality management system there is a quality policy, which contains a mission statement and a policy statement and objectives. Beneath the quality policy there is a quality manual. The quality manual provides an overview of the system and details Laidley Shire Council's standard of commitment in pursuing an acceptable level of quality for services delivered to the customer. The quality manual also makes references to the quality procedures, which are shown as separate documents within Laidley's quality management system.

The quality system also has a set of operational documents, which includes a construction workplace plan that is used for capital upgrades of infrastructure and a road maintenance project plan for carrying out routine maintenance. Each operational document then has appropriate works procedures and inspection and test plans for the respective works. A diagram of the Laidley Shire Council quality management system is shown in Figure 4.1 below:

Figure 4.1 - Laidley Shire Council Quality Management System



4.2.2 Gatton Shire Council

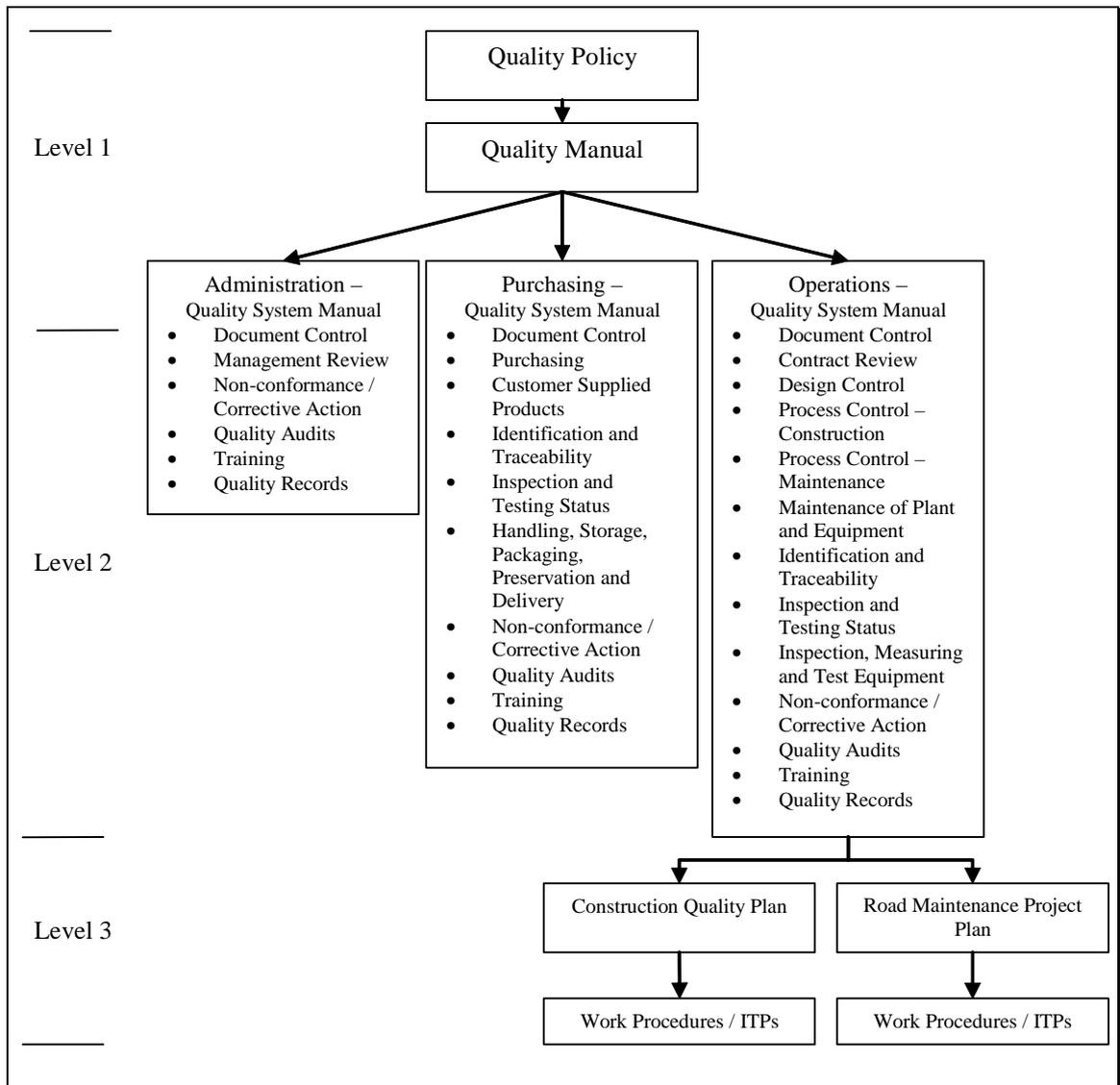
Gatton Shire Council’s quality management system, which is used for construction and maintenance, can also be categorised into the three general levels of documentation. However, the levels of documentation are not as clearly defined as they were for Laidley’s quality management system.

At the head of the quality management system there is a quality policy, which contains a mission statement and statements of Gatton’s commitment to quality. Underneath the quality policy there is a quality manual. The quality manual is broken up into three small quality system manuals, which are an administration manual, purchasing manual and an operational manual. The administration manual details how roadworks projects are to be managed to ensure quality is achieved. The purchasing manual describes the

procedures that were adopted by Council to ensure that all products purchased for construction activities met Council's requirements. The operational manual covers the actual working arrangements and procedures to ensure Council meets its customer's requirements with regards to quality. Each manual contains its own set of quality procedures, which are not as clearly defined as Laidley Shire Council's procedures were.

The quality system also has a set of operational documents, which includes a quality project plan that is used for capital upgrades of infrastructure and a road maintenance plan for carrying out routine maintenance. Each operational document then has appropriate works procedures and inspection and test plans for the respective works. A diagram of the Gatton Shire Council quality management system is shown in Figure 4.2 below:

Figure 4.2 - Gatton Shire Council Quality Management System



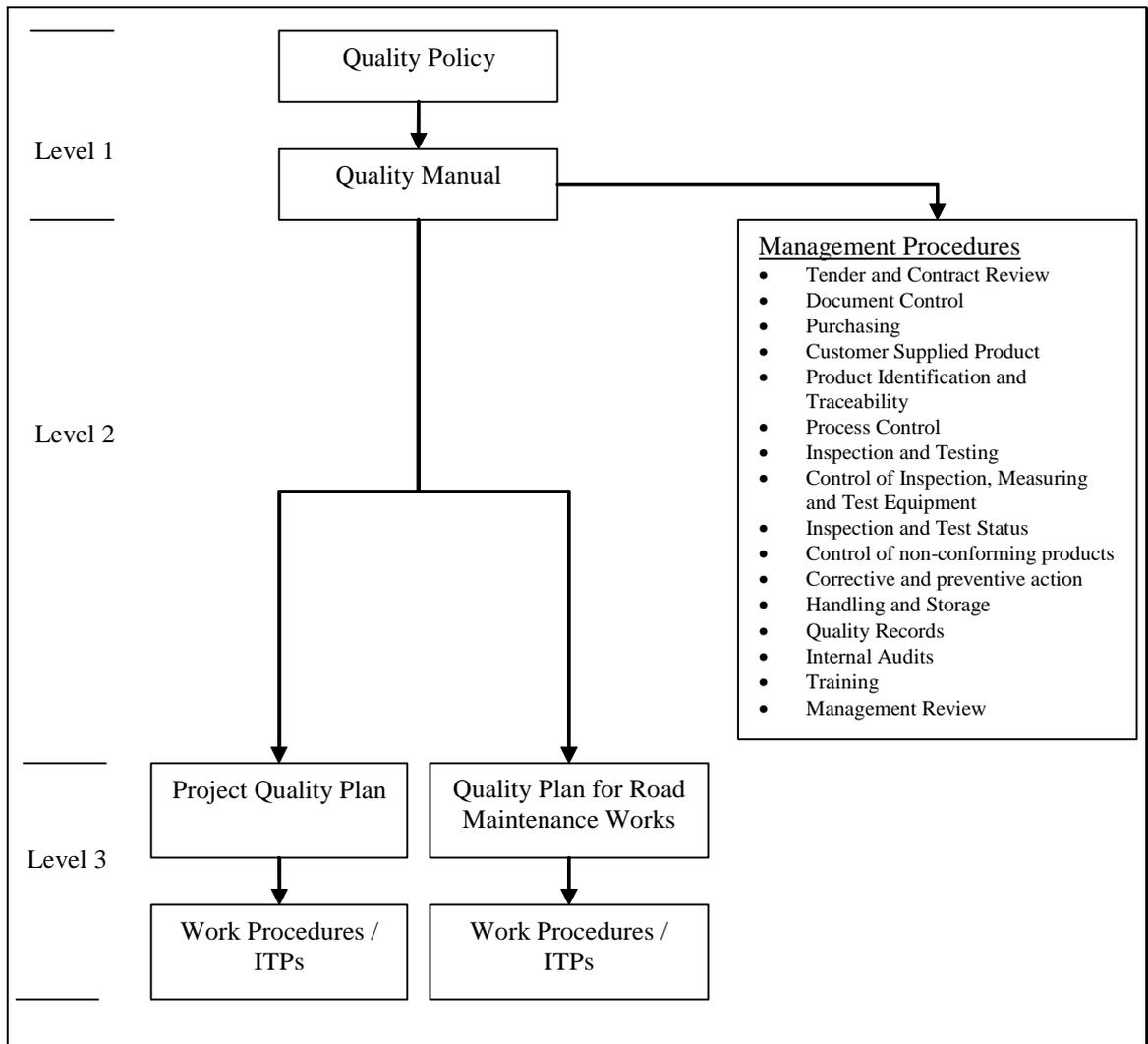
4.2.3 Goondiwindi Regional Council

Goondiwindi Regional Council’s quality management system that is used for construction and maintenance can be categorised into the three general levels of documentation, which were discussed in the literature review.

At the top of the quality management system there is a quality policy and beneath the quality policy there is a quality manual. Goondiwindi’s quality management system also has a schedule of management procedures in place.

The quality system has a set of operational documents, which includes a project quality plan and a road maintenance quality plan for carrying out routine maintenance. Each operational document then has appropriate works procedures and inspection and test plans for the respective works. A diagram of the Goondiwindi Regional Council quality management system is shown in Figure 4.3 below:

Figure 4.3 - Goondiwindi Regional Council Quality Management System



4.3 Comparative Review of the Systems

As can be seen in the descriptions of the above mentioned quality management systems of Laidley Shire Council, Gatton Shire Council and Goondiwindi Regional Council all three systems generally have a three tiered structure of quality management documents. Each system contains a quality policy and quality manual.

The Laidley and Goondiwindi systems have a similar and well defined structure, with the use of quality management procedures located within separate documents. The Gatton system is somewhat different due to its use of three separate quality systems manuals, which are for administration, purchasing, and operations. This does result in some duplication of areas within documents for procedures such as control of documents and control of records. The Gatton system also does not have a set of documented procedures, which is a requirement for specific sections of the ISO 9001:2008 standard.

Each system also has a set of level three or operational documents. All three systems have separate project plans in place for both construction and maintenance. Furthermore, they all have a set of works procedures and inspection and test plans for the various construction and maintenance activities that are carried out.

4.4 Gap Analysis

A gap analysis has been performed using the methodology outlined in Chapter 3. The Queensland Department of Main Roads Quality Audit Checklist has been broken down into the individual sections of the ISO 9001:2008 standard and the results of the gap analysis shown in each table. The systems were reviewed and identified as either compliant (C), need improvement (NI), or non-compliant (NC). A comparative review of the performance of each quality management system against the standard was then undertaken.

4.4.1 Quality Manual

The quality manual is simply a document that describes the quality management system and is usually the main document that all other quality management documents and procedures fall under. The requirements of a quality manual are specified in Clause 4.2.2 of ISO 9001:2008. The results of the gap analysis performed on the quality manual are shown below in Table 4.1:

Table 4.1 - Gap Analysis: Quality Manual

Clause 4.2.2 Quality Manual					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
Quality Manual:	-		-		-
• Scope of system (<i>any exclusions to be stated</i>)	NI		NC		NI
• Documented procedures established or make reference (<i>a table, in-text reference</i>)	C		NI		NI
• Description – interaction of the system (<i>overview of how the services sequence, diagram of interface</i>)	NI		NI		NI

As shown in the above table the quality manual by Laidley Shire Council does contain a scope of the system, however it does not make reference to any exclusions within the document. This was similar to the scope provided by Goondiwindi's manual. On the other hand, the scope provided by Gatton Shire Council's manual was only one sentence and did not fully explain the scope of the system.

Laidley's manual does make reference to its documented procedures whereas Gatton's manual does not have specific documented procedures although it does make reference to its three systems manuals and the contents of each. Goondiwindi's plan does not make any reference to its procedure within the manual but are shown as a table within an appendix.

Each manual does provide an overview of their quality management system however; they could be better described through the use of a sequence diagram or flow chart.

4.4.2 Control of Documents

Any quality management system needs to ensure that all documents managed by the system are controlled to some extent and a procedure for controlling documents needs to be established. The requirements for the control of documents procedure are specified in Clause 4.2.3 of ISO 9001:2008. The results of the gap analysis performed on the control of documents procedure are shown below in Table 4.2:

Table 4.2 - Gap Analysis: Control of Documents

Clause 4.2.3 Control of Documents					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
Documented procedure	C		NC		C
• Approval of document	C		NC		C
• Review and update as necessary and re-approve	C		NC		C
• Changes and current revision status of documents are identified	C		NC		C
• Applicable documents are available at points of use	C		NC		C
• Documents remain legible and readily identifiable (<i>min requirements: doc name and date of issue</i>)	C		C		C
• Documents of external origin are identified and distribution controlled (<i>Aust Stds, MR Manuals, Council Regs, Acts of Parliament</i>)	NI		NI		NI
• Obsolete documents. Apply suitable identification – if retained	C		NC		C
• Data backups	NI		NC		C

It can be seen from the above table that the Laidley and Goondiwindi quality management systems do have a documented procedure for the control of documents whereas the Gatton system does not. Each system needs to improve its identification of documents of external origin, such as Australian Standards and engineering manuals.

4.4.3 Control of Records

Quality management systems also need to ensure that all records required by the system are managed and controlled to some extent and a procedure for controlling records needs to be established. The requirements for the control of records procedure are specified in Clause 4.2.4 of ISO 9001:2008. The results of the gap analysis performed on the control of records procedure are shown below in Table 4.3:

Table 4.3 - Gap Analysis: Control of Records

Clause 4.2.4 Control of Records					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
Documented procedure:	C		NC		C
Identification, storage, protection, retrieval, retention time & disposition of records. (<i>Dataworks record management system</i>)	C		NI		C

The Laidley and Goondiwindi quality management systems do have a procedure for the identification, storage, protection, retrieval, retention time & disposition of records. The Gatton system does not have a documented procedure for the control of records however; it does make reference to record keeping throughout its quality manual. Subsequently, it would be better described through the use of a single documented procedure.

4.4.4 Management Responsibility

Management commitment recognizes that, without visible and sustained leadership from the organisation's senior management team, any management strategy will have limited success, or fail. Therefore, a successful quality management system must detail the requirements of management's responsibilities. The requirements for management responsibility are specified in Clause 5 of ISO 9001:2008. The results of the

gap analysis performed on management responsibility are shown below in Table 4.4:

Table 4.4 - Gap Analysis: Management Responsibility

Clause 5 Management Responsibility					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
• Management commitment	C		NI		C
• Quality Policy	C		-		C
❖ Appropriate to purpose of org.	C		C		C
❖ Commitment to continual improve	C		NC		C
❖ Provides a framework for establishing & reviewing quality objectives	NI		NI		NI
❖ Communicated and understood	NI		NC		NI
• Quality Objectives established	C		NC		C
❖ Measurable	NC		NC		NC
❖ Consistent with policy <i>(Corporate Plan, Operations- Business Plan, Works budget)</i>	NI		NC		NI
• Responsibility & Authority	-		-		-
❖ Defined and communicated	NI		NI		C
❖ Management Representative	NI		NI		C
• Internal Communication <i>(team meetings, briefings, email, toolbox talks, newsletters)</i>	NC		NC		C
• Management Reviews	-		-		-
❖ Planned intervals	NC		NI		C
❖ Review for improvement, Policy & Objectives	NC		NC		C
❖ Records	NC		NC		C
❖ Inputs (5.6.2)	NC		NC		C
❖ Outputs (5.6.3) including Action <i>(Council meetings, CEO-Director meetings, monthly reports up to Council, Team meetings, toolbox talks)</i>	NC		NC		C

• Resource needs	NC	NC	-
• Customer focus	NC	NC	C

It can be seen from the above table that management responsibility is not compliant in either Laidley or Gatton's quality management system documentation and a lot of improvements are required. Both systems do however contain a quality policy. Laidley's policy is compliant with regards to being appropriate to the purpose of the organisation; having a commitment to continually improve; and establishing a framework for establishing the quality objectives. Gatton's policy does however need improvement as it only complies with being appropriate to the purpose of the organisation. Goondiwindi's system does identify the management responsibilities and authorities of its senior management, as well as having a documented procedure for conducting management reviews.

4.4.5 Competence, Awareness and Training

Competence refers to the demonstrated ability to consistently perform work to a required standard and awareness recognizes that, for people to produce to required quality of their work, they need to understand what they are required to do and the importance of it. The requirements for competence, awareness and training are specified in Clause 6.2.2 of ISO 9001:2008. The results of the gap analysis performed on competence, awareness and training are shown below in Table 4.5:

Table 4.5 - Gap Analysis: Competence, Awareness and Training

Clause 6.2.2 Competence, Awareness and Training			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
• Determine the necessary competence for personnel (<i>PPR sessions</i>)	NC	NC	C
• Provide training	NC	NC	C
• Evaluate the effectiveness (<i>on-job assessment by workplace trainer-assessor, provider assessment</i>)	NC	NC	C
• Ensure personnel aware of their contribution to the achievement of the quality objectives (<i>Performance planning sessions</i>)	NC	NC	C
• Maintain appropriate records of education, training, skills and experience (<i>induction training = new staff; WH&S; site-inductions. HR or WHS Rep may hold any/all these/ personnel files</i>)	NC	NI	C

Competence, awareness and training is not identified in either Laidley or Gatton’s quality manual or procedures and is therefore non compliant. Gatton’s quality manual does make reference to the identification and provision of training however, improvement is needed. Goondiwindi on the other hand does have a documented management procedure for the provision of training.

4.4.6 Infrastructure

In order for a person to perform work to the best of their ability, they need the appropriate infrastructure and equipment. Therefore, appropriate planning of the infrastructure is a necessary part of any quality management system. The requirements for infrastructure are specified in Clause 6.3 of

ISO 9001:2008. The results of the gap analysis performed on infrastructure are shown below in Table 4.6:

Table 4.6 - Gap Analysis: Infrastructure

Clause 6.3 Infrastructure					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
Provide:	-		-		
• Buildings, workspace, and associated facilities	NC		NC		NC
• Process equipment (both hardware and software)	NC		NC		NC
• Supporting services (e.g. Transportation or communication) <i>(Safeplan audits, other Agency audits)</i>	NC		NC		NC

As shown above none of the quality management systems make any reference to infrastructure planning. Although the organisations themselves have procedures in place to plan their infrastructure requirements, such as safeplan audits and plant committees, they are not identified within their quality management system.

4.4.7 Work Environment

Work environment is similar to the infrastructure requirements specified in Clause 6.3 of ISO 9001:2008, however work environment relates to the indirect environment, which may includes weather, light, comfort and space. The requirements for work environment are specified in Clause 6.4 of ISO 9001:2008. The results of the gap analysis performed on work environment are shown below in Table 4.7:

Table 4.7 - Gap Analysis: Work Environment

Clause 6.4 Work Environment					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
<ul style="list-style-type: none"> • Suitable work environment (<i>Safepan audits, OH&S audits</i>) 	NC		NC		NC

As shown above none of the quality management systems make any reference to work environment. Although the organisations themselves have procedures in place to plan their work environment requirements, such as OH&S audits, work method statements and risk assessments, they are again not identified within their quality management system.

4.4.8 Planning of Product Realisation

Product realisation is the term used to describe the process required to get the work done. It is necessary for works procedures to be developed for each product, which describes the objectives to be completed and the resources necessary to conduct the work. The requirements for product realisation are specified in Clause 7.1 of ISO 9001:2008. The results of the gap analysis performed on product realisation are shown below in Table 4.8:

Table 4.8 - Gap Analysis: Planning of Product Realisation

Clause 7.1 Planning of Product Realisation					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
Determine the following:	-		-		
• Quality objectives and requirements of the product	C		NC		C
• The need to establish processes, documents, and provide resources specific to the product	NI		NI		C
• Required verification, validation, monitoring, inspection, and test activities specific to the product and the criteria for product performance	NI		NI		C
• Records (<i>Project plans, Pre-start, construction, post-construction meetings, budget reviews, planning meetings, MR Annual Performance Reports</i>)	NI		NI		C

Product realisation is covered in the quality systems of Laidley, Gatton and Goondiwindi. Works processes and inspection and testing plans of activities are provided however, the realisation from planning to the final handover of products through pre and post-construction meetings, budget meetings and performance reports are not readily identified within the Laidley and Gatton quality systems but are within Goondiwindi's system.

4.4.9 Customer Related Processes

Customer related processes require that an effective quality management system has processes in place to ensure that products are to the customer's requirements and expectations. The requirements for customer related

processes are specified in Clause 7.2 of ISO 9001:2008. The results of the gap analysis performed on customer related processes are shown below in Table 4.9:

Table 4.9 - Gap Analysis: Customer Related Processes

Clause 7.2 Customer Related Processes					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
<i>Determination of:</i>	-	-	-	-	-
• Requirements specified by the customer	NC		NI		NI
• Requirements not stated by customer but necessary.	NC		NC		NC
• Statutory and regulatory requirements related to the product	NC		NC		NC
• Any additional requirements determined by the organisation	NC		NC		NC
<i>Review of requirements to include</i>	-	-	-	-	-
• Review prior to commitment to supply	NC		NC		NC
• Requirements are defined	NC		NC		NC
• Differing requirements resolved	NC		NC		NC
• Ability to meet requirements	NC		NC		NC
• Records kept	NC		NC		NC
• Amendments to documents	NC		NC		NC
• Changes advised to relevant personnel	NC		NC		NC
<i>Effective Customer Communication</i>	-	-	-	-	-
• Product information	NC		NC		NC
• Enquiries, contracts and amendments	NC		NC		NC
• Customer feedback (<i>Pre-start, construction, post-construction meetings, budget reviews, planning meetings, MR Annual Performance Reports</i>)	NC		NC		NC

As shown above none of the quality management systems make any documented reference to customer related processes.

4.4.10 Design and Development

Design and development planning requires that an effective quality management system has processes in place to ensure that design processes, such as reviewing and approving designs, are adhered to. The requirements for design and development processes are specified in Clause 7.3 of ISO 9001:2008. The results of the gap analysis performed on design and development related processes are shown below in Table 4.10:

Table 4.10 - Gap Analysis: Design and Development

Clause 7.3 Design and Development					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
Design and Development Planning <i>Determine:</i>	-		-		-
• Design and development stages	NC		C		NC
• Review, verification and validation	NC		C		NC
• Responsibilities	NC		C		NC
Design and Development Inputs To include:	-		-		-
• Functional and performance requirements	NC		NI		NC
• Stat and Regulatory requirements	NC		NC		NC
• Information from previous designs	NC		NC		NC
• Other as required.	NC		NI		NC
Design and Development Outputs To:	-		-		-
• Meet input requirements	NC		NI		NC
• Provide appro info for provision of service / product	NC		NI		NC
• Contain / ref. Acceptance criteria	NC		NI		NC
• Specify product characteristics	NC		NI		NC

Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
Design and Development Review	-		-		-
• Undertake as planned	NC		NI		NC
• Evaluate ability to meet requirements	NC		NI		NC
• Identify problems and solutions	NC		NI		NC
• Records maintained	NC		NI		NC
Design and Development Verification	-		-		-
• Undertake as planned	NC		NI		NC
• Outputs meeting input requirements	NC		NI		NC
• Records Maintained	NC		NI		NC
Design and Development Validation	-				-
• Undertake as planned	NC		NI		NC
• Product meeting required application	NC		NI		NC
• Records maintained	NC		NI		NC
Control of Design and Development Changes	-		-		-
• Changes identified, recorded, reviewed and passed through same process.	NC		NC		NC

It can be seen from the above table that Laidley Shire Council's and Goondiwindi Regional Council's quality systems do not make reference to the design and development of the products being constructed. Gatton's quality manual does identify some design control, such as the identification of design stages and responsibilities. However, the processes for reviewing, verifying and validating the process are not defined.

4.4.11 Purchasing

Managing the risk of purchasing requires that a planned approach is undertaken when selecting suppliers, specifying requirements and verifying purchases. The requirements for purchasing are specified in Clause 7.4 of

ISO 9001:2008. The results of the gap analysis performed on purchasing are shown below in Table 4.11:

Table 4.11 - Gap Analysis: Purchasing

Clause 7.4 Purchasing					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
• Evaluate and select suppliers	NC		C		C
• Are records of evaluations maintained	NC		C		C
• Adequate description of product being purchased	NC		C		C
• Appropriate verification of purchased product undertaken. Where performed at supplier's premises. This is stated in purchasing information (<i>financial audit, internal reviews, may refer to local government Purchasing Policy</i>)	NC		NI		C

Laidley Shire Council quality manual does not identify the procedure for purchasing products whereas Gatton Shire Council's system does. In spite of this each former Council had a purchasing policy which identified each Council's requirements and specifications for purchasing. Therefore, it would be made better that a reference to the purchasing policy was made rather than duplicating the requirements and constantly reviewing the documents to ensure they contain the same information. Goondiwindi does have a quality management procedure for purchasing.

4.4.12 Production and Service Provision

Production and service provision requires that an organisation control its work processes, so that consistent results are achieved. The requirements for production and service provision are specified in Clause 7.5 of ISO

9001:2008. The results of the gap analysis performed on production and service provision are shown below in Table 4.12:

Table 4.12 - Gap Analysis: Production and Service Provision

Clause 7.5 Production & Service Provision					
Item	Laidley Council	Shire	Gatton Council	Shire	Goondiwindi Regional Council
<i>Control of Production & Service Provision:</i>	-		-		-
• Availability of information on product (<i>Project plans- Quality/ Environment/ Safety/ Traffic Control</i>)	C		NI		C
• Availability of work instructions	C		NI		C
• Use of suitable equipment (<i>plant / equipment maintenance records – workshop, registrations//inspections by Machinery Inspectors</i>)	C		NI		C
• Use of monitoring and measuring devices	C		NI		C
• Implementation of monitoring and measuring	C		NI		C
• Implementation of release, delivery and post delivery activities	C		NI		C
<i>Validation of Processes for Production & Service Provision (as required.)</i>	-		-		-
• Defined criteria for review and approval of processes	C		NI		C
• Approval of equipment and qualification of personnel	C		NC		C
• Use of specific methods and procedures	C		NI		C
• Requirement of records	C		NI		C
• Revalidation	C		NI		C

Overall each of the quality management systems of Laidley Shire Council and Goondiwindi Regional Council are compliant where as Gatton needs to make improvements to their documented reference to production and service provision. Laidley and Goondiwindi both have works procedures in place that are used to control production and service provision. Gatton only

has inspection and test plans, which do not properly address the works processes.

4.4.13 Identification and Traceability

Identification means understanding and being able to show what a particular product is. Traceability is knowing where the product has come from or where it was used. The requirements for identification and traceability are specified in Clause 7.5.3 of ISO 9001:2008. The results of the gap analysis performed on identification and traceability are shown below in Table 4.13:

Table 4.13 - Gap Analysis: Identification and Traceability

Clause 7.5.3 Identification and Traceability			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
• Product identified	C	NI	C
• Identify the product status	NI	NI	C
• Where traceability required, control and record the unique identification. <i>(Dataworks system referencing)</i>	NI	NI	C

As shown above both of the quality management systems by Laidley Shire Council and Gatton Shire Council need to make improvements to their documented reference to identification and traceability. Goondiwindi does have a management procedure for identification and traceability.

4.4.14 Customer Property

Managing customer property requires that an organisation takes appropriate care of any property of the customer that is under the control or being used by the organisation. The requirements for customer property are specified in Clause 7.5.4 of ISO 9001:2008. The results of the gap analysis performed on customer property are shown below in Table 4.14:

Table 4.14 - Gap Analysis: Customer Property

Clause 7.5.4 Customer Property			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
Identify, verify, protect and safeguard customer property (can include intellectual property).	NC	C	C

It can be seen that Gatton’s quality system does have a process for identifying, verifying, protecting and safeguarding customer property, and so does Goondiwindi’s system in the form of a management procedure. Laidley’s system on the other hand does not make any reference to customer property.

4.4.15 Preservation of Product

Preservation of product ensures that none of the activities carried out will adversely affect the product or service that is being provided. The requirements for preservation of product are specified in Clause 7.5.5 of ISO 9001:2008. The results of the gap analysis performed on preservation of product are shown below in Table 4.15:

Table 4.15 - Gap Analysis: Preservation of Product

Clause 7.5.5 Preservation of Product			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
<ul style="list-style-type: none"> • Identification • Handling • Storage <i>(MSDS info, Safeplan results, stocktake results)</i>	NC	NI	C

No mention is made to the preservation of product within Laidley Shire Council’s quality management system and only a small amount of references are made within Gatton’s system. Handling and storage is identified in a management procedure within Goondiwindi’s system.

4.4.16 Calibration of Monitoring and Measuring Devices

Calibration of monitoring and measuring equipment used in inspecting quality is required to be tested itself to ensure the accuracy of the equipment. The requirements for calibration of monitoring and measuring equipment are specified in Clause 7.6 of ISO 9001:2008. The results of the gap analysis performed on calibration of monitoring and measuring equipment are shown below in Table 4.16:

Table 4.16 - Gap Analysis: Calibration of Monitoring and Measuring Devices

Clause 7.6 Calibration of Monitoring and Measuring Devices			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
<ul style="list-style-type: none"> • Determine devices and processes required. Equipment: • Calibrated at specified intervals • Identified to enable calibration status to be determined • Safeguarded from adjustments that would invalidate the measurement result • Protected from damage and deterioration during handling, maintenance and storage • Assess validity of previous results • Take appropriate action on equipment and any product affected. • Records maintained • Ability of computer software to satisfy intended application confirmed. <p><i>(Calibration spreadsheet, service records, diary notes for 2-peg test, asset numbers)</i></p>	NC	C	C

It can be seen that both Gatton’s and Goondiwindi’s quality systems do have a process for identifying and calibrating monitoring and measuring equipment, whereas Laidley’s system did not make any remarks in regards to monitoring and measuring equipments.

4.4.17 Customer Satisfaction

An effective quality management system must monitor customer satisfaction. The organisation is required to measure its performance and the customer perceives it to be. The requirements for customer satisfaction are specified in Clause 8.2.1 of ISO 9001:2008. The results of the gap analysis performed on customer satisfaction are shown below in Table 4.17:

Table 4.17 - Gap Analysis: Customer Satisfaction

Clause 8.2.1 Customer Satisfaction			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
<ul style="list-style-type: none"> • Monitor information about customer perception as to whether the organisation has met customer requirements (<i>survey results, feedback, complaints received, phone contacts made, MR Performance Reports, Post-construction meetings</i>) 	NC	NC	NI

As shown above none of the quality management systems make any documented reference to identifying customer satisfaction except for Goondiwindi, which makes a minor reference.

4.4.18 Internal Audit

An audit involves an independent audit of how work processes are being performed, or have been performed. The process for an internal audit must be a documented procedure. The requirements for internal audits are specified in Clause 8.2.2 of ISO 9001:2008. The results of the gap analysis performed on internal audits are shown below in Table 4.18:

Table 4.18 - Gap Analysis: Internal Audit

Clause 8.2.2 Internal Audit			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
Documented procedure	C	NC	C
• Manage system effectively, implemented and maintained	C	NC	C
• Planned intervals – Status and importance of areas, resourcing, previous audits	C	NC	C
• Reporting results	NI	NC	C
• Actions taken – timely	NC	NC	C
• Follow up activities	NC	NC	C

It can be seen that Laidley’s quality system and Goondiwindi’s quality system do have a procedures for conducting an internal audit; however Laidley’s procedure does need some improvement to meet the ISO 9001:2008 standard. Gatton’s system did not make any mention in regards to conducting an internal audit.

4.4.19 Monitoring and Measurement of Processes

Monitoring and controlling a process is the most effective way of ensuring the quality of the output or product. The requirements for monitoring and measuring processes are specified in Clause 8.2.3 of ISO 9001:2008. The

results of the gap analysis performed on monitoring and measuring processes are shown below in Table 4.19:

Table 4.19 - Gap Analysis: Monitoring and Measurement of Processes

Clause 8.2.3 Monitoring and measurement of Processes			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
• Suitable methods for monitoring and measurement of system	C	NI	C
• If planned results not achieved, correction and corrective action shall be taken	C	NI	C

As shown in the table above both Laidley’s and Goondiwindi’s systems do have a compliant system of procedures for monitoring and measuring process. These are in the form of works procedures and inspection and test plans, which identify the processes for each type of activity. The works procedures and inspection and test plans found within Gatton’s quality system do not properly identify the processes for each activity and need improvement.

4.4.20 Monitoring and Measurement of Product

Monitoring and measurement of product is concerned with verifying that the customer’s requirements have been met at appropriate stages and before handover of the product. The requirements for monitoring and measuring products are specified in Clause 8.2.4 of ISO 9001:2008. The results of the gap analysis performed on monitoring and measuring products are shown below in Table 4.20:

Table 4.20 - Gap Analysis: Monitoring and Measurement of Product

Clause 8.2.4 Monitoring and Measurement of Product			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
Monitor and measure the product to verify requirements met:	C	C	C
• At appropriate stages	C	C	C
• Evidence of conformity	C	C	C
• Records to indicate the person(s) authorising the release of product <i>(Lot Test results, client feedback)</i>	C	C	C

The works procedures and inspection and test plans for each quality system do identify the requirements for monitoring and measuring the products and are therefore compliant.

4.4.21 Control of Non-Conforming Product

A non-conforming product is any product or service that does not meet the specified requirements and it needs to be clearly identified and controlled to prevent further usage. A documented procedure must be in place to control any non-conforming product. The requirements for control of a non-conforming product are specified in Clause 8.3 of ISO 9001:2008. The results of the gap analysis performed on control of a non-conforming product are shown below in Table 4.21:

Table 4.21 - Gap Analysis: Control of Non-Conforming Product

Clause 8.3 Control of Nonconforming Product			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
• Documented procedure noting responsibilities & authorities	C	NC	C
• Take action to eliminate nonconformity	C	NI	C
• Use under concession	C	NI	C
• Records maintained	C	NI	C
• Reverification to demonstrate conformity to the requirements	C	NC	C
• If N/C Product detected after delivery or use, take action appropriate to the effects or potential effects, of the nonconformity.	C	C	C

The table above identifies that Laidley’s system and Goondiwindi’s system do have a documented and compliant procedure for the control of a non-conforming product. On the other hand, Gatton’s system does not have a documented procedure but it does make some reference to the control of a non-conforming product.

4.4.22 Analysis of Data

As a result of measuring and monitoring activities and products, there will be a considerable amount of data collected. It is therefore appropriate to analyse the data to assess the effectiveness of the quality management system or to identify any improvements that could be made. The requirements for analysis of data are specified in Clause 8.4 of ISO 9001:2008. The results of the gap analysis performed on analysis of data are shown below in Table 4.22:

Table 4.22 - Gap Analysis: Analysis of Data

Clause 8.4 Analysis of Data			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
To provide information relating to:	-	-	-
• Effectiveness of QMS & its continual improvement	NC	NC	NC
• Customer satisfaction (see 8.2.1)	NC	NC	NC
• Conformance to customer requirements (see 7.2.1)	NC	NC	NC
• Characteristics and trends of processes and products including opportunities for preventive action	NC	NC	NC
• Suppliers (<i>analysis of survey results, complaints handling, phone contacts, supplier performance, accident-incidents</i>)	NC	NC	NC

As shown above none of the quality management systems make any documented reference to the analysis of data.

4.4.23 Continual Improvement

Continual improvement of a quality management system is a mandatory requirement of ISO 9001:2008. The requirements for continual improvement are specified in Clause 8.5.1 of ISO 9001:2008. The results of the gap analysis performed on continual improvement are shown below in Table 4.23:

Table 4.23 - Gap Analysis: Continual Improvement

Clause 8.5.1 Continual Improvement			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
<ul style="list-style-type: none"> • Organisation shall continually improve the effectiveness of the QMS through the use of quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review. <p><i>(Evidence of incorporation/analysis of data into actions to improve systems –Project Reviews, Management Review outcomes for example: Safeplan premium reductions, number of accidents-incidents, productivity changes, MR performance reports to Council, works budget performance)</i></p>	NI	NI	NI

As shown above each of the quality management systems need to make improvements to their documented reference to continual improvement.

4.4.24 Corrective Action

Improvement through corrective action is concerned with identifying why things have gone wrong and working out how they could be avoided in the future. Improvement through corrective action is one of the continuous improvement strategies where a documented procedure must be in place. The requirements for corrective action are specified in Clause 8.5.2 of ISO 9001:2008. The results of the gap analysis performed on corrective action are shown below in Table 4.24:

Table 4.24 - Gap Analysis: Corrective Action

Clause 8.5.2 Corrective Action			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
Documented procedure for:	C	NC	C
• Reviewing nonconformities (including customer complaints)	C	NI	C
• Determining causes of nonconformities	C	NC	C
• Evaluating action to ensure that nonconformities do not recur	C	NC	C
• Determining and implementing action	C	NC	C
• Records of the results of action taken	C	NI	C
• Reviewing corrective action <i>(Management review outcomes)</i>	C	NC	C

As shown in the table above Laidley’s system does have a documented and compliant procedure for corrective action and so does Goondiwindi’s system. On the other hand, Gatton’s system does not have a documented procedure and only makes a small remark with regards to corrective action.

4.4.25 Preventive Action

Improvement through preventive action is another continuous improvement strategy where a documented procedure must be in place. It is somewhat more difficult to address than corrective action because you are required to anticipate non-conformances, rather than respond to problems or errors. The requirements for preventive action are specified in Clause 8.5.3 of ISO 9001:2008. The results of the gap analysis performed on preventive action are shown below in Table 4.25:

Table 4.25 - Gap Analysis: Preventative Action

Clause 8.5.3 Preventive Action			
Item	Laidley Shire Council	Gatton Shire Council	Goondiwindi Regional Council
Documented procedure to define:	C	NC	C
• Determining potential non conformities and causes	C	NI	C
• Evaluating the need for action to prevent occurrence of non conformities	C	NI	C
• Determining and implementing action needed	C	NC	C
• Actions recorded	C	NC	C
• Reviewing preventive action taken. <i>(Management review outcomes)</i>	C	NC	C

As shown in the table above Laidley Shire Council and Goondiwindi Regional Council do have a documented and compliant procedure for preventive action. Gatton’s system does not have a documented procedure and only makes a small remark with regards to preventive action. It is therefore non compliant.

4.5 Conclusion

This chapter has presented the results obtained from conducting a review of the former quality management systems at Laidley Shire Council and Gatton Shire Council. The gap analysis has identified the areas in which the systems are compliant with the ISO 9001:2008 standard; need improvement in order to be compliant; or a non-compliant with the standard. The results that are shown with this chapter can now be discussed and used to identify deficient areas with the quality management system so that recommendations for improvements to the system can be made. The recommendations and also the challenges for implementing these changes will be discussed in the following chapter.

Chapter 5 Discussion and Recommendations

5.1 Introduction

This chapter will provide a discussion of the results obtained from the overview of the system and the gap analysis and comparative review that was undertaken using the Queensland Department of Main Roads Quality Audit Checklist. Recommendations for improvements to the system will be identified for the areas that either need improvement or are non-compliant. Discussion on the challenges of implementing the recommendations will also be undertaken, along with what the benefits of updating the quality management system at Lockyer Valley Regional Council to ensure that it complies with the requirements of ISO 9001:2008 – Quality Management Systems - Requirements.

5.2 Discussion of Gap Analysis and Recommendations

The results obtained from conducting the gap analysis can be found in chapter 4. After reviewing the results, it was found that certain sections within the system were found to be compliant, some needed improvement in order to be compliant and other sections were found to not be compliant.

5.2.1 Compliant – Quality Management Systems

The sections of the existing systems, in which at least one system is compliant with ISO 9001:2008, are:

- Control of Documents
- Control of Records
- Planning of Product Realisation

- Purchasing
- Production and Service Provision
- Customer Property
- Calibration of Monitoring and Measuring Devices
- Monitoring and Measurement of Process
- Monitoring and Measurement of Product
- Control of a Non-Conforming Product
- Corrective Action
- Preventive Action

It can be seen from the above list that the areas that have been found to be compliant are in fact the areas in which Laidley Shire Council and Goondiwindi Regional Council had specific documented procedures in place that were required by ISO 9001:2008. Therefore, when developing the new documentation for Lockyer Valley Regional Council, the existing procedures from Laidley Shire Council will be able to be used. Although Goondiwindi also has procedures in place, it will be more beneficial to use the procedures developed by the former Laidley quality management system. This is because the actual processes developed by Laidley Shire Council have not changed a great deal since the amalgamation of the two Councils.

There is a need to modify the procedures slightly in order to fit the new Council's system. The main change is in regards to the control of documents and control of records. This is due to the fact that a new electronic record keeping system, which was not used in the former Laidley Shire, is now in place. Therefore, the new control of documents and records procedures will need to make reference to the use of this electronic record keeping system.

The use of an electronic data management system is an improvement of the former system, which used a hard copy system to store its documents and records. The benefits of an electronic storage system include reducing the amount of office space required for paper based record keeping; better searching and analysis of data through electronic means; and the ability to

back up data. The current procedure will result is data being backed up and recorded weekly within the computer system.

The other section, which is compliant with the ISO 9001:2008 requirements, is the monitoring and measuring of devices, processes and products. Each Council's quality management systems were compliant in these areas. This is because each Council has a functioning set of operational documents, which are the level three documents as described within the literature review. These are the construction quality plans, works procedures and inspection and testing plans. Therefore, there is no need to modify these documents as the works processes, specifications and testing requirements located within the documents have not changed and are suitable for use within the new quality management system.

5.2.2 Needs Improvement – Quality Management Systems

The sections that need improvement in order to be compliant with ISO 9001:2008 are:

- Quality Manual
- Management Responsibility
- Design and Development
- Identification and Traceability
- Preservation of Product
- Internal Audit
- Continual Improvement

Quality Manual

The improvements required in order to make certain that the quality manual's requirements comply with ISO 9001:2008 are: to improve the scope of the system; ensure that references of the documented procedures and standards are established; and to provide a description of how the documented procedures and processes within the system interact.

In order to improve the scope of the system, the scope not only needs to identify what is included in the quality management system, but also make reference to any exclusions to the system as well as a justification as to why it is not included. The reason for stating exclusions is that the ISO 9001:2008 standard specifies the general requirements of a quality management system for all different types and sizes of organisations. Therefore, some of the requirements may not be suitable for your specific organisation. When a quality management system is independently certified, the certifying body will seek to audit all sections of the ISO 9001:2008 standard if there is no statement of justification for any exclusions from the standard itself. Therefore the organisation may fail the audit if no justification of exclusions is made.

An exclusion that will be required is the omission of some of the design and development section. This is because the new quality management system is mainly concerned with the construction and maintenance of civil infrastructure. Even though, Council does carry out design and development activities, it would be better to have a separate quality management system for the design process. This is due to the size of the system that would be necessary to ensure that appropriate stages of the design process are controlled. These stages would include: planning, responsibilities, design review, verification, and validation and how design changes are managed.

Management Responsibility

The management commitment requirements that are necessary to satisfy the ISO 9001:2008 requirements need the most improvement out of all of the sections as some areas are also non-compliant.

The first requirement is for top management to provide commitment to the development and implementation of the quality management system and to continually improve the effectiveness of the system. This commitment can be achieved through establishing the quality policy and objectives and communicating these objectives within the organisation. The policy and

objectives should be aligned with Council's other corporate policies and goals such as Lockyer Valley Regional Council Corporate Plan and Operational Plan. The quality objectives that need to be established should be realistic and related to achievable and measurable outcomes. Example of quality objectives could include:

- Improving documentation of internal business processes;
- Improving training in processes and services;
- Meeting specific technical, safety and environmental requirements for a product of service; and
- Improving the identification and control of non-conformances through preventive action.

The quality manual is also required to specify the responsibility and authority of management within the quality management system. Therefore, clarifying who does what within the system is fundamental. The use of organisational charts and responsibility statements will help to identify the interrelationships that exist. As part of the responsibility statements a management representative needs to be identified. The management representative has the overall responsibility of administering the quality management system and ensuring that the system is continually improving.

Establishing an effective internal communication processes is also vital to the improvement of any quality management system. It is often assumed that people will communicate or find a way to be informed however, a lack of effort usually means that this isn't true. Therefore, there is a need to establish structured communication processes that will encourage informal communication. Lockyer Valley Regional Council's engineering department conducts a regular monthly meeting with all construction and maintenance managers and foreman to discuss issues regarding safety, quality, and updates on projects. This process needs to be documented as a communication process used to improve the quality of Council's works.

Management are also responsible for conducting regular reviews of the quality management system to ensure its continual improvement. Although it is not required by ISO 9001:2008 to be a documented procedure, it is an important process and would be better established in the form of a procedure. The procedure should identify the following items:

- Frequency of reviews;
- Typical review agenda;
- Participants required;
- Method of documenting and recording review; and
- The method of implementing outcomes of the review.

Design and Development

This quality management system is to be used for construction and maintenance, therefore most parts of the design and development section of ISO 9001:2008 can be excluded. As stated earlier, this means that the exclusion must be stated and justified within the scope of the quality manual. This does not mean that Council does not need to develop a quality management system for design and development because it does. Council has a design section within its engineering department that is responsible for the designing of civil infrastructure projects such as roads and drainage schemes and there is a requirement for a quality management system to be in place to control the design process.

However, some parts of the design process do in fact need to be included within the construction and maintenance quality manual. The process for reviewing the design outputs, which may include design sketches, drawings, and specifications need to be input into the operational system within the project plan so that the appropriate project objectives and works procedures can be identified. A process also needs to be put in place for when design changes occur during the construction. In controlling design changes, the process needs to ensure that:

- identification, recording, and tracking of the changes occur;
- the impact of the change on other systems such as procurement, schedules and construction is checked;
- changes are reviewed by the relevant parties, such as clients, designer or project manager; and
- communication of the change to all parties occurs.

Design validation is also relevant to the construction process as validation results in checking that the as-constructed works will meet the documented requirements and specifications for the project as well as ensuring customer satisfaction. Therefore, the design validation process needs to be documented within the construction and maintenance quality management system. The process needs to identify the process of checking the built works against the design drawings and specifications, which is usually achieved by conducting as-constructed surveys and reviewing test data.

Identification and Traceability

The identification and traceability section of the existing quality management systems at Laidley and Gatton Shire Council need to be improved in order to comply with the requirements of ISO 9001:2008. The area, which needs improvement, is the traceability requirements. A reference to the process for controlling traceability needs to be identified within the system. Traceability needs to be linked to inspection and test records so that appropriate lot identification is maintained.

Preservation of Product

No mention of preservation of product is identified within Laidley's quality system and is only mentioned briefly within Gatton's system. Preservation of product during internal processing includes identification, handling, packaging, storage and protection. Examples of preserving products include:

- safety during lifting heavy objects;

- safe handling and use of hazardous equipment and materials; and
- safe identification, labelling and storage of chemicals.

The examples provided above are all identified within Council's workplace health and safety systems through the use of safety procedures, risk assessments and material safety data sheets (MSDS) for hazardous substances. Therefore, there is a need to provide a reference to Council's workplace health and safety systems within Council's quality management system so that the linkage between the two is identified.

Internal Audit

The process for conducting an internal audit is required to be a documented procedure as stated within the ISO 9001:2008 requirements. Laidley Shire Council's quality management system does have a procedure for conducting an internal audit however the procedure needs improvement. The procedure does not identify the steps to be taken in reporting the results of audits; how action is to be taken if a non-conformity is found; and when and how follow up activities are to occur in order to verify that action has been taken. Therefore, the procedure needs to be amended in order to satisfy this requirement.

Continual Improvement

It is a requirement that the organisation shall continually improve the effectiveness of the quality management system through the use of quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review. In order satisfy the requirement to continually improve, the activities described above need to be put into action. No quality management system will be able to continually improve without putting these processes into action. There is also a need to then record these actions to justify that the system is being continually improved.

The most appropriate method to ensure continual improvement is to analyse the existing system and the data obtained from previous audits and to then review the data within management review meetings. In order to ensure that action is taken, formal management reviews need to be implemented.

5.2.3 Non-Compliant – Quality Management Systems

The sections of the Gatton and Laidley Shire Council quality systems that are non-compliant with ISO 9001:2008 are:

- Competence, Awareness and Training
- Infrastructure
- Work Environment
- Customer Related Processes
- Customer Satisfaction
- Analysis of Data

Competence, Awareness and Training

The two former systems of Laidley and Gatton Shire Council are non-compliant with the requirements of Clause 6.2.2 of ISO 9001:2008, which relates to competence, awareness and training. The requirements of Clause 6.2.2 of ISO 9001:2008 Quality Management Systems – Requirements are:

‘The organization shall:

- a) determine the necessary competence for personnel performing work affecting conformity to product requirements,*
- b) where applicable, provide training or take other actions to achieve the necessary competence,*
- c) evaluate the effectiveness of the actions taken,*
- d) ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives, and*
- e) maintain appropriate records of education, training, skills and experience (see 4.2.4)’.*

The process for determining the necessary competence of personnel needs to be included within the quality manual. It is a requirement within the existing construction quality project plan that each worker states their competencies within the safety induction, certificates and licences register when they are inducted onto a construction site.

Lockyer Valley Regional Council does maintain appropriate records of education, training, skills and experience of employees within their personal files, which are managed by Council's human resources department. This therefore needs to be justified within Council's quality manual.

A process also needs to be put in place to monitor the existing skills and experience of Council's employees and plan for the future needs of the organisation. There is therefore a need to identify competency gaps and the training needs of the employees. Evaluations of training programs also need to be developed in order to justify or improve the training programs. This can easily be achieved through the use of feedback and evaluation sheets that are filled out by the participants of the training. Overall these processes need to be identified and procedures put in place within the quality management system.

Infrastructure

The two former systems of Laidley and Gatton Shire Council are non-compliant with the requirements of Clause 6.3 of ISO 9001:2008, which relates to infrastructure. The requirements of Clause 6.3 of ISO 9001:2008 Quality Management Systems – Requirements are:

'The organization shall determine, provide and maintain the infrastructure needed to achieve conformity to product requirements.

Infrastructure includes, as applicable,

- a) buildings, workspace and associated utilities,*
- b) process equipment (both hardware and software), and*

c) supporting services (such as transport, communication or information systems)'.

This clause requires the organisation to identify its infrastructure requirements that are necessary to carry out its daily work activities. Council currently identifies its infrastructure and equipment requirements through the use of a plant committee and workplace health and safety hazard inspections of buildings and workspaces. It is therefore necessary to make reference to these existing processes and document them within the quality management system.

Work Environment

The two former systems of Laidley and Gatton Shire Council are non-compliant with the requirements of Clause 6.4 of ISO 9001:2008, which relates to work environment. The requirements of Clause 6.4 of ISO 9001:2008 Quality Management Systems – Requirements are:

'The organization shall determine and manage the work environment needed to achieve conformity to product requirements'.

Clause 6.4: Work Environment is similar to the previous Clause 6.3: Infrastructure. There is currently no mention of work environment in regards to working within and identifying the needs of a suitable work environment within the existing quality management system. A number of processes currently exist, which a documented procedure has not been developed. Existing systems in which the work environment is evaluated include the use of risk assessments and work methods statements. Some examples of risks assessments include: working in hot conditions and confined spaces. Works procedures also identify the necessary personal protective equipment (PPE) and procedures for working in the sun.

Customer Related Processes

The two former systems of Laidley and Gatton Shire Council are non-compliant with the requirements of Clause 7.2 of ISO 9001:2008, which relates to customer related processes. The requirements of Clause 7.2 of ISO 9001:2008 Quality Management Systems – Requirements are:

‘7.2.1 Determination of requirements related to the product

The organization shall determine

- a) requirements specified by the customer, including the requirements for delivery and post-delivery activities,*
- b) requirements not stated by the customer but necessary for specified or intended use, where known,*
- c) statutory and regulatory requirements applicable to the product, and*
- d) any additional requirements considered necessary by the organization.*

7.2.2 Review of requirements related to the product

The organization shall review the requirements related to the product. This review shall be conducted prior to the organization's commitment to supply a product to the customer (e.g. submission of tenders, acceptance of contracts or orders, acceptance of changes to contracts or orders) and shall ensure that

- a) product requirements are defined,*
- b) contract or order requirements differing from those previously expressed are resolved, and*
- c) the organization has the ability to meet the defined requirements.*

Records of the results of the review and actions arising from the review shall be maintained (see 4.2.4).

Where the customer provides no documented statement of requirement, the customer requirements shall be confirmed by the organization before acceptance.

Where product requirements are changed, the organization shall ensure that relevant documents are amended and that relevant personnel are made aware of the changed requirements.

7.2.3 Customer communication

The organization shall determine and implement effective arrangements for communicating with customers in relation to

- a) product information,*
- b) enquiries, contracts or order handling, including amendments, and*
- c) customer feedback, including customer complaints’.*

There is therefore a need to develop a procedure for identifying the customer related processes within Council. In most instances customer related process already exist in an informal sense. It is therefore a requirement to document the control of these existing processes. There is also a need to record any discussions that occur between Council and the customer within the project files. These records may be in the form of meeting minutes, emails, phone conversations and memos. If there are any communications that result in changes to the existing product or design requirements, then these changes must be made in accordance with the design and development process stated earlier.

Customer Satisfaction

The two former systems of Laidley and Gatton Shire Council are non-compliant with the requirements of Clause 8.2.1 of ISO 9001:2008, which relates to customer satisfaction. The requirements of Clause 8.2.1 of ISO 9001:2008 Quality Management Systems – Requirements are:

‘As one of the measurements of the performance of the quality management system, the organization shall monitor information relating to customer perception as to whether the organization has met customer requirements. The methods for obtaining and using this information shall be determined’.

As most of the construction and maintenance works are carried out on Council’s assets, there is not a direct client. The client is essentially Council’s community and its ‘ratepayers’. Therefore assessment of customer satisfaction can be analysed through reductions in Council’s customer request/ complaints system. All front counter and phone call requests are recorded and this system could be used to monitor customer satisfaction.

The other form of construction and maintenance works that Council carries out is for external client, such as the Department of Main Roads and developers. In most instances customer contact is fairly regular and a close relationship exists during the construction progress as onsite inspections take place throughout the various stages of construction. Therefore identification of customer satisfaction is a somewhat informal process that takes place during construction. However, most construction projects will hold a set of meetings to ensure customer satisfaction at the various stages. These stages include: design review meetings, pre-start of construction meetings and post-constructions meetings. It is at these meeting were customer needs and satisfaction are to be recorded.

Analysis of Data

The two former systems of Laidley and Gatton Shire Council are non-compliant with the requirements of Clause 8.4 of ISO 9001:2008, which relates to analysis of data. The requirements of Clause 8.4 of ISO 9001:2008 Quality Management Systems – Requirements are:

‘The organization shall determine, collect and analyse appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the effectiveness of the quality management system can be made. This shall include data generated as a result of monitoring and measurement and from other relevant sources.

The analysis of data shall provide information relating to

- a) customer satisfaction (see 8.2.1),*
- b) conformity to product requirements (see 8.2.4),*
- c) characteristics and trends of processes and products, including opportunities for preventive action (see 8.2.3 and 8.2.4), and*
- d) suppliers (see 7.4)’.*

In order to comply with the requirements of Clause 8.4 of ISO 9001:2008 it is recommended that a documented procedure be put in place that identifies the methodology or step involved in conducting an analysis of the data. As stated in Clause 8.4, data can be obtained from a number of areas within the quality management system. Useful information can come from areas such as: non-conformance and audit reports, commonly occurring issues of customer dissatisfaction, employee suggestions to improve work practices, and financial data of project costs. The outcomes of this data should then form part of the management review agenda so that outcomes and actions for continual improvements to the system can be administered.

5.3 Challenges of Implementation

There will always be challenges and setbacks when setting up new systems within an organisation and implementing a quality management system is no different. Some of the potential challenges of implementation include: documenting internal processes; putting into practice new processes; the

requirement for additional paperwork and documentation; and improving record keeping.

Any new processes that are implemented within the new quality management system need to be communicated to the affected employees within the organisation. This communication may involve training on the new process to ensure compliance. There will also need to be follow up action to ensure that the process has been successfully implemented.

Although additional paperwork and documentation may result due to the changes within the system, they are necessary requirement to ensure compliance with ISO 9001:2008. On the other hand, the amount of forms and checklists that result in 'tick and flicks' needs to be minimized. This is so that work does not become counter productive. The amount of additional paperwork should be minimal as the main concern with the existing system is the lack of documented processes.

Improving the control of records is also an important process in the quality management process. This is because records provide justification of the quality of works and can be used to settle disputes. Maintaining records also allows for continual improvement by analysing the data recorded. The use of an electronic record system will improve this process as data will be electronically scanned so the possibility of losing data is minimal.

Implementing the requirements for additional paperwork and control of records can only be achieved through improved communication with staff to change the existing culture. Conducting audits to identify non-compliance within this area and following up these issues of non-compliance will be a start. Continual improvements can then be made to the system over time as better procedures and advancements in technologies and software occur.

5.4 Benefits

The main reasons for implementing a quality management system in accordance with ISO 9001:2008 are externally orientated. That is, improving the organisational image and responding to customer demand for ISO 9001 certification. In order for Lockyer Valley Regional Council to carry out works for the Department of Main Roads, Council needs to have an approved quality management system in place. It will also improve customer confidence for other clients such as private developers. The construction and maintenance works carried out for other organisations provide a form of revenue for Council. This therefore allows Council to provide a larger workforce within the community, which has employment benefits, and the profits from these external projects can be injected back into the community assets, which reduce the revenue required from charging rates.

The main internal benefits include establishing better control over business operations and processes; and providing a foundation for continuous improvement. Having better control over processes and continually improving these processes will result in improved operational efficiency. The benefits of this is that it can reduce defect rates and overall costs and produce better quality roads, which mean less maintenance expenditure and potentially longer useful lives.

5.5 Conclusion

This chapter has discussed the results obtained from the gap analysis in the previous chapter and made recommendations for improvements to the new quality management system. The recommendations were made in areas where the existing systems needed improvement or where it was non-compliant with the ISO 9001:2008 standard.

As can be seen in the above discussion, there are some functioning processes in place within Council however; they are not documented properly. As a result of these processes not being documented, customers, such as the Queensland Department of Main Roads, are unaware of them being in place and can only assume that the system does not work effectively. Another important aspect to consider, is the requirement to continually improve and without having proper processes in place and analysing the data obtained within the system, there is no way to gauge the effectiveness of continual improvement.

Chapter 6 Conclusion

6.1 Introduction

This research project has proved to be a valuable insight into the requirements for delivering an effective quality management system. The aim and objectives of this study was to investigate the former quality management systems used at Laidley Shire Council and Gatton Shire Council and make recommendations for the joining of the two systems, as well as making improvements to the new system. The improvements to the system were achieved by conducting a gap analysis by ensuring that all quality policies and management plans were in accordance with quality management standards, which was AS/NZS ISO 9001:2008.

This dissertation has provided an introduction to the project, a comprehensive review of the literature on quality management systems, the methodology for conducting the comparative review and gap analysis of the existing systems and an analysis and discussion of the results.

The results and subsequent analysis have revealed that there are a number of areas within the existing systems that are either compliant, need improvement, or non-compliant with ISO 9001:2008. Recommendations for improvements to the system were identified for the areas within the system where a gap was identified. The main areas where recommendations for improvements can be made include:

- documenting existing internal processes;
- improving procedures for conducting audits and management reviews;
- identifying the competency of the workforce and future training needs; and

- improving communication processes between Council and its customers to ensure their requirements are met and they are satisfied with the outcomes.

If the recommendations highlighted within the previous chapter are adopted and improvements to the system are effectively implemented, there will be many benefits for the organisation, which include greater customer confidence, improved efficiency, better communication and overall improved quality of the built infrastructure.

6.2 Further Research

Whilst undertaking this research a number of additional research topics were identified that could lead on from this dissertation and make improvements to Lockyer Valley Regional Council's quality management system. These potential research topics include:

- The development of a quality management system, which satisfies the requirements of ISO 9001:2008, for the design and development department at Council.
- Identifying a risk management approach to quality management and linking that to Council's asset management system where the quality of work correlates with the useful lives of the asset being constructed.
- A further step would be to develop an integrated management system that links the quality management system with other systems and departments within Council, such as workplace health and safety, finance, asset management and customer service.

6.3 Conclusion

This chapter has provided an overview of the previous chapters of this dissertation along with a summary of the recommendations for improvements to the new quality management system at Lockyer Valley Regional Council. Further areas for potential research opportunities have also been identified that will further improve the management systems within Council or any other organisation that does not have these systems in place.

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APPENDIX A – Project Specification

FACULTY OF ENGINEERING AND SURVEYING

ENG4111/4112 Research Project
PROJECT SPECIFICATION

FOR: **Mitchell Neil BICHEL**

TOPIC: INVESTIGATION OF THE QUALITY ASSURANCE SYSTEM AT
LOCKYER VALLEY REGIONAL COUNCIL

SUPERVISOR: Mr Trevor Drysdale
Mr Gerry Franzmann, Director Engineering Operations, Lockyer
Valley Regional Council

SPONSORSHIP: Lockyer Valley Regional Council

PROJECT AIM: This project seeks to investigate the quality assurance (QA) system
used at Lockyer Valley Regional Council for the construction and
maintenance of civil infrastructure.

PROGRAMME: (Issue A, 16 April 2009)

1. Research the background information relating to quality assurance systems and the requirements defined in AS/NZ ISO 9000 family of Australian Standards for quality management.
2. Research the Quality Assurance systems used by other local governments and state departments such as the Department of Main Roads.
3. Conduct a comparative review of the systems used by other local and state government departments for the construction and maintenance of civil infrastructure.
4. Describe and define the current QA system used for construction at Lockyer Valley Regional Council.
5. Analyse the current system against AS/NZ ISO 9000 series.
6. Make recommendations for improvements to the current system.

As time permits

7. Implement the updated QA system and gauge the effectiveness of the improvements.

AGREED

 (Student)

Date: / / 2009

_____ (Supervisor)

Date: / / 2009

Examiner/Co-examiner: _____

APPENDIX B – Queensland Department of Main Roads Quality Audit Checklist

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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4.2.2 Quality Manual				
Quality Manual:				
<ul style="list-style-type: none"> • Scope of system <i>(any exclusions to be stated)</i> 				
<ul style="list-style-type: none"> • Documented procedures established or make reference <i>(a table, in-text reference)</i> 				
<ul style="list-style-type: none"> • Description – interaction of the system <i>(overview of how the services sequence, diagram of interface)</i> 				
4.2.3 Control of Documents				
Documented procedure				
<ul style="list-style-type: none"> • Approval of document 				
<ul style="list-style-type: none"> • Review and update as necessary and re-approve 				
<ul style="list-style-type: none"> • Changes and current revision status of documents are identified 				
<ul style="list-style-type: none"> • Applicable documents are available at points of use 				
<ul style="list-style-type: none"> • Documents remain legible and readily identifiable <i>(min requirements: doc name and date of issue)</i> 				
<ul style="list-style-type: none"> • Documents of external origin are identified and distribution controlled <i>(Aust Stds, MR Manuals, Council Regs, Acts of Parliament)</i> 				
<ul style="list-style-type: none"> • Obsolete documents. Apply suitable identification – if retained 				
<ul style="list-style-type: none"> • Data backups 				
4.2.4 Control of Records				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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Documented procedure: Identification, storage, protection, retrieval, retention time & disposition of records. (<i>Dataworks record management system</i>)				
5 Management Responsibility				
• Management commitment				
• Quality Policy				
❖ Appropriate to purpose of org.				
❖ Commitment to continual improve				
❖ Provides a framework for establishing & reviewing quality objectives				
❖ Communicated and understood				
• Quality Objectives established				
❖ Measurable				
❖ Consistent with policy (<i>Corporate Plan, Operations-Business Plan, Works budget</i>)				
• Responsibility & Authority				
❖ Defined and communicated				
❖ Management Representative				
• Internal Communication (<i>team meetings, briefings, email, toolbox talks, newsletters</i>)				
• Management Reviews				
❖ Planned intervals				
❖ Review for improvement, Policy & Objectives				
❖ Records				
❖ Inputs (5.6.2)				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
❖ Outputs (5.6.3) including Action <i>(Council meetings, CEO-Director meetings, monthly reports up to Council, Team meetings, toolbox talks)</i>				
• Resource needs				
• Customer focus				
6.2.2 Competence, Awareness and Training				
• Determine the necessary competence for personnel <i>(PPR sessions)</i>				
• Provide training				
• Evaluate the effectiveness <i>(on-job assessment by workplace trainer-assessor, provider assessment)</i>				
• Ensure personnel aware of their contribution to the achievement of the quality objectives <i>(Performance planning sessions)</i>				
• Maintain appropriate records of education, training, skills and experience <i>(induction training = new staff; WH&S; site-inductions. HR or WHS Rep may hold any/all these/ personnel files)</i>				
6.3 Infrastructure				
Provide:				
• Buildings, workspace, and associated facilities				
• Process equipment (both hardware and software)				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
<ul style="list-style-type: none"> Supporting services (e.g. Transportation or communication) <i>(Safeplan audits, other Agency audits)</i> 				
6.4 Work Environment				
<ul style="list-style-type: none"> Suitable work environment <i>(Safeplan audits, OH&S audits)</i> 				
7.1 Planning of Product Realisation				
Determine the following:				
<ul style="list-style-type: none"> Quality objectives and requirements of the product 				
<ul style="list-style-type: none"> The need to establish processes, documents, and provide resources specific to the product 				
<ul style="list-style-type: none"> Required verification, validation, monitoring, inspection, and test activities specific to the product and the criteria for product performance 				
<ul style="list-style-type: none"> Records (<i>Project plans, Pre-start, construction, post-construction meetings, budget reviews, planning meetings, MR Annual Performance Reports</i>) 				
7.2 Customer Related Processes				
<i>Determination of:</i>				
<ul style="list-style-type: none"> Requirements specified by the customer 				
<ul style="list-style-type: none"> Requirements not stated by customer but necessary. 				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
• Statutory and regulatory requirements related to the product				
• Any additional requirements determined by the organisation				
<i>Review of requirements to include</i>				
• Review prior to commitment to supply				
• Requirements are defined				
• Differing requirements resolved				
• Ability to meet requirements				
• Records kept				
• Amendments to documents				
• Changes advised to relevant personnel				
<i>Effective Customer Communication</i>				
• Product information				
• Enquiries, contracts and amendments				
• Customer feedback <i>(Pre-start, construction, post-construction meetings, budget reviews, planning meetings, MR Annual Performance Reports)</i>				
7.3 Design and Development				
Design and Development Planning <i>Determine:</i>				
• Design and development stages				
• Review, verification and validation				
• Responsibilities				
Design and Development Inputs To include:				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
<ul style="list-style-type: none"> Functional and performance requirements 				
<ul style="list-style-type: none"> Stat and Regulatory requirements 				
<ul style="list-style-type: none"> Information from previous designs 				
<ul style="list-style-type: none"> Other as required. 				
Design and Development Outputs To:				
<ul style="list-style-type: none"> Meet input requirements 				
<ul style="list-style-type: none"> Provide appro info for provision of service / product 				
<ul style="list-style-type: none"> Contain / ref. Acceptance criteria 				
<ul style="list-style-type: none"> Specify product characteristics for use 				
Design and Development Review				
<ul style="list-style-type: none"> Undertake as planned 				
<ul style="list-style-type: none"> Evaluate ability to meet requirements 				
<ul style="list-style-type: none"> Identify problems and solutions 				
<ul style="list-style-type: none"> Records maintained 				
Design and Development Verification				
<ul style="list-style-type: none"> Undertake as planned 				
<ul style="list-style-type: none"> Outputs meeting input requirements 				
<ul style="list-style-type: none"> Records Maintained 				
Design and Development Validation				
<ul style="list-style-type: none"> Undertake as planned 				
<ul style="list-style-type: none"> Product meeting required application 				
<ul style="list-style-type: none"> Records maintained 				
Control of Design and Development Changes				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
<ul style="list-style-type: none"> Changes identified, recorded, reviewed and passed through same process. 				
7.4 Purchasing				
<ul style="list-style-type: none"> Evaluate and select suppliers 				
<ul style="list-style-type: none"> Are records of evaluations maintained 				
<ul style="list-style-type: none"> Adequate description of product being purchased 				
<ul style="list-style-type: none"> Appropriate verification of purchased product undertaken. Where performed at supplier's premises. This is stated in purchasing information <i>(financial audit, internal reviews, may refer to local government Purchasing Policy)</i> 				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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7.5 Production & Service Provision				
<i>Control of Production & Service Provision:</i>				
<ul style="list-style-type: none"> • Availability of information on product <i>(Project plans- Quality/ Environment/ Safety/ Traffic Control)</i> 				
<ul style="list-style-type: none"> • Availability of work instructions 				
<ul style="list-style-type: none"> • Use of suitable equipment • <i>(plant / equipment maintenance records – workshop, registrations//inspections by Machinery Inspectors)</i> 				
<ul style="list-style-type: none"> • Use of monitoring and measuring devices 				
<ul style="list-style-type: none"> • Implementation of monitoring and measuring 				
<ul style="list-style-type: none"> • Implementation of release, delivery and post delivery activities 				
<i>Validation of Processes for Production & Service Provision (as required.)</i>				
<ul style="list-style-type: none"> • Defined criteria for review and approval of processes 				
<ul style="list-style-type: none"> • Approval of equipment and qualification of personnel 				
<ul style="list-style-type: none"> • Use of specific methods and procedures 				
<ul style="list-style-type: none"> • Requirements of records 				
<ul style="list-style-type: none"> • Revalidation 				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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7..5.3 Identification and Traceability				
• Product identified				
• Identify the product status				
• Where traceability required, control and record the unique identification. <i>(Dataworks system referencing)</i>				
7.5.4 Customer Property				
• Identify, verify, protect and safeguard customer property (can include intellectual property).				
7.5.5 Preservation of Product				
• Identification • Handling • Storage <i>(MSDS info, Safeplan results, stocktake results)</i>				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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7.6 Calibration of Monitoring and Measuring Devices				
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<ul style="list-style-type: none"> • Determine devices and processes required. Equipment: • Calibrated at specified intervals • Identified to enable calibration status to be determined • Safeguarded from adjustments that would invalidate the measurement result • Protected from damage and deterioration during handling, maintenance and storage • Assess validity of previous results • Take appropriate action on equipment and any product affected. • Records maintained • Ability of computer software to satisfy intended application confirmed. <p><i>(Calibration spreadsheet, service records, diary notes for 2-peg test, asset numbers)</i></p>				
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8.2.1 Customer Satisfaction				
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<ul style="list-style-type: none"> • Monitor information about customer perception as to whether the organisation has met customer requirements <p><i>(survey results, feedback, complaints received, phone contacts made, MR Performance Reports, Post-construction meetings)</i></p>				
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Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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8.2.2 Internal Audit				
Documented procedure				
• Manage system effectively, implemented and maintained				
• Planned intervals – Status and importance of areas, resourcing, previous audits				
• Reporting results				
• Actions taken - timely				
• Follow up activities				
8.2.3 Monitoring and measurement of Processes				
• Suitable methods for monitoring and measurement of system				
• If planned results not achieved, correction and corrective action shall be taken				
8.2.4 Monitoring and Measurement of Product				
Monitor and measure the product to verify requirements met				
• At appropriate stages				
• Evidence of conformity				
• Records to indicate the person(s) authorising the release of product (<i>Lot Test results, client feedback</i>)				

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Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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8.3 Control of Nonconforming Product				
Documented procedure noting responsibilities & authorities				
Take action to eliminate nonconformity				
Use under concession				
Records maintained				
Reverification to demonstrate conformity to the requirements				
If N/C Product detected after delivery or use, take action appropriate to the effects or potential effects, of the nonconformity.				
8.4 Analysis of Data				
To provide information relating to:				
• Effectiveness of QMS & its continual improvement				
• Customer satisfaction (see 8.2.1)				
• Conformance to customer requirements (see 7.2.1)				
• Characteristics and trends of processes and products including opportunities for preventive action				
• Suppliers <i>(analysis of survey results, complaints handling, phone contacts, supplier performance, accident-incidents)</i>				
8.5.1 Continual Improvement				
• Organisation shall continually				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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<p>improve the effectiveness of the QMS through the use of quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.</p> <p><i>(Evidence of incorporation/analysis of data into actions to improve systems –Project Reviews, Management Review outcomes for example: Safeplan premium reductions, number of accidents-incidents, productivity changes, MR performance reports to Council, works budget performance)</i></p>				
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8.5.2 Corrective Action				
Documented procedure for:				
• Reviewing nonconformities (including customer complaints)				
• Determining causes of nonconformities				
• Evaluating action to ensure that nonconformities do not recur				
• Determining and implementing action				
• Records of the results of action taken				
• Reviewing corrective action (<i>Management review outcomes</i>)				
8.5.3 Preventive Action				
Documented procedure to define:				

Item <i>Suggested Examples of Evidence for LGA in BOLD and Italics</i>	Doc	Standard Met / Not Met	Desktop Comments	Site Evaluation Findings
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<ul style="list-style-type: none"> • Determining potential non conformities and causes 				
<ul style="list-style-type: none"> • Evaluating the need for action to prevent occurrence of non conformities 				
<ul style="list-style-type: none"> • Determining and implementing action needed 				
<ul style="list-style-type: none"> • Actions recorded 				
<ul style="list-style-type: none"> • Reviewing preventive action taken. (<i>Management review outcomes</i>) 				

