University of Pretoria

Framework to develop a credible final accounts system for South African construction projects

by

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Department of Construction Economics

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Declaration

I, the undersigned, student number U86393104, hereby confirmed that the attached treatise is my own work and that any sources are adequately acknowledged in the text and listed in the bibliography.

I accept the rules of the University of Pretoria and the consequences for transgressing them.

This treatise is submitted in partial fulfilment of the requirements for the Doctor of Philosophy in Quantity Surveying at the University of Pretoria. It has not been submitted before for any other degree or examination at any other university.

Signature of acceptance and confirmation
Lydia Christina Carroll
March 2024

Dedication

To have achieved this milestone in my life, I would like to dedicate this thesis to the following people:

- the Highest Power of all, my Heavenly Father
- Professor Hoffie Cruywagen for his guidance in this study
- my deceased husband, Mark Carroll – you keep me inspired
- my children, Domonique Bullock and Kénan Carroll for their support, love and encouragement

Jude 1: 24 & 25: *"To him who is able to keep you from stumbling and to present you before his glorious presence without fault and with great joy – to the only God our Saviour, be glory, majesty, power and authority, through Jesus Christ our Lord, before all ages, now and forevermore"*

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Abstract

Title of treatise:	Framework for developing credible final accounts for South African construction projects
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During the post-contract administration of construction projects, the project team must produce a final account (FA) that incorporates all the information that signals the final agreed sum that the employer will pay the contractor. It includes payment for any work conducted by the contractor through the main contract, as well as any loss and expenses associated with any extension of time and any other contractual claims. Different FA formats have been developed by professional consultants with various approaches and processes to accommodate different project requirements and conditions of contract (CoC). Currently, there is a lack of understanding of the FA process, which results in material irregularities. Therefore, proper financial and contractual administration during project delivery should ensure that FAs have high standards with no gaps, including appropriate supporting information. The research methodology was based on reviewing of current literature as well as conducting interviews with professional Quantity Surveyors currently involved with construction projects within South Africa. The research findings suggest that to ensure an improved FA, there must be recognition that the FA process starts before the construction period and continues throughout. Therefore, these FA mechanisms should be included in the conditions of contract (CoC), and a final account project execution plan (FAPEP) should be established as soon as possible from commencing a project. It is of utmost importance to retain all records pertaining to all FA items during the project's execution, which serves as supporting information for the agreed FA. Therefore, each competent team member should understand their role in the FA process to ensure that the FA does not contain material irregularities. A final account template (FAT) and guidance notes would add value to all South African construction industry professionals and should be used as a guide throughout the FA process to ensure improved FAs. In the future, the proposed FAT and guidance notes might assist quantity surveyors in developing, compiling and finalising FAs for construction projects.

Keywords: final account; final account template; project execution plan

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List of abbreviations/acronyms

Abbreviations	Descriptions
AGSA	Auditor General of South Africa
ASAQS	The Association of South African Quantity Surveyors
BOQ	bill of quantity(ies)
CIDB	Construction Industry Development Board
CPA(s)	contract price adjustment(s)
CoC	conditions of contract
DoA	delegation of authority
DPWI	Department of Public Works and Infrastructure
FA(s)	final account(s)
FAPEP	final account project execution plan
FAT	final account template
FIDIC	Federation Internationale Des Ingeneieurs-Conseils *Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer* published by the International Federation of Consulting Engineers
GCC	*General Conditions of Contract for Construction Works* published by the South African Institution of Civil Engineering
JBCC	JBCC Suite of Contracts published by the Joint Building Contracts Committee
KZN Public Works	KwaZulu-Natal Department of Public Works
NEC	*New Engineering Contract Series of Contracts* published by the Institute of Civil Engineers
Preliminaries	preliminaries/preliminary and general
QS(s)	quantity surveyor(s)
RICS	Royal Institution of Chartered Surveyors
SA	South Africa/South African
SACQSP	South African Council for the Quantity Surveying Profession
SHEQ	safety, health, environment and quality
SMEs	small and medium-sized enterprises

List of definitions

Definitions	Descriptions
Activity schedule	A list of the activities which the contractor expects to conduct in completing their obligations under the contract
Completion certificate	Taking-over certificate/certifies completion/certificate of completion when the works have been completed
Contract/s	Signed construction contract/s between the client and the contractor for a specific construction project
Daywork allowance	Work of a minor or incidental nature to be executed on a daywork basis and valued in accordance with the daywork schedule included in the contract
Disputes	A dispute is a disagreement, argument or controversy that gives rise to a legal proceeding
Escalation	Adjustments/changes in the cost or price of specific goods or services in a given economy over a period
Final statement	A summarised statement as part of the final account, including details of the final contract sum (including all necessary adjustments)
Payment certificate	A certificate issued certifying the amount due and payable per the conditions of contract
Practical completion certificate	A certificate issued stating the date on which practical completion of the works or section of the works were achieved
Penalties/delay damages	Amount payable by the contractor to the employer per the conditions of contract when the contractor fails to complete the works within the contractual time for completion
Performance certificate	A certificate issued when the performance of the contractor's obligations has been completed
Preliminaries	General preliminaries and/or the items listed in the preliminaries section of the price document
Preliminary and general	Items scheduled in the preliminary and general section in the price document
Price document	Bill of quantities/activity schedule/lump sum section
Prime cost amount	An amount included in the price document for the delivered cost of materials and goods obtained from a supplier
Provisional sums	An amount included in the price document for the supply and installation of work by a subcontractor
Retention	A percentage of money that an employer holds as protection from incomplete or inaccurate work done by the contractor
Risk allowance	An amount added to the price document for items that cannot be precisely predicted (e.g., community unrest)
Set-off/contra-charges	An amount deducted from the payment certificate for employer's claims
Variations/compensation events	Change to the works which is instructed or approved as a variation per the conditions of contract

CHAPTER 1 - Introduction and study background

1.1. Introduction

Performing regular independent and objective oversight assessments (project assurance) of a capital project's performance is essential to ensure that no unauthorised expenditures form part of a project. Project assurance assessments evaluate the project's overall health regarding time, cost and quality. They note areas that require improvements based on the original plan. In addition, they assess a project's financial management and associated project close-out costs, which incorporate the creation of a final account (FA). A FA is a conclusive financial summary detailing the final amounts to be paid by the employer to the contractor for the works completed (Rajgopaul, 2023).

The following items are considered:

- contract sums and adjustments
- compliance with the terms and conditions of relevant contracts
- fully-assessed variations, provisional sums and remeasured work
- work completed on agreed-upon days
- accurately assessed loss and expense claims
- fluctuations (where applicable)
- confirmation of both parties' agreement with the FA

It is imperative to identify the specific assurance assessments that must be applied to each construction project to ensure an agreed FA without unauthorised expenditure.

1.2. Study background

KMPG (2015) published a global construction project owner survey, which included international organisations completing significant construction projects within the following sub-region operations (Figure 1).

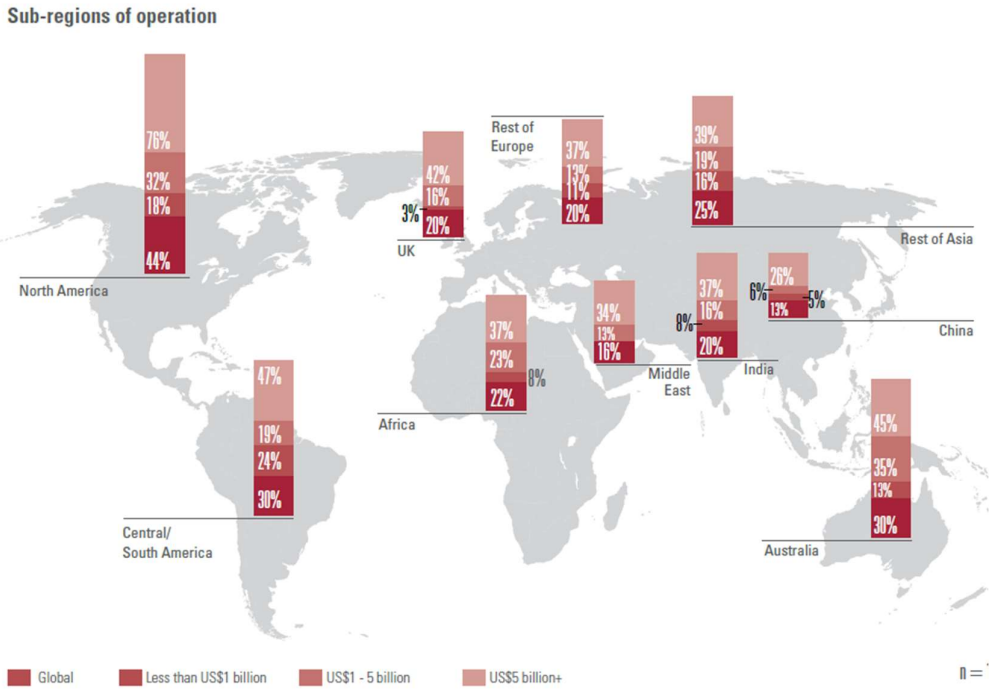


Figure 1: Global construction project survey (KMPG, 2015)

In the three years preceding the survey, not even one-third of the projects forming part of the survey came within 10% of the original planned budget. The public sector performing the worst (Figure 2).

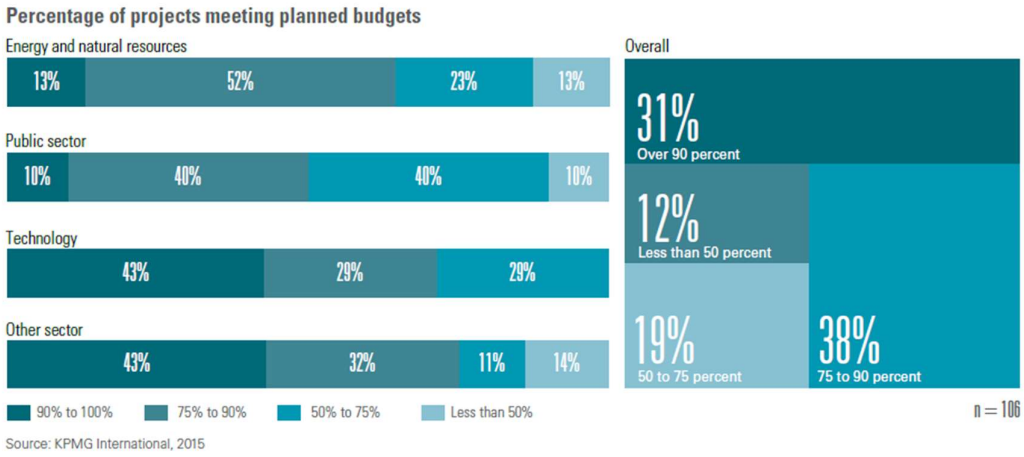


Figure 2: Percentage of projects meeting planned budgets (KMPG, 2015)

Part of a project's post-contract management process is to manage costs, variations and claims that feed into the project's FA. Hewitt (2020) notes that in the construction industry many disputes arise between the parties when the contractor submits their FA. These issues arise for all different contract forms. Several reasons have been cited as the basis for disputes

(e.g., failing to provide notices for claims, lack of full details of claims/variations, unclear instructions leading to additional costs and time). Ssegawa (2020) indicates that 58% of FAs are closed outside the stipulated contractual terms and that failure to settle a project's FA signifies poor management of construction projects.

The above indicates that globally projects are struggling to come within budget, and challenges that lead to problems in settling FAs include:

- poor management
- unresolved disputes
- lack of claims/variation details
- unclear cost
- time implications of instructions

Currently, the internationally published guidance aiding the creation of FAs is the Royal Institute of Chartered Surveyors' (RICS, 2015) guidance on FA procedures. This can assist in the production of FAs in South Africa as well as internationally. However, it does not cater for all the standard conditions of contract utilised within South Africa and it does not address all the post contract administration that is needed to provide a FA without material irregularities experienced in South Africa. Therefore, a more in depth study is needed to create a FAT and guidance notes that can be utilised within South Africa.

During the 2021 South African (SA) budget speech, the then-finance minister Tito Mboweni stated that the government committed ZAR 791.2 billion over the medium-term toward infrastructure investment (West, 2021 - budget). This spending included:

- water expenditure
- upgrades and expansion of ports and transport networks
- road infrastructure
- public housing
- expanding power generation
- sanitation and water services improvements
- small harbours

This indicates that numerous mega-, big-, medium- and small-construction projects would have to be executed in the near future in SA. For these and other projects, all project teams should strive for their projects not to include irregular expenditures. Irregular expenditure is defined by the National Treasury Department (Treasury, 2014), page 1, as "expenditure other than

unauthorised expenditure incurred in contravention in accordance with the requirement of any applicable legislation or any unauthorised expenditure". In turn, unauthorised expenditure is defined by the Treasury (2014), page 1, as "overspending of a vote (one of the main segments into which and appropriation act is divided in) or expenditure not made in accordance with the purpose of a vote". In other words, all spending must comply with applicable legislation within the contract and approved budget provisions.

To avoid unauthorised expenditure on FAs within SA, the Joint Study Committee of the Institute of South African Architects published practice notes as early as 1978. These guidance notes concerned the settlement of the FAs. It stated that although the quantity surveyor (QS) cannot undertake to maintain accurate monthly accounts of all work done, partially complete or otherwise, they should maintain variation accounts updated in respect of all variations which are certain. This would ensure the early completion of FAs as throughout the duration of a contract, it serves as a reliable indication to all parties concerned about the probable final cost (SAIA, 1983).

In addition, the Association of South African Quantity Surveyors (ASAQS, 1984) issued various practice notes as early as 1984. These dealt with different aspects of a FA (e.g., cash discounts and profit on price adjustment). Currently, the only two FA manuals published in SA to assist in producing FAs are as follows:

- the Manual for Consultant Quantity Surveyors published by the Department of Public Works and Infrastructure (DPWI) (D.P.W., 2020); and
- the Statement of Account published by the KwaZulu-Natal Department of Public Works (KwaZulu-Natal Public Works) (D.P.W., 2022).

These publications cover the generation of FAs and provide a FA template example. This must be applied to any work performed for the SA public departments. No other publications could be found on generating a FA within SA. The following issues, however, were not covered by any of the above-mentioned publications:

- who compiles a FA
- ethical behaviour
- ensuring an auditable FA
- completing a final account project execution plan (FAPEP)
- reporting
- FA meetings
- subcontractor direct payments

- dayworks
- interest
- set-off/contra-charges
- guarantees
- termination
- signing and dating
- list of retained information
- commentary
- complete checklist
- separate final account templates (FATs) for public and private sectors
- cession form for direct payment

Furthermore, the above-mentioned gaps and challenges requiring investigation into compiling FAs within SA led to this study. This study addresses these gaps and contributes to the SA construction industry by providing guidance to the project team and reducing material irregularities in FAs.

1.3. Research rationale

This study evaluates the complete FA process, including providing proper financial and contract administration during the delivery of a project to avoid substandard FAs with gaps and a lack of appropriate supporting information. In addition, the study provides a FAT and guidance notes. In doing so, the study addresses one of the biggest hurdles (i.e., unauthorised expenditure) according to the Treasury (2014) and enhances the knowledge of providing a FA within the SA construction fraternity. Describing and analysing the FA process in SA has reduced the uncertainty surrounding the process of creating a FA. More detailed information on the FA process reduces the risks associated with the project management team in the construction environment. Lower risk creates a more favourable environment for both parties to the contract. By providing a FAT and guidance notes (including a FA checklist), professionals could increase their understanding of the complete FA process and start implementing it to produce better FAs.

1.4. Research problem statement and research objectives

1.4.1. Problem statement

Material irregularities, such as unapproved cost and time overruns, payment for undelivered work, etc., within FAs are often experienced in construction projects within SA. Proper

planning, post contract administration and clear guidance on creating a credible FA will decrease the chances of these irregularities.

1.4.2. Problem statement and research questions

The main research problem was to create FAs without material irregularities. This study aims to provide a framework for the development of a FAT and guidance notes based on analyses of existing publications and opinions of registered professional QSs that will assist construction project teams in creating credible FAs.

This study aims to answer the following main question: “Would a developed, integrated and comprehensive FAT, including guidance notes, be an improvement over the current FA templates used in SA?”

Following the main research problem and question, the following research sub-questions were recognised:

- What are the currently known FA procedures, formats/structures and standards, and which ones are being used within the SA construction industry?
- Which AGSA key material irregularities should be mitigated using improved FAs?
- What could be implemented to ensure improved FAs?
- Would QSs and project teams within SA benefit from a newly developed FAT that includes guidance notes?

First, the study will examine the identified aspects that influence FAs to assess the minimum requirements for a FAT and guidance notes. These factors include:

- chosen institutional information for producing a FA,
- chosen private quantity surveying FA formats and procedures,
- applicable project assurance principles applied to FAs, and
- chosen standard CoC.

Second, the study will create a comprehensive FAT, including guidance notes to be used within SA. In creating a FAT and guidance notes, structured interviews will be conducted with various registered professional QSs within SA (e.g., the South African Council for the Quantity Surveying Profession [SACQSP], ASAQS and RICS members). The following will be assessed through the interviews:

- whether a FAT (including guidance notes) is needed,
- what the knowledge of existing FAs comprises,

- what the FAT layout should be,
- what must be included in the FAT,
- who would use such a FAT in future projects.

Any valid and value-added changes would be incorporated into the proposed FAT and guidance notes. Third, the proposed FAT and guidance notes will be distributed to identified SACQSP members for commentary. Then, valid findings and changes will be applied, and the final proposed FAT and guidance notes will be presented here.

1.4.3. Research objectives

A systematic and logical sequence of processes and methodologies is required to address the above problem and research questions. Chapter 3 describes the processes and methodologies. Section 1.4 states the problem and identifies that the problem would be solved by addressing four sequentially listed research questions.

The objective of research Question 1 is to ascertain which existing FA procedures, format/structures and standards are known to professionals within the SA construction fraternity, and which ones are being used by them. To answer this question, various questions pertaining to all existing procedures would be included in the interviews held with registered professional QSs. The completed interview answers would provide a comprehensive description of the knowledge and use of existing FA procedures by registered professional QSs.

The objective of research Question 2 is to firstly to collect data pertaining to AGSA key material irregularities through literature review to understand what material irregularities are found in SA. Questions would be included within the interviews held with registered professional QSs concerning audit irregularities. Information will be combined to assess which material irregularities can be mitigated through improved FAs.

The objective of research Question 3 is to develop the proposed FAT and guidance notes by combining data gathered from existing FA procedures. In addition, questions within the interviews held with registered professional QSs concerning the items covered and actions to be taken as a minimum in producing a FA to ensure improved FAs would be included.

The objective of research Question 4 is to collate data pertaining to the use of the newly developed FAT and guidance notes. It includes questions within the interviews held with

registered professional QSs concerning the use of the newly developed FAT and guidance notes.

By addressing the above research questions, the study's objective is two-fold:

1. Address the current lack of information regarding the development of a FA without material irregularities.
2. Provide the SA construction industry with the proposed FAT and guidance notes to assist in developing FAs.

1.5. Type of research/research paradigm

A combination of qualitative and quantitative data was used in this study by using previously published guidelines, literature reviews and interviews with professional registered QSs.

1.6. Research importance

It is essential for the SA construction industry to produce FAs that reduce the possibility of unauthorised and excess spending based on in-depth checks and well-identified good-practice principles. Ensuring that projects are properly managed concerning time, cost and quality is of utmost importance and should be actively managed during the construction life cycle. Therefore, the entire project team must ensure that all risk factors are considered when managing their construction projects and that the correct information is captured within the FA. This study will be valuable to stakeholders (e.g., the public sector, government, clients, investors, QSs, students, developers, property owners, property managers) and other professions (e.g. architects, the engineering profession and other building consultants) in the SA construction industry. This is because it gives them a better understanding of what should be incorporated into a FA and enlists them to use good principles in collating information to compile a FA. In addition, the FAT and guidance notes will provide a basis for FAs, considering various factors that influence cost, time and quality.

1.7. Study limitations

The study limitations included the following:

- the focus would be on FAs for SA construction projects only;
- face-to-face interviews could only be held in Gauteng, SA and only a small number of QSs were willing and available for interviews; and
- only a small number of actual FA formats used by private QS companies were received, as they were perceived to be intellectual property.

1.8. Study delimitations

This study delimitations included the following:

- structured face to face interviews were held with a limited number of registered professional QSs within Gauteng, SA as the researcher resides in Gauteng; and
- as it takes a lot of time to review the draft FAT and guidance notes a limited number of registered professional QSs were asked to review it and fewer were willing to participate in the review.

1.9. Study assumptions

This study makes the following important assumptions:

- Current existing FA procedures, format/structures and standards are known and used by registered professional QSs in SA as all construction projects are concluded with a signed FA per the currently used standard conditions of contract utilised within SA;
- FAs are needed for most construction projects in SA per the currently used standard conditions of contract utilised within SA; and
- FAs are handled in the same manner in all different industries (e.g., building, engineering and mining), and there are currently no allowances for differentiations included in the study.

1.10. Proposed research approach, strategy and schedule

The research approach started with obtaining existing FA procedures, format/structures and standards currently used in SA. Furthermore, to understand the current FA standards used in the construction industry, any problems encountered throughout the FA process, identifying gaps in published FA guidance notes, semi-structured interviews were conducted with the QSs. Section 1.4 briefly described the research strategy and objectives, and Chapter 4 discusses these in detail.

1.11. Data collection

Chapter 4 describes the data collection process.

1.12. Literature review

A comprehensive review of the recent applicable peer-reviewed literature was conducted during this study to provide overall context. Primary sources of published books, journals and institutions' websites relevant to the topic under investigation were included. The authors of the literature in the dissertation were recognised. Data obtained from literature sources were not manipulated or corrected, and quotes from sources were correctly recorded. A detailed list of references has been compiled.

1.13. Methods to ensure validity

Elias, (2023), page 2, states that "conclusions drawn from research (whether from analysing surveys, focus groups, experimental design or other research methods) are only useful if they are valid. Validity is used to determine whether the research measures what it intended to do and to approximate the results' truthfulness". Seven types of study validity have been defined (Elias, 2023): (1) face, (2) content, (3) construct, (4) internal, (5) external, (6) statistical conclusion and (7) criterion related. Chapter 3, Section 3.7 discusses research validity in greater detail. This study specifically focuses on creating a FA for construction projects and the aspects that might affect it. The proposed FAT and guidance notes were designed only to provide guidance to the project team regarding these specific aspects. Therefore, this study's face validity was considered. However, the data provided in the FAT and guidance notes should be considered with caution to guard against validity concerns. Chapter 3, Section 3.7 describe the additional measures taken to ensure research validity. It describes the measures taken to address concurrent, content, convergent, discriminant, predictive, internal and external validities.

1.14. Methods to ensure reliability

Various measures and procedures were followed to ensure a high degree of reliability of the data obtained in this study. The study was conducted with the support of the ASAQS. The interview participants were registered professional QSs who responded in terms of their professional capacity and knowledge of FA applications for the projects in which they were directly involved. The participants confirmed their answers after the interviews to ensure correctness. The completed FAT and guidance notes were carefully perused by registered professional QSs. Chapter 3, Section 3.8 describes the methods and procedures to ensure reliability in the data in greater detail.

1.15. Ethical considerations

The study was subjected to a complete ethical approval process by the University of Pretoria. The study's application for ethical approval was submitted to the Faculty Committee for Research Ethics and Integrity, Faculty of Engineering, Built Environment and Information Technology. This process included:

- Copies of typical informed consent form (Appendix A)
- Copies of typical company consent form (Appendix B)
- Copies of interview guide (Appendix C)
- Copy of the signed Memorandum of Agreement (Appendix D)
- Copy of the PhD research contract with the University of Pretoria (Appendix E)
- Copy of the proof of PhD student registration (Appendix F)
- Copy of the approval letter by the Committee for Research Ethics and Integrity is appended hereto (Appendix G)

1.16. Research structure

The chapters were outlined as follows to ensure that all aspects of the study (e.g. justification, aim descriptions, methodology and results) were covered:

Chapter 1: Introduction and background to the study

Chapter 2: Literature review

Chapter 3: Research methodology

Chapter 4: Data collection

Chapter 5: The research findings

Chapter 6: Discussion

Chapter 7: Conclusions and recommendations

1.17. Summary

Chapter 1 introduced and explained this study's rationale. The study problem originated from the lack of knowledge of existing FA procedures and the full understanding of the complete FA process, which is evident in the unauthorised expenditure on FAs. The chapter stated the problem and related questions, and it discussed the study's limitations, delimitations and assumptions. In addition, it addressed the research approach, data collection process as well as research validity and reliability. Chapter 2 provides a literature review.

CHAPTER 2 - Literature review

2.1. Introduction

In Chapter 1, the introduction to the study to provide the required context was discussed. The chapter addressed the issues with FAs, the rationale for the study, the problem statement and research objectives, the study's importance, limitations, delimitations and assumptions. Chapter 2 included a comprehensive current literature review on FAs, including the relevant topics covered within the study. Topics included the construction industry, FAs process, other FA-related matters, FA structure, existing FA templates, audits of FAs, and what SA tertiary institutions cover in their curriculum concerning FAs. Numerous sources (websites, dissertations, theses, publications, dictionaries and studies) were reviewed.

2.2. FA issue

HKIoS (2012) states that the FA is a summary of the financial effects of all activities conducted under a construction contract. A FA statement is prepared to signify three aspects (Ssegawa, 2020), page 13, namely:

1. "How the contract sum has been adjusted by additions, deduction, alterations and any other approved payments
2. An agreement between the two main parties (client and contractor) to a construction project
3. An amicable separation of the two key parties"

During the FA's preparation, issues arise because one or more parties are involved (client, contractor and consultant team) (Othman, 2021), which makes the process complex, as all parties could contribute to delays in closing the FA. Othman (2021) also states the input for preparing a FA starts from the moment the tender is awarded, and a tender sum is agreed upon by the key parties. This complete process is based on the signed contract and the interpretation of contract clauses. Poor construction project management results in failure to settle the FA (Ssegawa, 2020).

This argument is supported in the AGSA (2021) 's consolidated general report, page 7, which states that "local government finances are under severe pressure and not being managed as they should. Furthermore, significant improvement is needed in monitoring, reviewing as well as oversight by senior officials, municipal leaders and councils to avoid material irregularities". The report also states that the following four key areas form the basis for material irregularities and settling the FA: (1) procurement of contracts and progress payments, (2) interest for late

payment and penalties for late completion of the project, (3) managing of revenue as well as (4) investments and assets. Good preventive control during project execution would have prevented these issues before they became material.

2.3. Construction industry

The Construction Industry Development Board Act (Act 38 of 2000) (Gazette, 2000), page 4, defines the construction industry as: “The broad conglomeration of industries and sectors which add value in the creation and maintenance of fixed assets within the built environment”. The Construction Education and Training Authority (CETA, 2023), page 3, states that “the construction sector is extensive, with diverse activities, including construction, maintenance, renovation or replacement of fixed assets of a variety of magnitudes”. The above mentioned sectors comprises four sub-sectors: (1) manufacturing of materials, (2) construction of assets, (3) building and (4) overall built environment. The above-mentioned sub-sectors could be funded by private institutions, businesses, building owners or the federal/state government.

2.3.1. Global

The Deloitte global powers of construction publication (Deloitte, 2022) pointed out that the total revenue by global construction companies amounted to USD 1.9 trillion in 2022, 6.3% higher than in 2021. The state that “54% of the revenue originates from companies based in China, with the remaining revenue coming from Europe (particularly France and Spain), Japan, the United States and South Korea”. The same report states that the global construction industry is “expected to record sluggish growth in 2023 owing to the weak economic situation and negative conditions represented by increased construction material costs and significant labour shortages. Growth is expected to fall from 3.4% in 2022 to 2.8% in 2023, before rising slowly and settling at 3% in five years. This represents the lowest medium-term forecast in decades”, page 4 and 5. (Richards, 2023) forecasts that the global construction industry should from 2024 regain some growth momentum if the global economy stabilise. Output is likely to expand by 3.0% during 2024 with an annual average 4.2% growth from 2025 to 2027.

According to Buzio (2023), page 2 to 7, six trends are shaping the global construction industry’s future trajectory:

1. *“Macroeconomic dynamics*. High inflation and tightening financial conditions.
2. *Technological advancements*. Companies are changing their mindset regarding the adoption of new technologies.
3. *Modern methods of construction*. Prefabrication and modular construction techniques
4. *Sustainable construction*. Adoption of sustainable practices.

5. *Smart and connected infrastructure*. Development of intelligent and connected infrastructure.
6. *Skilled workforce and digital transformation*. Challenges in attracting and retaining top talent".

2.3.2. South Africa

Africa (2022) states in their report that the construction sector makes up about 3% of the SA GDP with a value of about USD 9.6 billion. Private spending in infrastructure construction was USD 668 million in 2020, and public spending committed USD 52.6 billion in infrastructure construction over the next decade. Based on the National Treasury Public-sector infrastructure update (Treasury, 2020), the planned spending on public infrastructure are aligned with current government priorities, as well as their medium-term strategies (Figure 3).

Table D.1 Public-sector infrastructure expenditure and estimates

R billion	2016/17	2017/18	2018/19	2019/20 Revised estimate	2020/21	2021/22	2022/23	MTEF total
	Outcomes				Medium-term estimates			
Energy	67.0	55.1	39.9	49.7	52.4	52.4	45.3	150.0
Water and sanitation	30.8	26.8	27.1	33.5	37.0	39.6	40.6	117.1
Transport and logistics	70.9	75.4	74.4	90.5	97.8	105.4	105.1	308.3
Other economic services	14.3	17.1	13.5	13.1	11.8	12.2	12.5	36.5
Health	10.4	9.7	11.3	12.0	12.3	12.3	12.6	37.3
Education	17.8	17.6	17.2	19.5	18.7	19.7	20.7	59.1
Human settlements[1]	18.3	14.3	15.0	18.8	16.6	13.4	13.9	43.9
Other social services	10.3	11.2	10.1	10.5	10.2	9.8	10.2	30.2
Administration services[2]	10.1	9.1	7.7	9.4	10.3	11.0	11.2	32.5
Total	**249.9**	**236.3**	**216.2**	**257.0**	**267.1**	**275.9**	**272.0**	**815.0**
National departments	15.8	14.9	13.6	15.8	16.1	16.9	17.3	50.4
Provincial departments	62.6	62.3	59.5	60.8	59.9	57.1	59.9	177.0
Local government	54.4	58.8	61.0	61.7	62.3	65.7	68.7	196.8
Public entities[3]	17.1	13.2	9.6	18.7	19.0	19.6	20.6	59.2
Public-private partnerships	4.8	4.8	4.9	5.6	5.7	6.1	5.9	17.8
State-owned companies[3]	95.2	82.2	67.5	94.2	104.0	110.5	99.5	314.0
Total	**249.9**	**236.2**	**216.2**	**257.0**	**267.1**	**275.9**	**272.0**	**815.0**

1. Human settlements includes public housing and bulk infrastructure amounting to R43.9 billion over the MTEF period
2. Administration services include infrastructure spending by the departments of International Relations and Cooperation, Home Affairs, and Public Works and Infrastructure, Statistics South Africa and their entities
3. Public entities are financed by capital transfers from the fiscus and state-owned companies are financed from a combination of own revenue, borrowings and private funding
Source: National Treasury

Figure 3: Public-sector infrastructure expenditure and estimates

Based on the above information, an estimated sum of ZAR 272 billion would be spent in the public sector during the 2022/2023 financial year, which would have to be managed and closed out by competent project teams. However, history has shown that this is not the case. The Auditor General of South Africa (AGSA)'s consolidated general report (AGSA, 2021), page 8, states that "local government finances continue to be under severe pressure as a result of non-payment by municipal debtors, poor budgeting practices, and ineffective financial management". It also states that "the financial position of just over a quarter of municipalities

in SA is so dire that there is significant doubt that they would be able to continue operating as a going concern in the near future. In addition, almost half of the other municipalities exhibit indicators of financial strain (e.g., low debt recovery, inability to pay creditors and deficits). The impact of unpaid municipal creditors is well-known. It affects Eskom and the water boards but is more devastating for smaller suppliers. Energy, water and sanitation are two of the three top planned spending areas (Figure 3) for 2022/2023, and if the local, provisional and national departments cannot manage their capital projects in an effective way, it has severe effects on providing energy, water and sanitation".

To ensure the delivery of these (Figure 3) and private sector projects, it is critical to have strong delivery management teams that can effectively manage applicable projects and ensure proper financial control, reporting systems, and governance during the full lifecycle of each project. Part of the process involves closing projects and producing FAs that cover all pertinent contractual items. This contributes to the success of projects. Based on a case study of the delivery management of infrastructure projects in the public sector (Brook, 2021), the root cause of time delays, overspending, and dissatisfaction among stakeholders is insufficient knowledge and experience of infrastructure delivery and contract management for infrastructure programs and projects. Furthermore, (Brook, 2021) states that a strong client delivery management team could be the solution to many infrastructure delivery problems. Therefore, educating project teams on the administration of a project throughout its life cycle is important. A part of this process is to produce high-quality FAs with all the correct information contained therein.

2.4. FAs in construction

Based on Rajgopaul (2023) a FA is a financial summary of the final amounts paid by the employer to the contractor when works have been completed. The QS prepares the FA in a manner best suited to a particular project and employer. The original agreed contract value is used as the starting point, taking all adjustments, terms of conditions, variations, provisional sums, remeasured works, dayworks, claims, omissions, cost fluctuations into account. In addition, a literature review on FA preparation in the construction industry (Othman, 2021) agrees that a FA is the agreed sum to be paid by the employer to the contractor at the end of the contract. Furthermore, it states that the FA's purpose is "to include all the necessary adjustments that an employer has agreed to pay the contractor for work done under the contract", page 36. A study on the challenges of closing construction project FAs (Ssegawa, 2020) states that the key parties to the preparation, agreement and approval of the FA of a construction project are the client and the contractor. However, other duly delegated parties representing both the client and contractor (e.g. QSs, architects and engineers) are role

players during the FA process. Therefore, the FA signifies an amicable separation between the two key parties.

The Royal Institution of Chartered Surveyors (RICS) produced a FA procedure (RICS, 2015) which states that a FA is the "conclusion of the contract sum (including all necessary adjustments) and signifies the agreed amount that the employer would pay the contractor. It includes any work that is paid to the contractor through the main contract, as well as any loss and expense associated with any extensions of time and any other claims that the contractor feels due under the contract. In addition, it indicates the finalisation of any disputes that might have arisen and in that sense, draws a line under the financial obligations of both parties, save with respect to defects", page 4.

In SA, the construction industry uses four standard CoCs to guide contracts between employers and contractors. These conditions are:

1. Joint Building Contracts Committee (JBCC) Principal Building Agreement Edition 6.2 (JBCC, 2018)
2. Federation Internationale Des Ingeneieurs-Conseils (FIDIC) Conditions of Contract for Construction (FIDIC, 1999) (FIDIC, 2017)
3. General Conditions of Contract for Construction Works (GCC, 2015)
4. New engineering contracts (NEC) Engineering and Construction Contract (NEC3, 2005) (NEC4, 2017)

Only the aforementioned JBCC and FIDIC CoCs contain definitions of FAs/final statements in their clauses. The JBCC (2018), page 3, states that a FA is "the document prepared by the principal agent that reflects the final contract value of the works at final completion or termination". The CoC for construction for building and engineering works designed by the employer (FIDIC Red Book 1999) (FIDIC, 1999) and the CoC for plant and design-build for electrical and mechanical plant, and for building and engineering works designed by the contractor (FIDIC Yellow Book 1999) (FIDIC, 1999), page 3, both define the final statement, which could be seen as the same as a FA, as "the final statement with supporting documents showing in detail the value of all work done in accordance with the contract and any additional sums which the contractor considers to be due to them under the contract or otherwise". The FIDIC Red and Yellow Books 2017 (FIDIC, 2017) (FIDIC, 2017), page 4, define the final statement as "the final statement with supporting documents showing details of the value of all work done, any additional sums which the contractor considers to be due at the date of the issue of the performance certificate, and an estimate of any other amounts which the contractor considers have or would become due after the issue of the performance certificate".

As stated before, GCC (2015) does not define a final statement or a FA; it only states that the contractor shall deliver a final statement claiming the final settlement of all money due to them. The NEC3 (2005) does not include any reference to a FA or final statement, nor any FA mechanism that could be applied, as it is expected that the compensation event procedure described in the contract conditions will result in the FA. Any scope of work changes and price are made by raising a compensation event that includes full details pertaining to the proposed change. Then, FA is the original contract plus all compensation events. However, the NEC4 (2017) states that a final assessment is an assessment of the final amount due to the contractor. Table 1 summarises the CoC's FA information.

Table 1: Summary of conditions of contract's' final account information

Description	JBCC	FIDIC (1999 & 2017)	GCC	NEC3	NEC4
FA definition	Yes	No	No	No	No
Final statement definition	No	Yes	No	No	No
Final assessment definition	No	No	No	No	Yes
Statement prepared by	Principal agent	Contractor	Contractor	N/A	Project manager
Reflects	Final contract value	• Value of all work done • Additional sums • Estimate of other amounts	Final settlement of all money	N/A	FA due

Abbreviations: final account (FA), Federation Internationale Des Ingeneieurs-Conseils (FIDIC), General Conditions of Contract (GCC), Joint Building Contracts Committee (JBCC), New Engineering Contract (NEC)

2.5. FA process

2.5.1. Necessity of FA process

To produce FAs without material irregularities, it is important to understand what material irregularities are and which material irregularities are currently experienced in SA. In the Consolidated General Report on the Local Government Audit Outcomes MFMA 2019-20, the (AGSA, 2021), page 93, reported 8 material irregularities defined in the report as follows:

1. "any non-compliance with legislation,
2. any contravention of legislation,
3. fraud,
4. theft,
5. breach of a fiduciary duty resulting in a material financial loss,
6. misuse of a material public resource

7. loss of a material public resource,
8. substantial harm to public sector institutions or the general public".

AGSA (2021), page 102, also states that the following five irregularities formed 50% of the reported material irregularities:

1. " to contractor for construction work not done at the Moshate stadium
2. Payments in 2018 to 2019 to two suppliers for provision of stormwater drain cleaning that were not received
3. Failure by municipality to monitor contract for construction work to municipal office building and gate house resulted in contract extension that included items already paid for as part of original contract
4. Overpayment in 2018-2019 to supplier for water-tanking services to communities as a result of municipality not having an effective system of expenditure control
5. Payments made for construction of attenuation (Flood-protection) dam on Nyakallong storm-water system not constructed resulting in overpayments on project"

Following the above, it is noted that five out of the top ten material irregularities are for payments for work not performed, failure in accurate contract management and over payment. The other five irregularities not mentioned above relate to asset protection, where assets were stolen and/or vandalised, and lack of charging interest on debtors in arrears. If accurate project administration, including a correct monthly assessment of actual performance, was provided for the above-mentioned projects, all five material irregularities could have been avoided. Applying a FA mechanism throughout a project is one way to manage the actual work performed against the money paid for the services provided. Therefore, the FA process is crucial.

According to Williams (2021), not all construction contracts require a complex FA mechanism. Simple and straightforward construction contracts might provide a lump sum to be paid in stages and, in theory, there might be no need for a complex FA process. Furthermore, in many construction contracts, parties agree that interim applications might be submitted regarding the then-estimated value of works, with the true value of the works determined at the FA stage (Williams, 2021). This provides a fair system of monthly progress payments to the contractor and ensures adequate cash flow.

2.5.2. Who prepares the FA and what are their competencies?

Rajgopaul (2023) states that the principal agent (engineer, QS, client representative) prepares the FA. However, both the employer and contractor sign the FA statement. This signifies that

the FA amount is the full and final settlement. In each of the standard CoCs mentioned in Section 2.4, and used in this study, the person preparing the FA is stated (Table 2).

Table 2: Standard conditions of contract final account preparation person

Standard CoC	Document reference	Person
JBCC	(JBCC, 2018)	The principal agent prepares the FA. However, certain aspects of works could be delegated to agents (e.g., a QS).
FIDIC suites	FIDIC (1999 & 2017)	The contractor prepares a final statement and sends it to the engineer to approve. The engineer could delegate their duties to assistants (e.g., a QS).
GCC	(GCC, 2015)	The contractor prepares a final statement and sends it to the employer's agent to approve. The employer's agent could be a QS if stated in the data.
NEC3	(NEC3, 2005)	Does not allow for FA process.
NEC4	(NEC4, 2017)	The project manager assesses the final amount. The project manager might delegate any of their actions to a delegate (e.g., a QS).

Abbreviations: conditions of contract (CoC), final account (FA), Federation Internationale Des Ingeneieurs-Conseils (FIDIC), General Conditions of Contract (GCC), Joint Building Contracts Committee (JBCC), New Engineering Contract (NEC), quantity surveyor (QS)

The RICS FA procedure (RICS, 2015) provides a procedure to prepare a FA, as well as the process of co-operation and negotiations between the parties, which could be used by their registered surveyors. Based on the procedure, page 3, the QS, or any consultant fulfilling the role of administering the contract regarding FAs, must fulfil the following duties regarding a FA:

- "Preparing the FA and reporting against the last cost/financial report
- Engaging in FA meetings with contractors
- Valuing variations to the contract with the contractor to enable the FA's agreement
- Advising on the cost implications of loss and expense claims – when so instructed
- Preparing the FA's statement
- Advising on costs associated with any defects
- Engaging in any meetings relating to the FA's agreement
- Advising the employer on calculations for withholding liquidated damages – when so instructed and
- Preparing FA documentation for auditing purposes"

The literature review on FA preparation in the construction industry (Othman, 2021), page 38, lists the competencies that a QS should display during FA preparation namely "teamwork, procurement, quantification and costing, project finance control and reporting, construction

practice and construction administration". Procurement, quantification & costing and contract administration are stated as the three top competencies.

The above-mentioned literature review examined the competencies of QSs in FA preparation, and from this study's findings, it is clear that QSs are competent in presenting procurement reports. They however lacked competencies in dealing with funding and financial issues. Furthermore, it indicated that QSs should improve their ability to control and report on project finance, providing advice on strategies and ways to control budgets, as well as providing advice on dealing with overall financial issues and funding issues.

The Preparation of Financial Statements Guide 5 (AGSA, 2020), page 5 to 9, emphasises the importance of the following:

- "ensuring adequate capacity and skills to perform accounting and reporting activities,
- implementing standardised, effective accounting processes, and
- ensuring proper recordkeeping and document control".

Furthermore, most municipalities appoint consultants for financial reporting, and the benefits of using such consultants are not always apparent. They provided the following reasons why the consultants were ineffective (Figure 4).

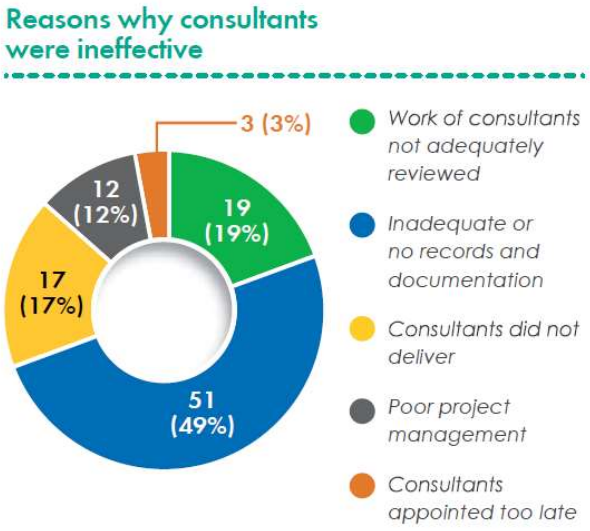


Figure 4: Reasons why consultants are ineffective (AGSA, 2020)

Construction project administration performed by consultants forms part of the aforementioned financial reporting and could add to the poor financial management and reporting addressed by the AGSA. Providing good financial management and reporting during a construction

project is essential in providing a comprehensive FA and will assist in reducing the reasons why consultants currently fail in their duties as support for the financial management of their clients. Zarabizan bin Zakaria (2013) states that the contract administrator of a project should demonstrate certain criteria (Figure 5: Contract administrator criteria). These criteria prevent disputes and also ensure timely completion of projects in accordance with the specified costs. Furthermore, understanding these roles and responsibilities is important in a project's preliminary stage to select the correct superintending party.

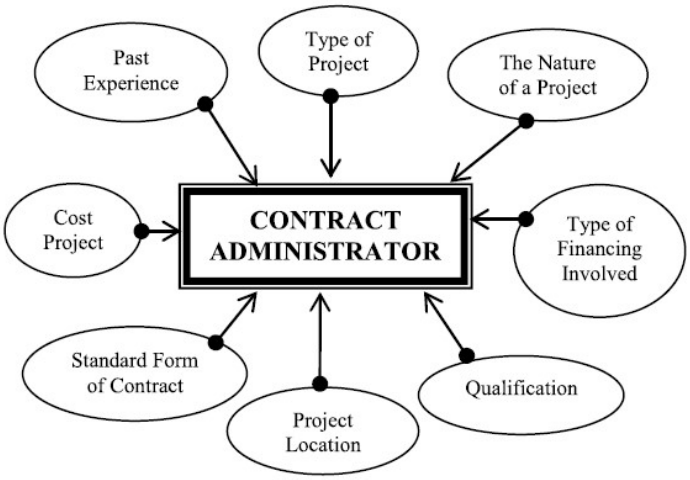


Figure 5: Contract administrator criteria (Zarabizan bin Zakaria, 2013)

2.5.3. Process to be followed in providing FAs

According to Wu (2012), page 1, "the construction industry has regularly been criticised for cost and schedule overruns and its tendency towards disputes over performance. Furthermore, it has been argued that this situation is caused by the fragmented nature of the construction process and that more collaborative procurement methods and working practices could produce a positive and substantial impact on project performance not only in time, cost and quality aims, but also concerning more general outcomes (e.g. greater innovation and improved user satisfaction)". To ensure this positive outcome, parties working together throughout the project execution phase in a collaborative way could ensure a quicker without disputes FA, as the aims concerning time, cost and quality for both parties are met. The Construction Industry Development Board (CIDB) has developed for the public sector a comprehensive model describing all the processes that make up delivery management which must be applied to the construction industry in their best practice guideline #A2 (CIDB, 2004) (Figure 6):

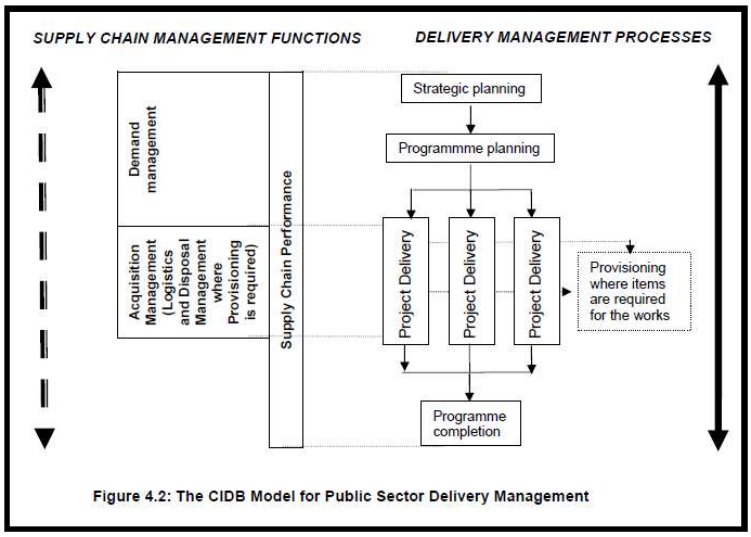


Figure 6: Construction Industry Development Board delivery management model (CIDB, 2004)

Based on this model, three distinct processes are present in delivery management: (1) planning, (2) project delivery and (3) programme completion. Project delivery is divided into three main processes: (1) initiation, (2) implementation and (3) completion. Furthermore, the model provides delivery management core processes related to the provision of engineering and construction work (Figure 7).

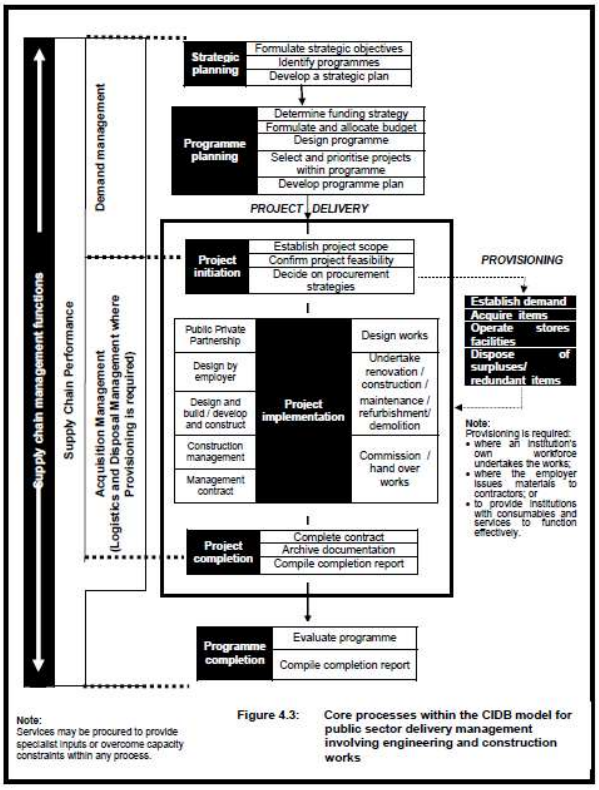


Figure 7: Construction Industry Development Board model for delivery management (CIDB, 2004)

Although this model was developed for the public sector, the same principles could be applied to the private sector. Proper planning of a programme/project is essential for its success, and a part of the planning phase involves budget formulation. This baseline budget forms the basis of a programme/project's feasibility and cost management throughout its lifecycle. Bearing the FA in mind while compiling the budget ensures that sufficient details are incorporated to ensure cost management. Furthermore, during the project initiation stage, this budget should be developed to ensure that a well-defined FA is agreed upon between the parties. Therefore, the basis of the price (bill of quantities [BOQ], activity schedule) and associated CoC should be in sufficient detail so that a detailed FAPEP could be agreed upon between the two parties at the beginning of a project, ensuring that all of the above-mentioned delivery management is covered, and that the FA could be agreed upon within an industry-acceptable period.

The CIDB (2007)'s best practice guideline #A1, defines Activity 6 (administer contracts and confirm compliance with requirements) as follows, page 16:

- *"Step 6.1: Administer the contract in accordance with its terms and provisions*.
    - Administer the contract in accordance with its terms and conditions within the agreed timeframe.
    - Pay contractors within the periods provided for in the contract to avoid interest on late payments.
    - Resolve disputes in accordance with the provisions of the contract.
- *Step 6.2: Ensure compliance with requirements.* Monitor the contractor's performance to ensure that the requisite quality standards are attained and the requirements are satisfied and certify compliance upon completion.
- *Step 6.3: Capture the contract completion/termination data.* Record the key performance indicators related to the time, cost, and attainment of specific goals associated with the preferential procurement policy or, if the contract is terminated or cancelled, record the reasons".

The above activities are confirmed in SACQSP (2016)'s professional skills module no. 3, Provide Procurement Advice, Advice on Contract Documents and Price Determination Documents for Built Environment Projects, under activity 6: Administer contracts and confirm compliance with requirements. This module continues by stating the client's aims of obtaining value for money:

- having a building fit for purpose,

- receiving a building free of defects at completion,
- experiencing the building as aesthetically pleasing,
- project being delivered on time,
- the building supported by meaningful guarantees, and
- the design resulting in reasonable operational costs and satisfactory durability should be met.

A major part of administering the contract to achieve compliance with the requirements is managing the project per CoC, paying the contractor for work completed to the required quality, capturing and agreeing between the parties all changes to cost and time in an ongoing manner based on the contract conditions, and performing close-out of the project in a timeous manner.

A LinkedIn publication on FA procedures (for construction projects) (Abdelshahid, 2016), page 3, states that preparing the FA "occurs throughout the contract period and that the financial statements (payment certificates) prepared by the QS will serve as the starting point for FA discussions. If costs have been tracked properly throughout the duration of the project then the only difference between the last formal cost report and the FA should be any changes or variations in the period between the last forecast report and the FA".

The RICS FA procedures (RICS, 2015), page 5, confirm the above-mentioned process, stating that the "last formal cost report prepared by QS provides a good indication of where the FA is likely to be settled. If costs have been tracked properly throughout the duration of the project, then the only difference between the last formal cost report and the FA should be changes or variations in the period between the last forecast report and the FA. Suitable project documentation and well-followed contract administration procedures would make the preparation of a FA more straightforward". Good documentation is easily auditable and important when appropriate records are unavailable. At the project's commencement, a FAPEP should be produced (based on the applicable CoC), which should contain a procedure for the project contract administration. Including a change-control mechanism as well as handling all contract instructions is essential. The FAPEP helps to provide a framework for the FA process as well as maintaining good contract documentation, which will assist during the settlement of the FA.

Together with maintaining regular updates concerning costs during the project, applying a good change control process should ensure a smooth FA negotiation phase. This is explained more in the RICS' FA procedures (RICS, 2015), page 5, which state that "change control is the administrative process that implements the contract mechanisms for instructing changes. This

process must adhere to the contract requirements for the notification and approval of changes by the identified parties. Change control is a critical part of a well-run and audited project. Any potential changes should go through this process before instruction is given so that the employer feels that they can make informed decisions".

An applied change control system should not be cumbersome or difficult to implement by a project team. Without such a change-control process, FA negotiations might be more difficult because differences in opinions between the parties on what was actually instructed could hold up the process. The majority of FAs will require site measurements between parties.

The Hong Kong Institute of Surveyors' (HKIoS, 2012), page 4, practice notes for QSs state that site measurements for a FA should include the following:

- "Record the QS's name, company, time of arrival and departure in the site visitor's book (if any)
- Ensure that all measurements are properly recorded. Each entry must have the date of measurement recorded against it
- If measurements are jointly taken with the contractor, request the contractor to initial against the measurements"

Furthermore, (HKIoS, 2012), page 6, states that the "QS should remeasure all provisional quantities in the BOQ as soon as the 'for construction' drawings are issued to the contractor for implementation. A copy of the remeasurement, duly priced, should be issued to the contractor for their information as soon as it is available, as it is a bad practice to wait for the work to be completed before performing the remeasurement". Remeasurements and agreement of remeasurements on a remeasurable type of contract form a large part of the FA process, and care should be taken by the QSs to perform this throughout the project, so that only a small number of outstanding items will need to be measured and agreed upon at the project's end. This ensures that the time required to agree with the FA is reduced.

2.5.4. Timescale to complete FA

The timescale applied to prepare a FA is dictated by the CoC. The risk of not adhering to the indicated timescale might lead to a formal dispute between parties. Therefore, both parties need to fully understand the associated timescales to ensure compliance. Based on the four standard CoCs extensively used in the SA construction industry, the following timescales apply:

- The JBCC (JBCC, 2018) states in sub-clause 26.1 that "the principal agent shall determine the value of adjustments to the contract value in co-operation with the

contractor in preparing the FA". Furthermore, Sub-clause 26.10 states that "the principal agent shall prepare and issue the FA to the contractor within sixty (60) working days of the date of practical completion" and based on Sub-clause 26.11 "the contractor shall accept the FA within thirty (30) working days of receipt thereof or give notice of non-acceptance with reasons failing which the FA shall be believed to be accepted"

- Both the 1999 FIDIC Red and Yellow Books (FIDIC, 1999) (FIDIC, 1999) state in sub-clause 14.11 that "within 56 days of receiving the performance certificate, the contractor shall submit a draft final statement with supporting documents to the engineer". Sub-clause 14.13 states that "within 28 days of receiving the final statement, the engineer shall issue the final payment certificate to the employer". These periods apply to the CoC for Construction, Second Edition 2017 (FIDIC, 2017) and the CoC for Plant and Design-Build, Second Edition 2017 (FIDIC, 2017)
- The GCC (GCC, 2015) states in sub-clause 6.10.9 that "the contractor shall deliver to the Employer's Agent within 14 days of the date of the Final Approval Certificate a final statement and that the Employer's Agent shall within 14 days issue a Final Payment Certificate to the Employer and the contractor"
- The NEC3 contract (NEC3, 2005) states in sub-clause 30.2, that "the project manager certifies completion within one week". Furthermore, sub-clause 50.1, states that "the project manager will assess the amount due at each assessment date", and sub-clause 51.1, states that "the project manager certifies payments within one week of the assessment date". There is no reference to the final statement or FA in this standard CoC. The NEC4 contract (NEC4, 2017) states in Sub-Clause 53.1 that "the project manager assesses the final amount due and certifies a final payment no later than four weeks after the supervisor issues the defects certificate or 13 weeks after the project manager issues a termination certificate. The final payment is made within three weeks of the assessment".

The DPWI experienced delays in the finalisation of FAs and published two directives (Nos. 3 and 5) to address this problem. DPWI Directive No. 3 (D.P.W, 2016) brought inter alia the following to the attention of all project managers and QSs:

- The CoC must be strictly adhered to
- All work measured provisionally must be properly remeasured during the construction stage for FA purposes and measurements, including site measurements, must be made available on request

- Rates for additional work or omissions must be determined strictly in accordance with the CoC and the mere acceptance of a quotation from the contractor or a sub-contractor is NOT acceptable
- Quotations must be used in exceptional cases only and must be certified (after proper verification by the QS) as fair, reasonable and market related.
- The acceptance of the lowest of the three quotations without verification is unacceptable, as there is currently a tendency to obtain an initial first quotation which is inflated, and then obtain inflated cover quotations. This is highly irregular and unacceptable.
- Additional work, scope changes and the like which are not part of normal remeasurements must be covered by variation orders, duly approved by the variation order committee and might under no circumstances be covered under remeasurements
- The provisional sums and budgetary allowances must be strictly addressed by the CoC. The acceptance of invoices or quotations without proper verification is unacceptable.
- Before any cost for delays, disruption, standing time, acceleration and the like could be included in a FA, the QS as well as the PM must ensure that there are valid reasons for inclusion of such costs and that the reasons are recorded and approved in writing.
- It is the QS's function and responsibility to compile the FA, providing the correct quantities and all item costs.
- It is unacceptable for a QS to claim that they cannot finalise a FA, as they are waiting for information from the contractor. If no information was provided, it is the QS's responsibility to deal with these matters without input from the contractor.
- If there is a dispute between the QS and the contractor concerning quantities, rates or any other matter that cannot be resolved within the period allowed to finalise the FA, the QS must refer, such dispute to the PM who in turn must refer it to a Departmental QS for an opinion and recommendation. The Department QS must be decisive and make a firm recommendation to the PM within the shortest possible time
- Where consensus cannot be reached with the contractor concerning quantities, rates or any other matter, the FA must formally be issued to the contractor. This must be done based on the QS determined final cost and recommended by the Departmental QS
- The Departmental QS must interact directly with the QS to resolve outstanding matters on a FA once it has been submitted for scrutiny.

DPWI Directive No. 5 (D.P.W, 2020) states that all measurements/remeasurements of the final quantities must be performed as soon as possible and in conjunction with the contractor. Once agreed upon, it should be approved by the contractor for recording purposes. This will prevent disputes at the FA stage when it will, in many cases, not be possible to verify the quantities

that are in dispute. This directive states that all approved claims must be included in the FA, and the FAs must be finalised within the period stipulated in the CoC. According to the DPWI's published manual (D.P.W., 2020), if the FA is completed late, and there is costs arising from such late completion, that the QS should be held accountable for these costs. This is onerous for QSs, and careful attention should be paid to the contractual period for the completion of a FA. It is of utmost importance to finalise FAs within the contractual stated timescale, as it is to the advantage of both parties.

2.5.5. Challenges in closing construction projects' FAs

Based on a study of the challenges of closing construction project FAs (Ssegawa, 2020), the factors affecting FA settlement vary and are inexhaustible. In general, it is the interpretation of the contract clauses, the efficiency at which the FA is prepared, the acknowledgement of the existence, adjustment, and valuation of work that fosters disputes and hence delays in closing the FA. In addition, the study lists factors causing delays in four categories: (1) contractor, (2) client, (3) environmental and (4) general factors (Table 3).

Table 3: Causes of delays in closing the construction project's final account (Ssegawa, 2020)

Category of factors	Delay factors
Client related	• Client's inefficiency in promptly issuing the defect liability certificate • Client's inefficiency in promptly assessing the FA • More work issued during the defects liability period which causes disagreements • Lack of funds to cater for the final payment
Contractor Related	• Contractor's inefficiency in promptly submitting an FA • Too much workload leading to taking a long time to submit FA • Contractors make errors in the FA and hence rejected • Inadequate experience of the contractor in preparing the FA and hence taking more time • Poor record keeping leading to loss of information to support claims • Wrong documentation to support claims leading to back and forth submissions • High workload leading to 'I do not care attitude for an ending project.' • Cost of rectifying the defects far exceeds the claim in the final account (FA) • The contractor goes into liquidation or financial administration
Common to both the client and contractor	• Inadequate understanding of the contract conditions leading to disagreements • Unsuitable contract to handle the complexities of project activities fostering disagreements • Lack of agreement with the work valuation method, process and hence value • The person in charge of preparing the FA is transferred, resigns, retires or dies • Unethical client employees who may collude with contractors to defraud and which may lead to protracted investigations. • Poor change control mechanism leading disagreements of variations and other instructions
Environment-related	• Change in regulations • Force majeure

Abbreviations: final account (FA)

After conducting a questionnaire survey, the same study, page 21, concluded that the following nine factors contributed to closing significant delays in closing FAs (in descending order of occurrence):

1. "Cost of rectifying the defects far exceeds the outstanding balance

2. Client taking longer time to agree and certify claims
3. Person in charge of the FA from the contractor's side is retired, dead or transferred from the project
4. Workload from other projects for the contractor resulting in time constraints
5. Person in charge of the FA from the client's side is retired, dead or transferred from the project
6. Delay in submission of accurate claims by the contractor
7. Lack of understanding of the contract conditions by the contractor
8. Submission of inadequate documentation supporting the claim by the contractor
9. Failure by the client to understand the contract conditions"

Based on a literature review of FA preparation in the construction industry (Othman, 2021), page 42, the following issues and challenges during the preparation of FAs are experienced by QSs (ranked from highest to lowest):

- "Incomplete submission of required documents by the contractor for FA
- Disputes involving provisional quantities or quantities which require remeasurement
- Disputes involving insufficient allocation provided for contractual risks (fluctuation of market price, material unavailability in the market, contingencies)
- Employer's lack of knowledge of own roles during the FA preparation
- Employer's lack of knowledge regarding the QSs' roles during the FA preparation
- QS's ethics (not conducting site valuation routinely, delayed issuance of related documents)
- QS's inadequacies (lack of confidence, lack of knowledge)"

In Zarabizan bin Zakaria (2013), an overview of the contract administrators' roles and responsibilities during contract execution and closing FAs successfully went further and listed the following causes of problems in closing FAs:

- longer time to certify the claim
- unethical employees
- outstanding/extra work in maintenance period
- rationalisation of rates (work price changes)
- lack of communication
- FA certificate issuance
- person in charge is retired or transferred

In addition, Zarabizan bin Zakaria (2013), page 8, states that “contract administrators should give reminders to all parties to maintain all records properly during the project and that this should start from an early stage of the project to avoid the problems of dispute and delays in the closing of a FA”.

2.5.6. Retaining information concerning FAs

Based on the professional client/consultant services agreement (PROCSA, 2017), clause 7.3: “The liability of the consultant shall be limited to defective services whether patent or latent, notified within a period of five (5) years which period shall commence on the earlier of:

- Ninety (90) days after practical or other equivalent completion of the works
- Completion by the consultant of the services
- Termination of all the contracts
- Termination of this agreement”

All documents pertaining to the FA should be kept at a minimum for as long as the QS has liability under contracted consultant services. Therefore, it is deduced from the above-mentioned clause that this should be for a minimum period of five years. However, owing to the current age of electronic filing systems, information can be stored for a period longer than a minimum of five years. Documents can be stored as physical or electronic files.

2.6. Other FA-related matters

In certain instances, other matters related to the FA are requested from the QS by the client. These must be considered during the FA process as early as possible so that it does not hold up the overall FA process. In RICS FA procedures (RICS, 2015), page 11 to 17, they provide the following practical considerations that the QS should consider in advising their clients about other FA related matters:

- “Disputes (adjudication/arbitration/litigation): in the event that a FA cannot be settled amicably, and all other options have been exhausted, then it could be stated that the parties are in dispute. The CoC will include dispute resolution options applicable to the contract.
- Negotiation as an alternative to dispute resolution: Advising to negotiate to avoid lengthy formal dispute is preferred as the process of agreeing a FA inevitably already involves some degree of co-operation and negotiation.
- Dealing with items not formally instructed: One of the common reasons that items are not agreed in FAs is because they have not been formally instructed. The reason for items not formally instructed might be because they were in dispute for a period of time, or

there might be some late changes. For a well-run project advising to issue a 'wrap-up' instruction to formalise the outstanding items could settle applicable items in the FA.

- Agreeing the FA: Other parties could affect the FA discussions (e.g. the contractor's subcontractors and suppliers). It is advised that it should be clear where the party could make decisions and has been given the appropriate delegated powers or where they need to seek permission.
- Bespoke and amended contracts: Bespoke contracts and amendments might be made to reinforce a partnering approach and might include provisions for shared savings, which might be dependent upon the FA figure. Therefore, a bespoke or amended contract might include a more detailed process arrangement of how this might be dealt with. This will affect the FA and should be set out accordingly.
- Patent and latent defects: If the contractor does not rectify patent defects, most of the standard conditions allows the employer to conduct the work by another contractor and include contra-charges as part of the FA settlement. Latent defects occurred outside the defect's liability period does not affect the FA's agreement as it will be subject to a separate claim for damages and for breach of contract or for negligence.
- Auditing of accounts: Auditing of FAs should be a standard part of the FA process.
- Items that the QS might be asked to advise on:
    - *Professional fees*. While the QS might not administer the professional fees budget; they will often need to have a good understanding of the budget and ensure it is tracked throughout the course of the contract.
    - *VAT*. VAT liable on any project should be calculated and advised by a VAT specialist. However, the QS might have to report these figures and ensure they are up to date.
    - *Employer internal costs*. This should be included in the overall financial report.
- Possibility of the agreed FA being used in disputes: Where the employer considers that the problems in the project were caused by the design team, they could initiate claims against the professional team. If this leads to legal action, the FA documentation could be an important forensic tool.
- Insurance recovery: In a construction contract, parties will usually attempt to take out insurances to cover their risks. The most common insured risks are all-risk insurance for the works on site, insurance of the works, public liability insurance and professional indemnity insurance. These insurances will sit outside the FA negotiations and should not affect the FA process. If liquidated damages are to be applied, then the contractor might have taken out an insurance policy against this.

- ‘Notional’ FAs caused by the contractor going into liquidation or administrative receivership: In most cases, FAs represent the end of a project and occur when the employer is taking possession of their new asset. However, there are occasions when FAs have to be settled in the middle of a project, due to liquidation or administration, or termination of the contract (by either party). The FA will include the agreed value of works completed at the date of termination or liquidation. The interim valuations’ (certificates) accuracy is now vital as it might be difficult to reclaim for any over payment from the contractor, currently in administration. The FA should clarify the scope of work remaining to complete the work to the contractual obligations. If the contract is terminated due to reasons outlined in the contract, then the rules in most forms of contract are clear and will stipulate the types of loss that could be claimed and the limits of recovery. If the contract isn’t prescriptive then the common law remedies will apply. If the employer terminates before the end of the contract, then they must realise the implications and that they might be forgoing any liquidated damages that are owed.
- Retention release: Once the FA has been agreed at the point of completion, then the employer should release the retention (typically a percentage) stated in the contract. However, if the FA has not been agreed and a difference of opinion remains then the employer is entitled to release retention up to the amount, he believes is payable under the contract. When the FA is agreed it is common for another payment certificate to be issued, including releasing the applicable retention”.

2.7. Checklist for compiling FAs

Following a comprehensive FA checklist will ensure that all steps in developing a FA is followed and that the minimum documentations are created. The RICS FA procedure (RICS, 2015), page 14, provides the following example of a type of FA audit checklist to ensure that everything is considered in compiling a FA. This does not only consider producing the FA document itself, but it includes some other considerations that influences a FA:

- “Project control plan
- Contract documents examined to determine:
    - The period for final measurement of the works
    - Responsibility for preparing the FA
    - If not specified, agreed with the contractor
- Staff resources to prepare FA agreed with team manager/partner
- Register maintained of architect/contract administrator
- Instructions
- FA calculation assembled

- Including, as appropriate:
    - The summary page
    - Adjustment of prime cost amount and provisional sums
    - Adjustment of provisional items
    - Adjustment of approximate quantities
    - Valuation of variations, dayworks
    - Fluctuations
    - Loss and expense incurred by the contractor
    - Adjustment of overheads and profit
    - Adjustment of any other amount required by the contract
- Before the summary and statement were printed, were the following checked:
    - Pages numbered correctly
    - Pricing document rates and references correct
    - Were pencil figures inked in and all calculations arithmetically checked
- Statement of FA prepared:
    - Submitted by the contractor for agreement and signature
    - Checked on its return to ensure no amendments made prior to signature
- Statement of FA approved by partner/director before the issue, approval recorded by partner initialling office copy
- Signed statement of FA issued to architect or contract administrator under a covering letter
- Disputes regarding the FA resolved, disputed points recorded
- Where the contractor prepared the FA sufficient checks completed to ensure its correctness, all checks recorded on office copy
- Necessary deductions made (when permitted by the form of contract) if defective or non-compliant work identified
- Any variations issued after practical completion evaluated and included under a separate heading
- If the employer required FA to be audited, was the auditor supplied with a copy of all supporting information required".

The only document within the SA context that could be found that provides reference to items that could be contained within a FA checklist is the form QS 005: Final Account Certification by Consultant Quantity Surveyor (D.P.W., 2021), page 1 to 2. Within this form the following items are listed:

- "All schedule rates are cross referenced to the priced BOQ

- All non-schedule rates are supported by relevant calculations, invoices, etc and are included where applicable
- All variations to the contract have been covered by departmentally approved contract instructions (variation orders)
- Departmentally approved contract instructions (variation orders) are incorporated in the FA
- All work measured provisionally has been remeasured and is included in the FA
- All provisional sums have been adjusted in the FA
- Dates used for calculation of CPA (if applicable to the contract)
- Amounts for calculation of CPA are correct and correspond with the progress payment certificates
- Adjustment of Preliminaries amount where applicable
- Achievement of contract participation goal (on applicable projects only)
- Copy of priced BOQ
- Copies of approved contract instructions (variation orders)
- Copies of payment certificates signed by principal agent
- Copies of CPA calculations
- Copy of contract completion report
- Documentation confirming successful test results (test cubes, compaction tests, etc)
- Relevant documentation confirming achievement of contract participation goal (on applicable projects only)
- Copy of contract data”

2.8. FA structure

Based on the LinkedIn publication on FA procedures (Abdelshahid, 2016) the structure of a FA should at least include the following typical FA headings:

- Adjustable costs
    - Provisional sums
    - Final quantities (if remeasurable contract)
    - Prime cost amount
    - Day work allowance
- Variations
- Loss and expense
- Fluctuations

2.8.1. Global FA procedure and proposed structure

The RICS FA procedure (RICS, 2015), which is used globally, provides information regarding the structure of a FA. There are no firm rules for how a FA should be structured as long as both parties agree to it. The structure might be dictated by the employer requirements. The document might follow the original pricing document contained within the contract document – e.g., if there is a BOQ in the contract, it might be used to adjust each section to calculate the final value which will form the FA's basis. Based on the procedure typically, a FA should include the following headings and descriptions, page 6 to 8:

- "*Variable costs*. Sums included in the contract sum that might be subject to change; e.g., provisional sums (defined provisional sums and undefined provisional sums):
    - *Approximate quantities*. Remeasurable contracts resulting in changes in quantities. (Contract BOQ would prescribe which quantities are to be remeasured).
    - *Prime cost amounts*. Items where the final specification of the work has not been decided at contract stage.
    - *Daywork allowances*. Payment for work which the quantity and specification is unknown and whose instruction is on an ad-hoc basis and where the valuing of the work by reference to contract rates would be inappropriate.
- *Variations*. Contractually entitled changes to the contract sum based on either an instruction or claimed by the contractor.
- *Loss and expense*. Loss and expense associated with any delay or disruption based on awarded extension of time
- *Fluctuations*. Financial adjustments made to the original contract price to compensate for changes in pricing levels at a macro-economic level by reference to input costs, price indices and price adjustment formulae
- Risk allowances (contingencies) included in the contract:
    - Risk allowance fully owned by the employer: allowance is offset against valid variations throughout the construction period
    - Transparent variable risk allowance: transparent allowance within contract sum for unforeseen events linked to a risk register
- *Liquidated damages* (delay damages). This might not be included in the FA as the employer could deduct liquidated damages from the final payment certificate.
- *Disputes.* Agreed dispute amounts.
- *Set-off/Contra-charges*: costs recovered from the contractor that the contractor has caused the employer to incur"

2.8.2. South Africa FA manual and proposed structure

The DPWI published a manual for consultant quantity surveyors (D.P.W., 2020) that states that the QS must ensure that the following documentation is included with the FA, page 11:

- "Copy of priced BOQs
- Certificate of compliance and indemnity by consultants, signed by the QS
- Copy of letter confirming the commencement date
- Copy of Contract Data
- Copies of approved contract instructions (Variation orders)
- Copies of payment certificates signed by the principal agent
- Copies of approved revision of date for practical completion
- Copy of certificate of practical completion
- Copy of certificate of works completion
- Copy of certificate of final completion
- Copies of the contract price adjustment (CPA) calculations
- Copy of contract completion report
- Calculations of non-scheduled rates, including invoices and receipts.
- Documentation confirming successful test results (test cubes, compaction tests)
- Final statement
- FA Certification by consultant QS"

Furthermore, D.P.W. (2020), page 12, states the following regarding the FA's compilation:

- "All pages of the FA are to be numbered consecutively
- Schedule rates must be clearly cross referenced to the priced bills of quantities
- The non-schedule rates must be determined by the CoC.
- New rates negotiated at current prices must either be de-escalated to base date, or included in the FA as non-escalatable amounts
- All supporting documentation (invoices, receipts, build-up of non-scheduled rates) must be included with the FA and clearly cross referenced to the relevant items to which they refer
- All work measured provisionally must be remeasured
- The date of the payment certificate and not the valuation date must be used for calculating CPA
- The FA must be finalised without the contractor should there be a lack of co-operation and assistance from them in this regard
- Approved contract instructions must be obtained for all adjustments to the contract value
- Copies of all approved contract instructions must be included in the FA

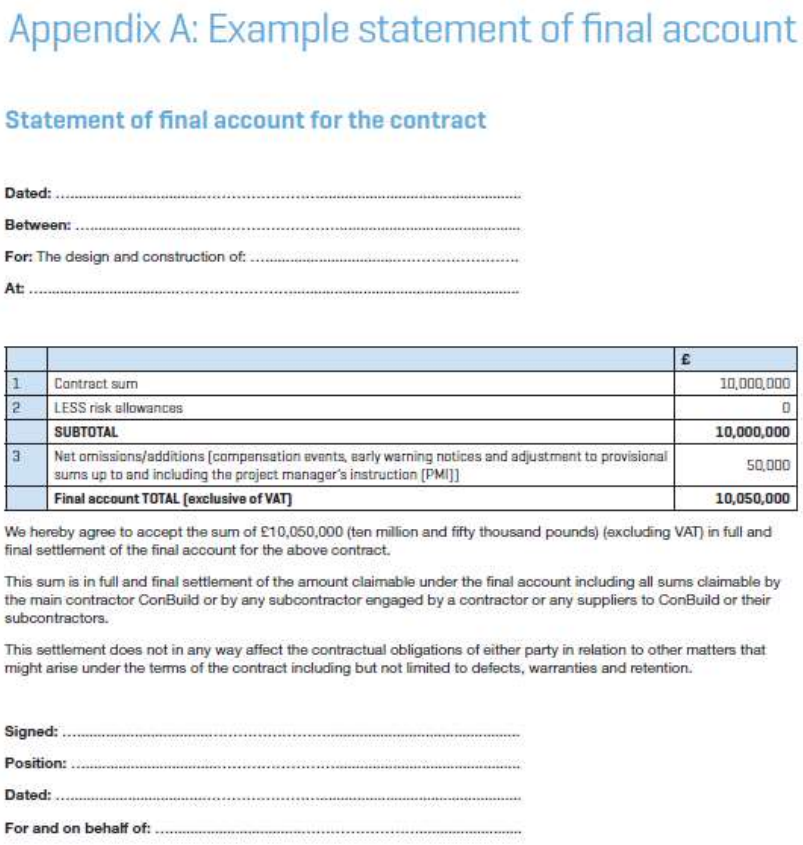
- Revision of date for completion will only be valid if granted in writing by the department
- Penalties are to be deducted for any delay in the completion of the contract unless the revision of date for completion has been granted in writing by the department
- The waiver of penalties does not constitute an extension of time
- Payment reduction security must be addressed in strict accordance with the relevant clauses of the CoC.
- The final statement might not be issued to the contractor for signature prior to the FA being approved by the department
- The professional team will be held liable for any overpayments to the contractor".

Although the above is provided for the public sector within SA, it could mostly be applied within the private sector as well.

2.9. FA current available templates

2.9.1. Global available FA templates

The RICS FA procedure (RICS, 2015), which is used globally, includes the following example of a FA statement layout (Figure 8).



Appendix A: Example statement of final account

Statement of final account for the contract

Dated: .....

Between: .....

For: The design and construction of: .....

At: .....

		£
1	Contract sum	10,000,000
2	LESS risk allowances	0
	SUBTOTAL	**10,000,000**
3	Net omissions/additions [compensation events, early warning notices and adjustment to provisional sums up to and including the project manager's instruction (PMI)]	50,000
	Final account TOTAL (exclusive of VAT)	**10,050,000**

We hereby agree to accept the sum of £10,050,000 (ten million and fifty thousand pounds) (excluding VAT) in full and final settlement of the final account for the above contract.

This sum is in full and final settlement of the amount claimable under the final account including all sums claimable by the main contractor ConBuild or by any subcontractor engaged by a contractor or any suppliers to ConBuild or their subcontractors.

This settlement does not in any way affect the contractual obligations of either party in relation to other matters that might arise under the terms of the contract including but not limited to defects, warranties and retention.

Signed: .....

Position: .....

Dated: .....

For and on behalf of: .....

Figure 8: Royal Institution of Chartered Surveyors statement of final account (RICS, 2015)

2.9.2. South Africa available FA templates

The DWS' manual (D.P.W., 2020) includes the following example of a FA statement layout as well as an example of the summary of all alterations and additions (Figure 9 and Figure 10):

FINAL STATEMENT

WCS NO: 003706
REFERENCE NO: 6032/1004/9/4

PROJECT: BLOEMFONTEIN: SUPREME COURT: ALTERATIONS AND ADDITIONS

CONTRACTOR: BUILDER AND SONS

Net amount of contract (excluding VAT)			R	3 618 925.26	
Net omission (excluding VAT)			R	-	-
Net addition (excluding VAT)			R	53 831.00	+
			R	3 672 756.26	
PLUS: Contract Price Adjustments			R	303 365.67	+
			R	3 976 121.93	
(1) LESS: Penalty for late completion	R	-			
(2) LESS: Penalty for non-compliance with CPG	R	-	R	-	-
			R	3 976 121.93	
Value Added Tax			R	596 418.29	+
			R	4 572 540.22	
LESS: Credit for old materials			R	-	-
FINAL VALUE OF CONTRACT			R	**4 572 540.22**	
*Retention retained (including VAT)			R	-	

CONSULTING QUANTITY SURVEYOR

DATE: _____

PROJECT MANAGER

DATE: _____

PRINCIPAL AGENT

DATE: _____

pp DIRECTOR-GENERAL
DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE

DATE: _____

I, the undersigned, duly authorised, accept the above statement as correct.

CONTRACTOR

DATE

*Applicable for engineering contracts where 12 months retention period is required and retention amount also included in final value of contract.

FOR DEPARTMENTAL USE

Contract close out captured on WCS (WG10PU): Name: _____ OPW: _____

Date: _____

Figure 9: Department of Public Works and Infrastructure final statement (D.P.W., 2020)

Final Summary

Item	Description	Omissions	Additions
Item No. 1	Alterations to Generator room (*CI No. 1)		1 026.00
Item No. 2	Hoop Iron Ties to Columns (CI No. 2)		264.00
Item No. 3	Re-do Brickwork in Corridor (CI No. 3)		No cost
Item No. 4	Window Sill and Lintel Details (CI No. 4)	1 971.00	10 334.30
Item No. 5	Alterations to Counters (CI No. 5)	5 103.00	57 335.10
Item No. 6	Remeasurement of General Site Works (including CI No. 6)	30 090.30	25 547.00
Item No. 7	Remeasurement of Provisionally Measured Items	8 852.90	5 341.80
	Totals	46 017.20	99 848.20
	Less: Omissions		46 017.20
Net Addition Carried to Final Statement		R	53 831.00

Figure 10: Department of Public Works and Infrastructure final summary (D.P.W., 2020)

The KwaZulu-Natal Department of Public Works (KZN Public Works)'s format of FA (D.P.W., 2022) includes the following example of a FA statement layout as well as an example of the summary of all alterations and additions (Figure 11 and Figure 12):

Specimen 5
WIMS NO.

(SERVICE TITLE)
AT
(INSTITUTION NAME)
(PLACE/TOWN/CITY)
FOR THE
PROVINCIAL ADMINISTRATION OF KWAZULU-NATAL

CONTRACT NO. ZNT ..... W
WIMS NO. .....

ARCHITECT'S NAME
ADDRESS

QUANTITY SURVEYOR'S NAME
ADDRESS

CONTRACTOR'S NAME
CONTRACTOR

STATEMENT OF ACCOUNT

CONTRACT SUM (EXCLUDING VAT)	R	
ADD/OMIT: NET ADDITION/OMISSION PER SUMMARY OF VARIATIONS	R	_____
ADD: ESCALATION : CONTRACTOR	R	
ESCALATION : NOMINATED SUB-CONTRACTORS .	R	_____
	R	
ADD: VALUE ADDED TAX	R	_____
FINAL COST OF CONTRACT	R	_____

I/WE, THE UNDERSIGNED, HEREBY CERTIFY THAT THE AMOUNT OF R *******.** (WORDS) IS THE FINAL COST OF THIS CONTRACT ACCORDING TO OUR RECORDS AND IN ACCORDANCE WITH, AND BASED ON: THE SIGNED CONDITIONS OF CONTRACT; ALL VARIATION ORDERS ISSUED BY THE HEAD : PUBLIC WORKS; THE CONTRACTOR'S CLAIMS AS AGREED TO BY THE HEAD : PUBLIC WORKS; INVOICES AND/OR STATEMENTS RECEIVED FROM NOMINATED SUB-CONTRACTORS; AND ACCOUNTS PAID BY THE CONTRACTOR TO LOCAL OR OTHER AUTHORITIES, ALL AS APPROVED BY THE HEAD : PUBLIC WORKS.

*NAME**		*NAME** HEAD :
WORKS QUANTITY SURVEYOR	ARCHITECT	
DATED: _____	DATED: _____	DATED: _____

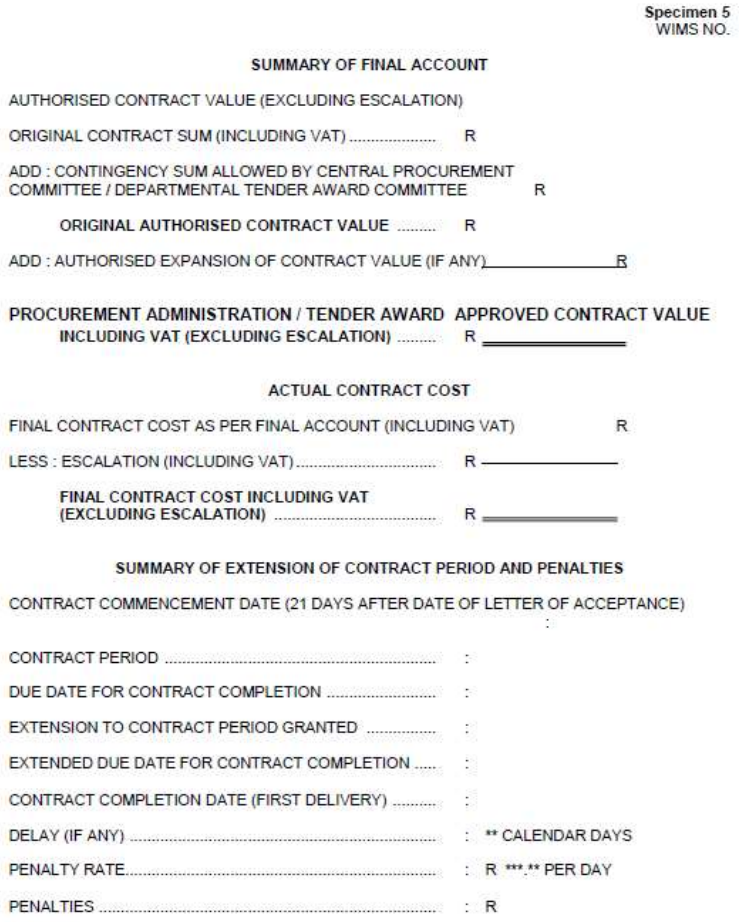
I/WE, THE UNDERSIGNED HEREBY AGREE THAT THE AMOUNT OF R ******.** (WORDS) IS CORRECT, AND I/WE ACCEPT SAME AS THE FINAL COST OF THIS CONTRACT IN TERMS OF THE STATEMENT ABOVE. I/WE HAVE NO FURTHER CLAIMS TO MAKE IN CONNECTION WITH THIS CONTRACT.

NAME
CONTRACTOR

DATED:

*INSERT NAME OF PRACTICE

Figure 11: Kwazulu-Natal Department of Public Works statement of account (D.P.W., 2022)



Specimen 5
WIMS NO.

SUMMARY OF FINAL ACCOUNT

AUTHORISED CONTRACT VALUE (EXCLUDING ESCALATION)

ORIGINAL CONTRACT SUM (INCLUDING VAT) ..... R

ADD : CONTINGENCY SUM ALLOWED BY CENTRAL PROCUREMENT COMMITTEE / DEPARTMENTAL TENDER AWARD COMMITTEE R

ORIGINAL AUTHORISED CONTRACT VALUE ..... R

ADD : AUTHORISED EXPANSION OF CONTRACT VALUE (IF ANY) R

PROCUREMENT ADMINISTRATION / TENDER AWARD APPROVED CONTRACT VALUE INCLUDING VAT (EXCLUDING ESCALATION) ..... R

ACTUAL CONTRACT COST

FINAL CONTRACT COST AS PER FINAL ACCOUNT (INCLUDING VAT) R

LESS : ESCALATION (INCLUDING VAT)..... R

FINAL CONTRACT COST INCLUDING VAT (EXCLUDING ESCALATION) ..... R

SUMMARY OF EXTENSION OF CONTRACT PERIOD AND PENALTIES

CONTRACT COMMENCEMENT DATE (21 DAYS AFTER DATE OF LETTER OF ACCEPTANCE) :

CONTRACT PERIOD ..... :

DUE DATE FOR CONTRACT COMPLETION ..... :

EXTENSION TO CONTRACT PERIOD GRANTED ..... :

EXTENDED DUE DATE FOR CONTRACT COMPLETION ..... :

CONTRACT COMPLETION DATE (FIRST DELIVERY) ..... :

DELAY (IF ANY) ..... : ** CALENDAR DAYS

PENALTY RATE..... : R ***.** PER DAY

PENALTIES ..... : R

Figure 12: Kwazulu-Natal Department of Public Works final account summary (D.P.W., 2022)

Items that are not addressed in the above standard templates, which is necessary to address all information required within a FA, include:

- dayworks,
- settled disputes,
- direct payment,
- risk allowances,
- set-off/contra-charges and
- interest on late payments.

2.10. Audits of FAs

To ensure FAs without material irregularities the QS should understand audits of FAs. The RICS FA procedure (RICS, 2015) advises that audits should be completed before the agreeing and signing off of the FA. This will ensure that if any irregularities are found they could be addressed and possibly avoided before the FA is signed. Furthermore, they stated on page 15

that “audits are a powerful tool and should be encouraged both internally and externally. They provide accountability and a safety net. They should not be seen as a criticism of work completed but simply as a way to reduce mistakes, misunderstandings and crucially to learn to ensure weaknesses or shortcomings are addressed”.

The AGSA states in their corporate information on their website (AGSA, 2021), page 1, that “through their audit activities, they play an important role in enabling accountability and thus promote sound financial governance practices in SA. They do this by providing independent assurance to the various legislatures on whether entities that use public funds have managed their financial affairs in line with sound financial principles, have complied with the relevant legal framework and have provided credible information on achieving their financial and performance aims. In this way, the elected representatives of the SA people hold the executive and accounting authorities, officials and public entities accountable”.

The AGSA material irregularities in national and provincial government report (AGSA, 2022), page 9, define a material irregularity as “any non-compliance with, or contravention of, legislation, fraud, theft or a breach of a fiduciary duty identified during an audit performed under the Public Audit Act that resulted in or is likely to result in a material financial loss, the misuse or loss of a material public resource or substantial harm to a public sector institution or the general public”.

In the AGSA’s consolidated general report (AGSA, 2021) they indicate that 75 of the total material irregularities found during their audit on municipalities relates to legislative non-compliance that resulted in a material financial loss, totalling an estimated ZAR 1.04 billion. The indicated material irregularities occur in four areas:

1. procurement and payments
2. interest and penalties
3. revenue management
4. investments and assets

The above irregularities have been reported by the AGSA for several years and are not issues that is too complex to resolve. In order to resolve it the following basic self-controls and processes should be in place at the municipalities:

- procuring at the best price,
- paying only for what was received,
- making payments on time,
- recovering the revenue owed to the state, and

- safeguarding assets.

The AGSA states in this report that with good preventative controls these could have been prevented.

In the AGSA's material irregularities in national and provincial government report (AGSA, 2022) they state that by 31 August 2022 they have identified 166 active material irregularities, which is 91 more than their previously reported material irregularities of 75. This is an unacceptable increase of 121%. The nature of material irregularities is indicated as follows in the same report (Figure 13):

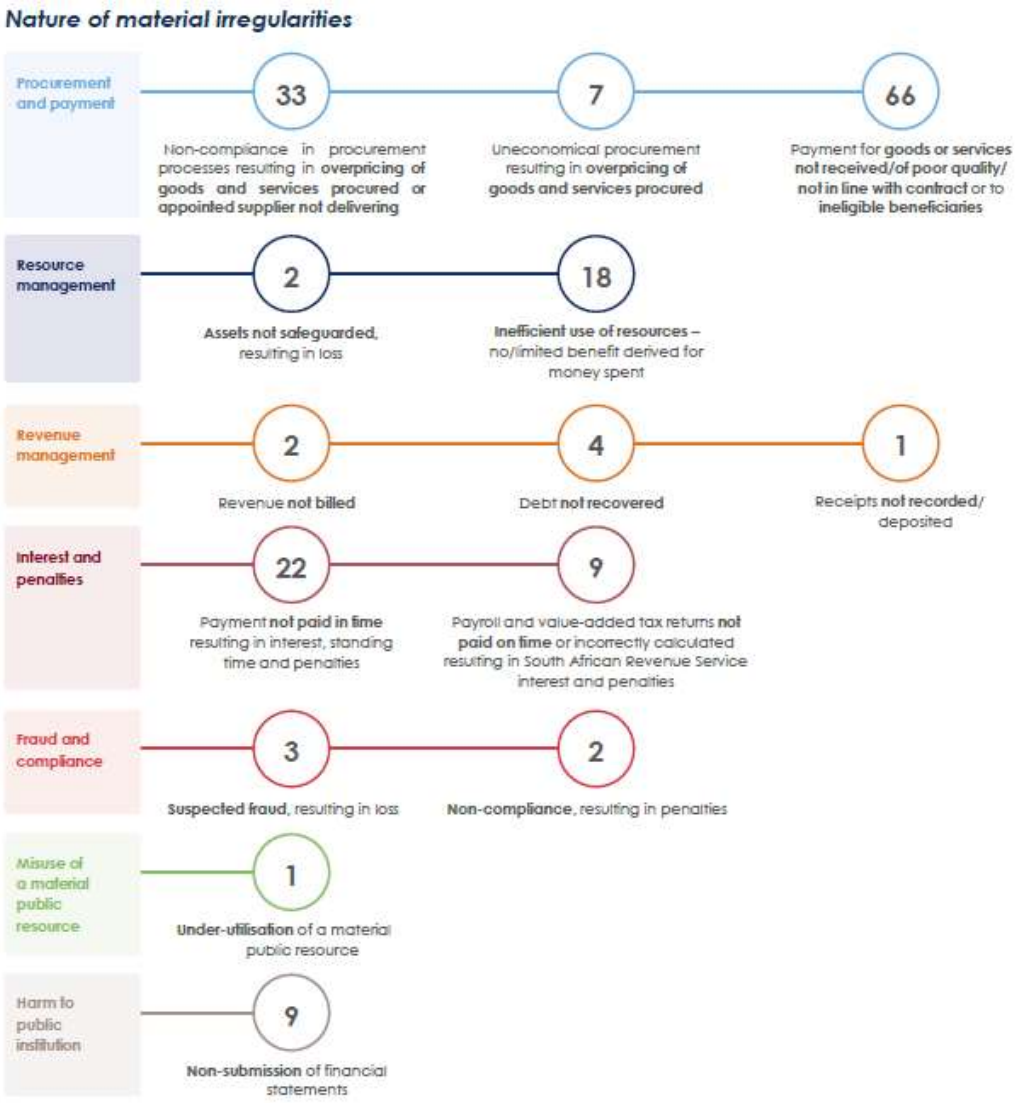


Figure 13: Nature of material irregularities (AGSA, 2022)

Procurement and payment irregularities are the highest contributors (59%) and based on the report runs through the following different portfolios:

- Basic education
- Communications
- Defence and military veterans
- Health
- Higher education, science and technology
- Human settlements
- Public enterprises
- Public works and infrastructure
- Transport
- Water and sanitation
- Other

Proper expenditure management and correct reporting on construction projects has the potential to reduce material irregularities significantly as this forms part of the biggest contributor to the above-mentioned irregularities. QSs perform duties on construction projects being constructed for the government as elected 'accounting' officials and the responsibility for ensuring that all the financial management parts of the project are executed in line with sound financial principles.

Based on the report of the AGSA to Parliament on a performance audit of the infrastructure delivery process at the provincial departments of Education and Health (AGSA, 2011) the following four key phases are stated as being audited for infrastructure delivery:

1. demand management
2. acquisition management
3. project management
4. commissioning and use

Any performance audit concentrates to answer certain questions applicable to each part or phase of the project's lifecycle in order to address the efficient and effective use of resources in constructing infrastructure. One phase for effectively ensuring a FA with no findings is the project management phase. The report (AGSA, 2011) states that the focus during this phase was on achieving critical planned delivery dates, the monitoring of actual expenditure and progress against budgeted funds and planned timelines, ensuring quality is aligned to the specifications as well as applying stringent risk management.

Questions during an audit could include:

- Was project implementation effective to ensure the timely, cost-effective and quality delivery of infrastructure projects?
- Were effective measures implemented to ensure that quality projects were completed on time and within budget?
- Did the client department and implementing agent effectively monitor and evaluate progress to ensure timely, cost-effective and quality infrastructure projects?
- Was the communication and co-ordination between the different role-players in the infrastructure delivery process effective in ensuring comprehensive infrastructure delivery?

Based on AGSA (2011), page 4 to 5, there are five types of audit opinions that could be raised after conducting an audit, namely:

1. "*Clean audit outcome*. Free from material misstatements (unqualified audit opinion) with no material findings and no non-compliance with legislation
2. *Financially unqualified audit opinion*. No material misstatements with findings on either reporting on predetermined aims or non-compliance with legislation, or both these aspects
3. *Qualified audit opinion*. Material misstatements in specific amounts, or insufficient evidence to conclude
4. *Adverse audit opinion*. Material misstatements that are not confined to specific amounts, or the misstatements represent a substantial potion
5. *Disclaimer of audit opinion*. Insufficient evidence to base an audit opinion on"

Usually, auditors determine their aims before conducting an audit against predetermined criteria. This assist in preparing for an audit, but it means that reported performance information must be valid, accurate and complete.

a) *Principles of auditing construction projects*

Internal audit

Per IIA (2016), page 1, internal auditing is an "independent, objective assurance and consulting activity designed to add value and improve an organisation's operations. It helps an organisation accomplish its aims by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes".

One of the main responsibilities for the internal audit team is to ensure that standards (e.g. policies and procedures, contracts) are implemented in the correct way. In other words, is there a well-established, effective and standard process in place and is it implemented correctly. The process should address every action required as well as who is responsible to perform each of them. It should be clear who is delegated to perform what functions to ensure segregation of duties, thus minimising the opportunity for checking your own work. Therefore, internal auditors test the project controls' efficiency. Normally the audit committee will provide oversight of the functions of the internal audit team.

For a construction project, based on the above principles, the following could be tested during an internal audit:

- Correct procurement processes followed
- Adequate capacities and skills of team
- Safeguards implemented against conflict of interest
- Signing of the contract before work commence
- Clear contract with effective processes and responsibilities
- Application of contract in the correct way
- Application of policies and procedures in the correct way
- Application of delegation of authority (DoA) (signing rights) in the correct way

Another responsibility of internal auditors is to confirm that recordkeeping (including document controls) are in place. LGC (2020) states that good document control ensures that documents are accurate, up-to-date, and accessible to those who need them, when they need them. For a construction project this could entail testing of:

- Sound and up to date recordkeeping in a complete and accurate manner per the contract
- Approved variations/compensation event per the contract (including maintaining updated registers)

Internal auditors independently review calculations, records, consumables and assets, which could entail the following for a construction project:

- Reviewing monthly payment certificates
- Reviewing variations/compensation event calculations
- Reviewing dispute settlement calculations
- Reviewing all FA account calculations
- Reviewing consumables on site

- Reviewing assets when construction is completed against the original plan

External audit

The main responsibilities for the external audit team is to ensure that the financial statements are aligned with the accounting standards of the organisation. Srivastav (2023), page 1, states that external audit is the “audit of financial records of the company in which independent auditors perform the task of examining the validity of financial records of the company carefully to find out if there is any misstatement in the records due to fraud, error or embezzlement and then reporting the same to the stakeholders of the company”. External audits is all about the money – verifying the general ledger for management to make informed decisions.

For a construction project, based on the above principles, the following could be tested:

- Calculations applied
- Revenue calculations
- Cost to date calculations
- Cost to complete calculations
- End of site position (revenue minus cost to complete)
- Variations and dispute calculations (completed and not completed)
- Risk allowance calculations
- Delay damages/penalties calculations

McCarthy, n.d. provides the following tips for audit success:

- Open a line of communication before the audit start date
- Set up an early planning meeting with your auditor
- Maintain current and complete files
- Learn from the past, review your earlier audit results
- Assess changes in activities
- Remember to document, document, document throughout the year
- Develop an audit timeline and assign responsibilities
- Perform a self-review of the annual report
- Once the audit starts, relax

2.11. Current curricula: FAs in South Africa tertiary institutions

To ensure that the construction industry within SA are provided with comprehensive information pertaining to the development of a FA there must be an understanding of what

tertiary institutions within SA include in their current curricula FAs. This should give an indication of the level of knowledge students have when leaving tertiary institutions into the construction industry in preparing FAs. Based on Mclean (2022) the following tertiary institutions offer programmes in QS in SA:

- Nelson Mandela University – Bachelor of Science in Construction Economics, Honours in Quantity Surveying
- University of Cape Town – Bachelor of Science in Property Studies, Honours in Quantity Surveying
- University of Pretoria - Bachelor of Science in Quantity Surveying, Honours in Quantity Surveying
- Tshwane University of Technology – Diploma in Construction, Advanced Diploma (QS)
- University of the Free State - Bachelor of Science in Quantity Surveying, Honours in QS
- University of Johannesburg – Bachelor of Science in Construction, Honours in Quantity Surveying
- Cape Peninsula University of Technology – Diploma in Construction, Advanced Diploma (QS)
- Durban University of Technology – Bachelor of Technology in Quantity Surveying
- University of Witwatersrand – Bachelor of Science in Quantity Surveying, Honours in Quantity Surveying

Various of the above-mentioned tertiary institutions in SA were approached by the researcher to understand what is covered in their current curricula pertaining to FAs. However, only two responses were received providing the following information:

a) ***Nelson Mandela University***

Cumberlege (2022) stated in an email that the university covers FAs in their third-year curricula which includes the following elements as a minimum:

- Determining the value of contract instructions which could be for changing the scope of the work; omitting what was originally allowed for or adding new work
- Adding and omitting work in the BOQ
- Adjustment of all work measured provisionally in the BOQ
- Adjustment of all provisional sums
- Adjustment of preliminaries based on value, time and fixed-related items
- Final escalation based on final contract value

b) *University of Cape Town*

Jeune (2022) stated in an email the university covers FAs in their honour's year course. The syllabus includes the following elements as a minimum:

- The QS role associated with the pre-contract, tender, post-contract and FA stages
- Costs plans and BOQ preparation and final presentation
- Administration of adjudication process, valuations for interim payment certificates, on and off-site material valuations and payments, applying escalation calculations, preparation of FAs

The following tertiary institutions' curricula pertaining to FAs could be found in their year- or handbooks.

c) *University of Pretoria*

In the University of Pretoria Yearbook 2022 (UP, 2021) the subject Quantity Surveying Practice 300 (BRK300) is listed as a third-year undergraduate subject. Within this subject the following module content is listed: Management theory; basic principles of production management, lists of materials, pricing, payment certificates*; final accounts*; contract price adjustments; application of computer-based measuring programmes.

d) *Cape Peninsula University of Technology*

In the Faculty of Engineering & Built Environment Handbook (CPUT, 2022) the subject Construction Management 2 list contract administration and administer construction projects within the subject outline. Furthermore, it indicates under the subject Construction Practice, FAs as an item within the subject outline.

e) *Tshwane University of Technology*

In the Faculty of Engineering & Built Environment Handbook (TUT, 2023) under the advanced diploma in QS the subject Construction Contracts and Administration list introduction to FAs, compiling the FA, contractual claims negotiations and settlements, reporting on project's status and compiling the FA within the subject outline.

f) *University of the Free State*

On the Faculty of Natural and Agricultural Sciences home page (UFS, 2023) the subject Building Economics 3 is listed which includes payment cycles, preparing recovery statements, payment certificates and notifications and FAs, calculate interest and CPAs.

Based on the above information certain aspects of FAs are covered within the tertiary institutions. However, the following information seems to be not included:

- Introduction to FAs (including process and reporting)
- Ethical behaviour of the parties and representatives
- Agreeing of FAPEP at the beginning of a project
- FA time scales per different CoC
- FA meetings (including recordkeeping)
- Subcontractors as part of FA, including:
    - Direct payments from employer
    - Incorporating major Subcontractors into FA process
- Recordkeeping and retaining of information
- Change control, including:
    - Determining the value of contract instructions per CoC
    - Remeasuring of BOQ (including site measurements and recordkeeping)
    - Adjustment of preliminaries (value, time and fixed-related items)
    - Agreeing new rates
    - Adjustment of provisional sums
    - Adjustment of prime cost amounts
    - Dayworks (if applicable)
    - Adjustment of risk allowances (if applicable)
    - Escalation/CPA
- Interest on late payments (if applicable)
- Set-off/contra-charges if in CoC
- Retention releases
- Contingencies (including adjustments)
- Penalties/delay damages
- Guarantees
- FA process if contract is terminated
- FAT formats (public and private sectors)
- FA Checklist

2.12. Research

Research to expand knowledge of and study the influence of industry specific factors that might enhance producing better FAs is essential and is encouraged by the ASAQS. Currently there is not enough research on this topic globally as well as within SA. Therefore, the ASAQS

supports this study to analyse and improve current trends in developing FAs within SA and to develop a FAT and guidance notes, thereby improving industry knowledge.

2.13. Summary

Chapter 2 has introduced the issue of developing a FA and why the process is required. Other FA related matters as well as providing a FA checklist were then discussed. Material irregularities found in SA indicated by the AGSA were indicated. Current FA structures and templates were referred to and what audits of FA within SA entails. A discussion of what is currently covered in tertiary institutions concerning FAs production concluded this chapter.

It was established that there is currently no clear guidance in developing a FA without any material irregularities as found by the AGSA. There are also only two published FA templates in SA that only address work done for SA public works, which leaves a huge gap for the private construction industry. Possible gaps were also established in tertiary institution curriculums with regards to FAs.

Chapter 3 will debate the research methodology.

CHAPTER 3 - Research methodology

3.1. Introduction

Chapter 2 consisted of a review of the current literature applicable to the study. The literature review considered the different aspects of developing a FA (including the FA process). Other FA related matters were discussed as well as developing a FA checklist. Current FA structures and templates were described and what audits of FAs within SA entails. Current tertiary institution's FA curriculums and gaps were discussed in some detail. Chapter 3 discusses the methodology, which provides a overview of the main types of methodologies, including discussion and motivation of the applicable methodology used for this study. It covers the research validity and the importance thereof as well as the measures to ensure that the study attends to validity.

3.2. Research definition and characteristics

Per UWS (2020), page 1, research is defined as the "creation of new knowledge and/or the use of existing knowledge in a new and creative way to generate new ideas, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it leads to new and creative outcomes".

Goundar (2012), page 3, states that the following three processes should be undertaken during research:

1. "It is being undertaken within a framework of a set of philosophies (research approaches)
2. Use procedures, methods and techniques that have been tested for their validity and reliability
3. Design it to be unbiased and objective"

Streefkerk (2019), page 1, states that inductive and deductive research could be combined and describes the main difference between inductive and deductive reasoning as "that inductive reasoning aims at developing a theory while deductive reason aims at testing an existing theory. In other words, inductive reasoning moves from specific observations to broad generalisations while deductive reasoning works the other way around". Gabriel (2013) supports this argument by explaining that the main difference between the two approaches to research is that a deductive approach is aimed at testing theory whilst an inductive approach is concerned with the generation of new theory emerging from the data.

This study followed an inductive reasoning approach, which based on Herrity (2023), page1, is a “logical process that involves using specific experiences, observations or facts to evaluate a situation”. However, some aspects of a deductive approach were incorporated as part of the study. These aspects were to the existing FA templates used in the industry.

TIIKM (2022), page 1, explains that conducting a study is a “cycle from the initial stages of formulating research questions to analysing data and drawing conclusions. It comprises several interconnected phases, including planning and design, data collection, data analysis and interpretation of findings. The research cycle is an interactive process, with researchers frequently revisiting and refining various stages based on feedback, new insights or unexpected findings. It is a systematic approach that allows for rigorous investigation, knowledge generation and contribution to the academic community or practical applications in various field”.

Minhaz (2023) stated that there are 12 characteristics of research:

1. focused on priority problems
2. systematic
3. logical
4. reductive
5. replicable
6. generative
7. action-oriented
8. follow an integrated multidisciplinary approach
9. participatory
10. simple, timely and time-bound (employing a comparatively simple design)
11. cost-effective
12. presented in formats most useful for readers

3.3. Research data

Darby (2023), page 1, states that research data are the “raw materials collected, processed and studied in the undertaking of research. They are the evidential basis that substantiates published research findings. They might be primary data generated or collected by the researcher or secondary data collected from existing sources and processed as part of the research activity”. This is confirmed by Wagh (2023), page 1, stating that “the researcher has generated primary data himself/herself, surveys, interview, experiments, specially designed for understanding and solving the research problem at hand while secondary data is using existing data generated by institutions and facilities”.

This study always strives to secure data from the primary source whenever possible. Sourcing information regarding FAs through interviews with identified registered QSs, who are currently actively managing projects in the construction industry, ensured data sourcing from primary sources.

3.4. Data measurement

Trochim (2023), page 1, states that “measurement is the process of observing and recording the observations that are collected as part of a research effort. It is important to know the level of measurement as it helps you decide how to interpret the data from that variable. Knowing the level of measurement helps deciding what statistical analysis is appropriate on the values that were assigned”. There are typically four defined levels of measurement: (1) nominal, (2) ordinal, (3) interval and (4) ratio.

Based on Trochim (2015) in the nominal measurement the numerical values just ‘name’ the attribute uniquely. No ordering of the cases is implied. Bhat (2023) stated that nominal measurement is used to categorise data into mutually exclusive categories or groups. Some of the questions (e.g. level of employment, main function or line of business) included in the interview during this study were based on the nominal scale measurement.

In the ordinal measurement the attributes could be rank ordered. Here, distances between attributes do not have any meaning (Trochim, 2023). Bhat (2023) define this measurement scale as providing meaningful insights into attitudes, preferences and behaviours by understanding the order of responses.

Trochim (2015) explained that in the interval measurement the distance between attributes does have meaning. The interval between values is interpretable. Bhat (2023) stated that this type of measurement scale enables prices comparisons and calculations. Most of the questions (e.g. rating knowledge of existing FA procedures, rating topics to be included in the guidance notes) included in the interview during this study were based on the interval scale measurement.

Trochim (2015) stated that in the ratio measurement there is always an absolute zero that is meaningful. Thus, you could construct a meaningful fraction (or ratio) with a ratio variable. Bhat (2023) confirmed that this measurement scale allows for comparisons and computations (e.g. ratios, percentages and averages). Where questions were stated in percentages to determine ratios.

Trochim (2023) also, stated that “it’s important to recognise that there is a hierarchy implied in the level of measurement idea. At lower levels of measurement, assumptions tend to be less restrictive and data analyses tend to be less sensitive. At each level up the hierarchy (i.e., nominal, ordinal, interval and ratio [lowest to highest]), the current level includes all of the qualities of the one below it and adds something new. In general, it is desirable to have a higher level of measurement (interval or ratio) rather than a lower one (nominal or ordinal)”.

3.5. Research methodologies

Bhat (2023), page 2, stated that empirical research is defined as “any research where conclusions of the study is strictly drawn from concretely empirical evidence, and ‘verifiable’ evidence. This empirical evidence could be gathered using both quantitative and qualitative market research methods”. Team (2023) stated that there are four research methodologies: (1) qualitative, (2) descriptive, (3) quantitative and (4) experimental.

3.5.1. Qualitative research

Qualitative research involves collecting and analysing written or spoken works and textual data. It might concentrate on visual elements or a person’s body language to generate the researcher’s detailed observations. Qualitative data are usually gathered through carefully selected participants in interviews and focus groups. Collecting the data is more time-consuming than collecting quantitative data and it is also more subjective. (Team, 2023)

A qualitative study needs a clear research question. The research must be practical, categorised, compared and evaluated (along a scale or by a typology chart) by reference to a baseline. This will then determine an outcome with value as new and reliable information (Girardin, 2023). Furthermore, it is stated that this method is used to generate new ideas due to the exploratory nature. Thus it can uncover unexpected information, which can generate new theories and research topics. In addition, Radu (2019), page 1, defines it as “a market research method that focuses on obtaining data through open-ended and conversational communication. This method focuses on the ‘why’ rather than the ‘what’ people think”.

Although semi structured interviews normally gather qualitative data, some of the questions in the study interview with registered professional QSs were close-ended questions to collect data on a specific subject which could be measured numerical. This is quantitative in nature (George, 2022). Close-ended questions that could not be measured numerical and all open-ended questions which were included in the interview gained qualitative data.

3.5.2. Quantitative research

Team (2023), page 1, stated that quantitative research is used when “the research objective is to confirm something. If focuses on collecting, testing and measuring numerical data, usually from a large sample of participants. The data is analysed using statistical analysis and comparisons”. Questionnaires, databases, surveys, tests and organisational records are known methods to gather this type of data. This methodology is usually faster and is objective of nature.

In addition, LeTourneau (2020) also stated that quantitative research data are collected through questionnaires, surveys, polls or by manipulating pre-existing statistical data using computer techniques. It also states that this is an objective method of measurement and is a mathematical or numerical data analysis. Sreekumar (2023) states that using already existing data is known as the secondary quantitative research method. The main sources of secondary data are the internet, government and non-government sources, public libraries, educational institutions and commercial information sources e.g. newspapers, journals, radio and TV. Over and above quantitative data gathered through the interviews with registered professional QSs, this study is based on secondary quantitative data gained through using existing FA manuals and templates as a basis for generating the proposed FAT and guidance notes.

3.5.3. Descriptive research

McCombes (2023), page 1, states that descriptive research aims to “describe a population, situation or phenomenon accurately and systematically. It could answer what, where, when and how questions, but not why questions”. This research design investigate one or more variables by using a variety of research methods. In other words the researcher does not control or manipulate any of the variables, but only observes and measures them (McCombes, 2023).

3.5.4. Experimental research

Experimental research design uses a scientific approach by conducting an experimental research using two sets of variables. Herein, the first set of variables acts as a constant, used to measure the difference of the second set (Donotedit, 2022). Data is gathered to make research decisions and determining the facts of a study. Per Donotedit (2022), page 4 to 5, there are three primary types of experimental research designs:

1. “*Pre-experimental*. A group or many groups are under observation after implementing research factors of cause and effect.
2. *True experimental*. Relies on statistical analysis to prove or disprove a researcher’s hypothesis.

3. *Quasi-experimental*. Similar to a true experimental design with control group".

3.5.5. Mixed-method research

Team (2023), page 1, stated that this contemporary research methodology "combines quantitative and qualitative approaches to provide additional perspectives, create a richer picture and present multiple findings. The quantitative methodology provides definitive data, while the qualitative provides a human aspect". By using the qualitative and quantitative research methodologies through semi-structured interviews to test the analyses conducted using the quantitative research methodology on existing FA manuals, the researcher endeavoured to augment each of the research methodologies' strengths in this study. Goundar (2012) shows the strengths and limitations of both research methodologies (Table 4).

Table 4: Strengths and limitations of quantitative and qualitative research

Research type	Strengths	Limitations
Quantitative	• Reliable measurement which makes it precise. • Can control it better. • Can create connected statements due to exact experiments. • Statistical which can result in sophisticated investigations.. • Can be repeated.	• Complexity can make it difficult to control all variables. • Because of human factor people can respond in different ways contrary to a matter in the physical sciences. • Tends to exclude concepts of 'freedom', 'choice' and 'moral responsibility'. • Quantification could become an end in itself. • People's ability to interpret experiences and to create their own meanings is excluded. • Can lead to the conclusion that everything is the same for all people all of the time. • Can produce trivial findings that does not contribute anything as variables are controlled. • It is not completely objective - researcher is subjectively involved in interpreting the results.
Qualitative	• Researcher is more involved which gives and inside vies of the study field. • Provide important role of telling associations, causes, effects and active processes. • No statistics are used however can gain new insights by using forms of knowledge. • It provides details for social analysis.	• Can have a problem with validity or reliability due to subjective nature of the data's origin. • Cannot be replicated • Can only be applied to a wider context than the one studied. • Lengthy time to gather data. • In finding selection anonymity and confidentiality may create a problem. • Biasness can be a problem.

3.6. Interviews methodology

There are four types of interviews that could be conducted: (1) structured-, (2) semi-structured-, (3) unstructured- and (4) focus groups. Table 5 shows the most important differences between the four types (George, 2022) (Table 5).

Table 5: Differences in interview types (George, 2022)

	Structured interview	Semi-structured interview	Unstructured interview	Focus group
Fixed questions	✔	✔	✖	✔
Fixed order of questions	✔	✖	✖	✖
Fixed number of questions	✔	✖	✖	✖
Option to ask additional questions	✖	✔	✔	✔

During this study a semi-structured interview technique was applied to understand current FA standards used in the construction industry, problems encountered throughout the FA process, identifying gaps in published FA guidance notes. The data collected during the interviews was analysed to enhance the creation of the FAT and guidance notes. Though it takes more time to plan and prepare, compared to an unstructured interview, this method was chosen based on the following strengths as stated by George (2022), page 4:

- "It is considered to be the 'best of both worlds', combining elements of structured and unstructured interviews. This results in comparable, reliable data and the flexibility to ask follow-up questions
- The ability to design a thematic framework beforehand holds the interviewer and participant to task, avoiding distractions while encouraging two-way communication
- It introduces more detail and richness to structured interviews due to the more open-ended nature. Participants could be asked to clarify, elaborate or rephrase their answers if necessary".

Furthermore, a semi-structured interview brings in an objectivity in the data collection, which is essential for this type of study.

In addition, the disadvantages of this method are listed in the above-mentioned article (George, 2022), page 4 to 5:

- "The flexibility of semi-structured interviews could lessen their validity and it could be challenging to compare responses between participants depending how far the interviewer departed for the predetermined list of questions
- The open-ended nature could lead to the temptation to ask leading questions, biasing the responses
- It could be difficult to develop good interview questions
- Can be difficult to conduct interviews correctly due to their delicate balance of prior planning and spontaneous asides"

Semi-structured interviews are limited to the participant's available time and might be perceived as less objective than a structured interview. However, this type of interview provides the interviewer the opportunity to ask structured questions as well as exploring some relevant topics. For this study a list of structured questions was drawn up to cover pertinent aspects of a FA process. However, some open-ended questions were added to understand the participants' difficulties, challenges and problems with the FA process.

3.7. Research validity

Chapter 1, Section 1.13 introduced the idea of validity and it will now be addressed in more detail. Validity is used to determine whether research measures what it intended to measure and to approximate the results' truthfulness. How 'true' are these results? How well do they represent the thing you're actually trying to study? Validity cannot be disregarded. If it is disregarded it can put other people's confidence in the result of the study into question. Validity make the difference between 'good' and 'bad' testing and ensuring increased validity will increase the reliability of the research results. (Elias, 2023)

Elias refers to seven key types of validity in research (Elias, 2023), page 4:

1. "*Face*. How valid a measure appears on the surface and make subjective judgments based on that – is the measurement valid at face value?
2. *Content*. Whether or not the measure used in the research covers all of the content in the underlying construct
3. *Construct*. A construct represents a collection of behaviours that are associated in a meaningful way to create an image or an idea invented for a research purpose. Construct validity is the degree to which the research measures the construct (as compared to things outside the construct)

4. *Internal*. The extent to which the independent variable could accurately be stated to produce the observed effect. Internal validity is how the research 'works' in a research setting – within a given study, does the changed variable affect the studied variable?
5. *External*. Refers to the extent to which the results of a study could be generalised beyond the sample. Findings could be applied to other people and settings. How well do the research results apply to the rest of the world?
6. *Statistical conclusion*. A determination of whether a relationship or co-variation exists between cause-and-effect variables. It requires ensuring adequate sampling procedures, appropriate statistical tests and reliable measurement procedures – the degree to which a conclusion is credible or believable
7. *Criterion-related*. A measure of the quality of the measurement methods. The accuracy of a measure is demonstrated by comparing it with a measure already known to be valid. If the measure has a high correlation with other measures that are known to be valid because of previous research performed"

This study focused on existing known FA manuals and procedures and related published information as well as information received through semi-structured interviews with professionally registered QSs. Existing FA manuals and procedures are specifically structured to capture certain relevant aspects pertaining to producing FAs and all information collected through the interviews were around the FA process. The study's face validity received consideration. However, the data provided through the interviews will be considered with due caution to guard against validity concerns. Participants were asked to confirm their responses after the interview.

Content validity for the interview participant's responses were ensured using existing FA manuals and procedures as the basis for the questions and anticipated answers, thus ensuring accurate and consistent participant's answers. Using existing FATs as the basis for the proposed FAT and guidance notes compiled within this study ensures that all known content pertaining to the FAs is covered within the newly developed FAT and guidance notes.

By collecting registered professional QSs opinions and knowledge concerning FAs through the interview process in a meaningful way, it ensured that a complete construct of what should be covered within the FAT and guidance notes were populated.

The internal validity had to receive consideration and data accumulated during the interviews were treated objectively and in strict pursuit of the stated methodology. Due care was taken to guard against any biasedness.

The study's structure and design set particular parameters for interview participants to qualify for inclusion in the study. These parameters enabled that current industry best practise is considered when answering the interview questions. The correct application of these parameters in a similar fashion by future users of the study's proposed methodology would ensure that any concerns regarding external validity were duly addressed.

The minimum list of items to be included in the FAT and guidance notes were compared to existing FA manuals and procedures' listed items, which are known to be valid and currently used in the construction industry. Therefore, criterion-related validity was acknowledged.

3.8. Methods to ensure reliability

The following steps and procedures were followed to ensure a high degree of reliability in the data that were sourced for the study:

- The study was conducted with the support of the ASAQS, which is a well-established and respected SA organisation functioning on both national and international level in the construction industry
- The interview participants were professionally registered QSs from the SA construction industry and were asked to answer questions in their professional capacity. This ensured a high degree of competence and serving to support the data's reliability.
- Interview participants were only from the QS professional discipline which ensured a high degree of focus and experience that support the data's reliability.
- Data relating to the development of the FAT and guidance notes were sourced by using existing FA manuals and procedures frequently used in the SA and global construction industries by construction project team members in creating FAs for their construction projects. This ensured that the base data used was reliable.
- A detailed questionnaire was drawn up that was included in each interview. This way the researcher ensured that each participant responded to all the required questions. Answers received from the participants were captured physically on paper and confirmed after the interview with each participant through an email correspondence to ensure that they agree with the data captured. This ensured that the correct answers were captured and that the captured data were reliable.

3.8.1. Sampling

To investigate the opinions of professional consultants regarding the development of the FAT and guidance notes in-person semi-structured interviews were conducted with consultants. Interviews were one-on-one interviews.

Sampling was done by firstly identifying which type of professional consultants to interview and secondly in the selection of the number of participants to interview.

Lund (2012), page 2, stated that purposive sampling, known as judgmental, selective or subjective sampling, is a "type of non-probability sampling technique. Non-probability sampling focuses on sampling techniques where the units that are investigated are based on the researcher's judgement. The goal of purposive sampling is to focus on particular characteristics of a population that are of interest, which will best enable to answer the research question".

Sago (2023), page 4, stated that the main advantages of purposive sampling are "the ability to improve the quality and accuracy of data collected by selecting participants most relevant to the research question". In addition, it stated that researchers should be aware of ensuring that their own judgement does not influence participants selection based on own potential biasness. This technique is limited that it might not represent the general population.

Based on Lund (2012), page 3, there are different types of purpose sampling techniques:

- "maximum variation
- homogeneous
- typical case
- extreme (or deviant) case
- critical case
- total population
- expert"

Expert sampling is a technique that aims to involve individuals with expertise or specialised knowledge in the study area. This sampling technique was applied in this study to decide on what type of professional consultants should be interviewed as the study's objective pertains to producing FAs and consultants with expert experience in FAs should be interviewed. In SA FAs are mostly produced by QSs as part of their quantity surveying Stage 5 services, B.5.1.9, per PROCSA (2017). Therefore, registered professional QSs were selected. To ensure that

the participant QS is an expert, a minimum of 10 years' post-graduation experience was a requirement.

To decide how many interviews must be conducted, purposive (expert) sampling as well as snowball sampling was applied. Due to logistics of face-to-face interviews the researcher could only have interviews with participants within driving distance. Therefore, interviews were only held with participants within the Gauteng province. The SACQSP (2021) indicated in their annual report that there were 2 293 registered QSs in SA. In addition, it indicated that approximately 39.5% of these does not have the minimum number of years' experience needed to participate in the interview process for this study. Therefore, there are only 1 187 possible participants in SA. 557 (46.9%) of these registered QSs are residing in Gauteng. This represents a high percentage of all registered professional QSs in SA that could participate in the interview process.

Through purposive expert sampling the researcher reached out through her own network and connections to registered professional QSs with the necessary minimum experience to participate in the interview process. Snowball sampling or referral sampling (Sago, 2023) was then applied where the initial identified participants provided references to others that fit the requirements. The sample size then grew to 44 participants. However, only 25 participants were willing to participate in the interview process. Twenty-five participants represent 4.5% of all registered professional QSs in Gauteng that could participate in the interview process.

Participants chosen were from different sectors of construction, namely building, engineering, mining, infrastructure, etc. This was to ensure that all requirements in the preparation of FAs within the different sectors were covered. All participants were all professionally registered QSs that can sign off payment certificates and FAs, therefore ensuring that they have the right professional experience to answer the provided questions. To ensure anonymity no further information pertaining to the participants are revealed in the study.

Once Draft 2 of the FAT and guidance notes was drawn up, after the above-mentioned interviews where data collected from the interviews were incorporated into Draft 2, the same purposive (expert) sampling methodology was used to choose six professionals registered QSs from the original 25 interview participants to review the draft and to provide comments. However, only five comments were received.

3.8.2. Data collection

The data collected from interviews were firstly captured on paper and confirmed by each participant after the interview. Data that could be captured in a spreadsheet type summary was then done in a Microsoft Excel spreadsheet. Other data that could not be captured in a spreadsheet was summarised in a table format in Microsoft Word. Finger errors can occur whilst capturing of data in this way, therefore the researcher had to take extreme care and double check all captured data. All of the interview participants were asked to share their currently used FA templates, which would be good data to use for this study. However, only a few were willing as it is seen as proprietary information. All templates received were in a pdf format. Comments on Draft 2 of the FAT and guidance notes were captured in Microsoft Word.

3.8.3. Data analysis

The method used in this study to analyse the data were recognised techniques often used in qualitative research to analyse data. Most of the questions' answers within the interview were analysed using descriptive statistics to calculate, describe and summarise collected data in a logical, meaningful and efficient way (Vetter, 2017) using the mean or average as a percentage. Furthermore, all the data collected were analysed looking at it from different viewpoints: either from the angles of various established sciences or just from a miscellaneous practical points-of-view, all per Routio (2007). Chapter 5 describes the data analyses applied in detail.

3.9. Ethical considerations

As Chapter 1 described, Section 1.15, the study was subjected to a complete ethical approval process by the University of Pretoria. The study's application for ethical approval was made to the Faculty Committee for Research Ethics and Integrity, Faculty of Engineering, Built Environment and Information Technology.

This process included:

- Copies of typical informed consent form (Appendix A)
- Copies of typical company consent form (Appendix B)
- Copies of interview guide (Appendix C)
- Copy of the signed memorandum of agreement (Appendix D)
- Copy of the PhD research contract with the University of Pretoria (Appendix E)
- Copy of the proof of registration as a PhD student (Appendix F)
- Copy of the approval letter by the Committee for Research Ethics and Integrity is appended hereto (Appendix G)

Permission to participate in any interviews was obtained from the organisation represented by the participant as well as from the participant before collection of any data.

3.10. Summary

Chapter 3 discussed the topic of research methodology, and all referenced works were referred to. The research process was defined (including references to significant research characteristics). Applicable aspects of the research data were discussed, including the measurement process of the research data and where each specific measurement level occurred in the study. The research methodologies and research validity were described as well as the methods to ensure reliability in the study findings and all ethical considerations. Chapter 4 introduces the research design.

CHAPTER 4 - Research design

4.1. Introduction

Chapter 3 described the different aspects of the research methodologies and validity. In Chapter 4 the research design created to address the study problem will be discussed. It includes the idea of the research design needed. Various data collection phases will be discussed as well as the research plan, problems and the development of the FAT and guidance notes.

Based on McCombes (2021), page 1, the research design is a “strategy for answering your research question using empirical data. Creating a research design means making decisions about:

- the overall research aims and approach,
- relying on primary or secondary research,
- sampling methods or criteria for selecting subjects,
- data collection methods,
- procedures followed to collect data, and
- data analysis methods”.

Jain (2022), page 1, agreed that a research design is a “plan to collect and evaluate data, tackle the challenges and reach a conclusion. It gives research direction, sharpen the research methods and set study up for success”. McCombes (2021), page 1, stated that a “well-planned research design helps ensure that the methods match the research aims and that the right kind of analysis are used for the data”. This is confirmed by Bouchrika (2024), page 5, stating that “an excellent research design has one purpose: to make the data address the research problem as clearly, as accurately, and as unbiased as possible”. This study’s design is based on sequential linked steps which enabled the study to make the findings and reach the conclusions required to answer the research problem.

4.2. Study population and sample

A study population is “the entire set of items or group of individuals living in a specific area at a specific time, used to draw conclusions from” (Ravikiran, 2023), while a sample is a “smaller and more manageable representation of a larger group, a subset of a larger population that contains characteristics of the population”, page 1. As Section 3.8.1 described, the interview participants were professionally registered QSs from the SA construction industry with a

minimum of 10 years post-graduate experience. This population definition returned a study population of 25 QSs. Purposive (expert) sampling as well as snowball sampling methodology was applied. The same method was applied in selecting six QSs to comment on Draft 2 the FAT and guidance notes, of which five provided input.

4.3. Research opportunity and obtaining of data

4.3.1. Industry's needs

The SA construction industry developed a real need for generating FAs without material irregularities. This need, which created the opportunity for this study, was described and justified in Chapter 1. In the SA construction industry two organisations have an urgency in addressing this need to ensure projects are concluded in the correct way with a comprehensive FA. These two organisations are the AGSA and the ASAQS. The AGSA was established to enable accountability and to promote sound financial governance practises in SA by providing independent assurance on entities that use public funds. The ASAQS is a voluntary organisation representing a majority of practising QSs in SA. QSs are professionals who focus on the financial management of construction projects.

4.3.2. Obtaining of data

This section briefly described the obtaining of data process. Sections 4.5 to 4.8 describes the process in much more detail. The obtaining of data for this study involved execution of several sequential processes. Firstly, it started by identifying potential registered professional QSs to be interviewed. The next step was to contact the identified QSs to secure their own as well as their represented company's agreement to participate in the study interview process. This was communicated with every participant through email explaining the study's details and what the interview entails.

Once the agreements were received from participants (Appendices A and B) that were willing to participate in the interview process a date, time and place were established with each interview participant for the interview. A challenge to obtain enough QSs to participate in the interview process was acknowledged as a limitation in Section 1.7. Face to face interviews were then held with each participant per the agreed date, time and place. The interview guide (Appendix C) was used to guide questions and to capture answers. All captured answers were then emailed to the participant after the interview for their confirmation that the answers were capture correctly. Confirmations were received from most of the participants and where no response were received, after numerous requests, it was assumed that they agree with the captured answers.

Each of the interview participants were asked during the interview to share their FAT that they use for completing their existing construction projects. Only a few were willing, but all received templates were kept as good reference data. This challenge was acknowledged as a limitation in Section 1.7. After completing the interviews, a second draft of the FAT and guidance notes were produced. This document was then circulated to six professionals registered QSs, that was part of the interview process, to review and provide comments. Comments were received from five QSs, which were accumulated to assess which changes needed to be made to Draft 2 of the suggested FAT and guidance notes.

4.4. Research plan

A research plan is a framework that shows how to approach a topic and introduces the research question, describes the approach to the research question, provides systematic approach to the study topic and communicate evidence (Petraits, 2010). This study's research plan encompass the purpose, methodology, structure, data type required, obtaining data, data processing, thought processes supporting findings made and the conclusions reached. The research plan needed to address and solve the research problem of providing a framework for the complete FA process in developing a FAT and guidance notes, all based on the analysis of existing publications and registered professional QSs opinions. Sections 4.5 to 4.8 present the research plan in detail.

4.5. Research problem and sub-questions

The research problem consisted of four sub-questions. The sub-questions followed a specific sequential order and forms part of the overall research plan. Therefore, the research plan follows the same sequential order. The research problem and sub-questions were described in Section 1.4.2. The main research problem was to provide a framework for the complete FA process for SA and to develop a FAT and guidance notes based on analysis of existing publications and registered professional QSs opinions. Following the main problem, the following main question and sub-questions were identified: "Would a developed, integrated and comprehensive FAT, including guidance notes, be an improvement over the current FA templates used in SA?"

Sub-questions:

- What are the currently known FA procedures, formats/structures and standards, and which ones are being used within the SA construction industry?
- Which AGSA key material irregularities should be mitigated with improved FAs?
- What could be implemented to ensure improved FAs?

- Will QSs and project teams within SA benefit from a newly developed FAT, including guidance notes?

4.6. Detailed study research plan

4.6.1. Sub-question 1

Sub-question 1 required the study to established which FA procedures, format/structures and standards exists and which ones are being used within SA construction industry. To address this sub-question, the following research plan was developed.

a) ***Identifying established FA standards***

Conduct a literature review to identify established FA procedures, formats/structures and standards that could be used in producing FAs within SA.

b) ***Conducting interviews***

Conduct interviews with professionally registered QSs currently working in the SA construction industry. Establish the level of knowledge of identified established FA standards from the participants and whether they use the identified established FA standards in their development of FAs by incorporating questions to this effect into the interview guide.

c) ***Capturing data from interviews***

Capture answers pertaining to established FA standards from the interviews, analyse data and present outcomes in a graph format to show which FA standards are known to the participants, which ones they've personally used and what their overall knowledge is of each FA standard.

4.6.2. Sub-question 2

Sub-question 2 required the study to established which AGSA material irregularities exist and which could be mitigated with an improved FA. To address this sub-question, the following research plan was developed.

a) ***Identifying AGSA material irregularities***

Conduct a literature review to identify current AGSA material irregularities within SA.

b) ***Conducting interviews***

Conduct interviews with professionally registered QSs currently working in the SA construction industry. Establish what is essential during the FA process to ensure an auditable FA and if a

developed FAT and guidance notes would reduce material irregularities on FAs by incorporating questions to this effect into the interview guide.

c) *Capturing data from interviews*

Capture answers pertaining to audits from the interviews, analyse data and present outcomes in graph and table formats to show what is essential for an auditable FA and if a FAT and guidance notes are developed that it would reduce material irregularities on FAs.

4.6.3. Sub-question 3

Sub-question 3 required the study to establish what could be implemented to ensure improved FAs. To address this sub-question, the following research plan was developed.

a) *Conducting interviews*

Conduct interviews with professionally registered QSs currently working in the SA construction industry. Establish the following by incorporating questions to this effect into the interview guide:

- items to be included in the FAT and guidance notes to assist developing FAs,
- supporting information needed for FAs,
- developing a FAPEP to ensure correct FA process,
- maintaining records of all information pertaining to FAs, and
- items assisting in settling of FAs.

b) *Capturing data from interviews*

Capture answers pertaining to FA information from the interviews, analyse data and present outcomes in graph and table formats to show what items are essential for an improved FA.

4.6.4. Sub-question 4

Sub-question 4 required the study to established whether QSs and project teams within SA benefit from a newly developed FAT (including guidance notes). To address this sub-question, the following research plan was developed.

a) *Conducting interviews*

Conduct interviews with professionally registered QSs currently working in the SA construction industry. Establish if QSs will use a newly developed FAT (including guidance notes) and benefitting of it and should it be incorporated into tertiary institutions curriculums to enhance the knowledge of FAs.

b) *Capturing data from interviews*

Capture answers pertaining to using of the developed FAT, including guidance notes from the interviews, analyse data and present outcomes in graph format to show if QSs will use it and whether they think it should be taught in tertiary institutions to enhance knowledge on FAs.

4.6.5. FAT and guidance notes

To address the research problem and main question in providing a framework for the complete FA process for SA in providing a FAT and guidance notes and to provide essential information in developing a FA, FAT and guidance notes was developed during this study. The study developed the following research plan for this process:

a) *Draft 1*

Captured and use data from existing known FA procedures, format/structures and standards and additional information based on the literature review information and draw up a proposed first draft of the FAT (including guidance notes). Conduct interviews with professionally registered QSs currently working in the SA construction industry. Establish the following by incorporating questions to this effect into the interview guide:

- items to be included in the FAT,
- list of documents to be included in the signed FA,
- list of documents to be kept as supporting information, and
- items to be included in the guidance notes.

b) *Draft 2*

Capture answers pertaining to the developed FAT, including guidance notes from the interviews, analyse data and present outcomes in table format to show what items should be included in the FAT and guidance notes, as well as supporting information. Capture FA templates/layouts provided by participants subsequent to interviews. Analyse all data generated from the interviews using the triangulation mixed method previously discussed and made applicable changes to Draft 1 of the FAT and guidance notes. FA templates/layouts provided by the participants were used to update the proposed FAT (including guidance notes). It is important to note that at this stage the researcher decided to produce a separate FAT for public sector work and private sector work, to provide one guidance notes section still only. This decision was as a result of participants indicating in their interviews that different requirements are needed within each of these two sectors. A second draft of the FAT and guidance notes were generated.

c) ***Draft 3***

Circulate Draft 2 of the FAT and guidance notes to registered professional QSs to review and provide comments. Accumulate comments received and analyse, assessing changes that needed to be made to Draft 2 of the suggested FAT and guidance notes. A third and final draft of the suggested FAT and guidance notes was developed and included in this study in Chapter 6.

d) ***Layout of FAT and guidance notes***

The layout of the FAT and guidance notes include the following details as a minimum:

4.6.5.d.1. Definitions and abbreviations

To ensure clarity on all the defined and abbreviated words in the document a list of definitions and abbreviations were provided. This reduces any confusion concerning terminology used in the document.

4.6.5.d.2. Different sectors

Following from the interviews it was decided to provide two FATs, one for the public sector and one for the private sector (Appendices 1 and 2).

4.6.5.d.3. Project flow chart

A flow chart was included to show the complete FA process and phases: the initiation, planning, execution and close out phases.

4.6.5.d.4. Guidance on who compiles the FA

Guidance was provided on who should compile a FA and what the minimum competencies of the person should be.

4.6.5.d.5. Ethical behaviour

Basic principles of ethical behaviour for both parties are listed and should be adhered to.

4.6.5.d.6. Auditable FA

This section included a list of minimum requirements in producing a FA to ensure that the FA is auditable.

4.6.5.d.7. FAPEP

Guidance was provided in developing and agreeing a FAPEP and a list of minimum activities to be included in FAPEP is provided in this section.

4.6.5.d.8. FA process and reporting

The complete FA process was provided as well as guidance on minimum descriptions in the FAT.

4.6.5.d.9. Time scales for completing FA

Guidance was provided in the appliable time sale to completing a FA.

4.6.5.d.10. FA meetings

Guidance was provided in FA meetings and signing off on agreements.

4.6.5.d.11. Subcontractor direct payments

Guidance was provided in direct payments from the client to the subcontractors as well as a template for cession agreement is provided as an attachment.

4.6.5.d.12. Recordkeeping

A list of minimum type of records that should be kept was provided.

4.6.5.d.13. Change control

Guidance was provided on change control during the project execution phase.

4.6.5.d.14. Remeasuring

Guidance was provided on on- and off-site remeasurements.

4.6.5.d.15. Adjustment of preliminaries

Guidance was provided on adjustment and settling of Preliminaries.

4.6.5.d.16. Agreeing of new rates

Guidance was provided on agreeing of new rates.

4.6.5.d.17. Provisional sums and prime cost amounts

Guidance was provided on adjustment of provisional sums and prime cost amounts.

4.6.5.d.18. Dayworks

Guidance was provided on handling of dayworks.

4.6.5.d.19. Risk allowances

Guidance was provided in handling of risk allowances.

4.6.5.d.20. Escalation/CPA

Guidance was provided in handling escalation in FAs.

4.6.5.d.21. Interest for late payment

Guidance was provided in handling interest on late payments in FAs.

4.6.5.d.22. Set-off/contra-charges

Guidance was provided on handling set-off/contra-charges in FAs.

4.6.5.d.23. Retention

Guidance was provided in handling retention money and/or retention bonds in FAs.

4.6.5.d.24. Contingencies

Guidance was provided in handling contingencies.

4.6.5.d.25. Guarantees

Guidance was provided in handling different types of guarantees.

4.6.5.d.26. Disputes

Guidance was provided in handling disputes in FAs.

4.6.5.d.27. Penalties/delay damages

Guidance was provided in handling penalties/delay damages.

4.6.5.d.28. Defects

Guidance was provided in handling defects in FAs.

4.6.5.d.29. Termination

Guidance was provided in handling termination due to different reasons.

4.6.5.d.30. Signing and dating FA

Guidance was provided in signing and dating of FAs.

4.6.5.d.31. Retaining information

A list of minimum backup documentations for FAs was provided.

4.6.5.d.32. Commentary

Guidance was provided on maintaining a continuous commentary while creating a FA during the execution phase as well as a list of pertinent issues.

4.6.5.d.33. Checklist

A FA audit checklist was provided to assist in completing the complete FA process.

4.7. Interviews

Part of the study's research plan is to conduct interviews with registered professional QSs.

4.7.1. Data collection

The population for the interviews of QSs were focused on the number of SACQSP registered professional QSs in SA with the necessary knowledge and insights to answer questions in a fruitful way. An invitation, with the following information, was emailed to the identified QS to participate in an interview:

- reason for the email,
- research title,
- short research description,
- details of proposed interview, and
- requesting willingness to participate in such an interview.

Conducting face to face interviews ensures a response rate of 100%. The challenge is to obtain enough participants to commit to the interview. QSs that responded positively to the researcher's request were contacted to set a date, time and place for the interview.

Before commencing the interview, the participants as well as their perspective companies signed consent documents giving consent to the interview as well as the recording thereof.

During the interviews relevant questions were asked to either confirm, reject, or enhance the original information collected during the literature review. All the data from the interviews were

captured in an excel spreadsheet as well as table format (dependant on the question) in order for the researcher to assess information received.

Though all the participants were known to the researcher, to try and ensure the anonymity of participants the participant's name was not recorded on the interview questionnaire, only the researcher's randomly allocated questionnaire number, no name was mentioned in the recording and no name was recorded in this study. All data kept from the interviews, including Microsoft Excel and Word documents, were stored in the password protected cloud-based storage site against the interview questionnaire number only.

After concluding the interview, none of the participants asked to be withdrawn from the study. Data collected during the interview was mailed to the participant after the interview to confirm the data's correctness. All the data information collected during the interviews are stored in a cloud-base storage site, which is password protected, this way only the researcher has access to the stored data. Data from the interviews will be stored for a maximum period of five years.

4.8. Reviews

Draft 2 of the FAT and guidance notes needed to be reviewed by registered professional QSs. The aim was for them to identify objectively any missing items, items they fundamentally disagree with and items that was not needed.

4.8.1. Data collection

An invitation, with the following information, was emailed to identified QSs, that already participated in the interview process, to participate in reviewing Draft 2 the FAT and guidance notes:

- reason for email
- request for review details.

Because the interview participants already committed time for the interviews, as well as subsequent time to review their answers, the researcher aimed to ask six of the participants working for clients and contractors to review Draft 2 of the FAT and guidance notes. To ensure a meaningful outcome the participants were chosen for their many years of experience in post contract administration and FAs in various type of construction projects, namely building, engineering, mining, infrastructure, etc. The researcher did not want to waste participants time as all of them already provided their input into the research questions during their interviews, which was utilised to produce the FAT and guidance notes. The aim was to cover at least 20% of the total number of interviewed participants:

25 x 20% = 5

Even though six participants were asked to participate, only five QSs responded with comments, which satisfied the minimum sample size requirements.

All the data received from the reviewers were captured in a Microsoft Word document. Though all the participants were known to the researcher, to try and ensure the anonymity of participants the participant's name was not recorded in the word document and only the word documents received from the participants were stored in the password protected cloud-based storage site against a randomly assigned reviewer number.

4.9. Summary

In Chapter 4, the research plan has been discussed in detail. The research plan consisted out of several elements to be implemented sequentially. The data analysis required were linked to and described the nature necessary to solve the research problem. The research problem consisted of one main question and four sub-questions. The research plan addressed each question individually. The sub-questions were structured sequentially and had to be solved in the same sequence. Chapter 5 describes the data analysis.

CHAPTER 5 - Data analysis

5.1. Introduction

Chapter 4 discussed the research plan with several elements to be implemented sequentially. Chapter 5 will detail the data gathered and the data processing and analysis.

5.2. Quantitative data

This study included the collecting and analysis of quantitative data collected through close ended questions in the interviews. To do this the major properties typical of quantitative data must be considered. These are the central tendencies (measured of centre or central location), which is a way to describe a whole set of data with a single value that represents the middle or centre of its distribution (Statistics, 2024).

5.2.1. Central tendencies

The tendency of quantitative data is referred to as the central tendency of the data and the three most common measures of central tendency are the mode, median and mean (Bhandari, 2023).

a) *Mode*

Research (2018), page 1, stated that the mode "is the most frequent score in a data set. It is the highest bar in a bar chart or histogram. The mode is being the most popular option in a particular data set. The problem with mode is that it is not unique, so it leaves a problem when there are two or more values that share the highest frequency".

b) *Median*

Research (2018), page 1, stated that the median "is the middle score for a set of data that has been arranged in order of magnitude. The median is less affected by outliers and skewed data".

c) *Mean*

Research (2018), page 1, stated that the mean "is the most popular and well-known measure of central tendency. It could be used with both discrete and continuous data, although its use is most often with continuous data. The mean is equal to the sum of all the values in the data set divided by the number of values in data set". The mean is however susceptible to outliers' influence, which is a big disadvantage.

For this study most of the data were measured to a mean scale of measurement.

5.2.2. Data dispersion

Furthermore, to understand quantitative data it is important to understand the spread of the data. Gawali (2021), page 1, stated that dispersion of data is “used to understand the distribution of data. It helps to understand the variation of data and provides a piece of information about the distribution data. The range, IOR, variance and standard deviation are the methods used to understand the distribution data”.

a) *Range*

Gawali (2021), page 1, stated that the range “is the easiest dispersion of data or measure of variability. It is measured by subtracting the lowest value from the highest value. The wide range indicates high variability, and the small range specifies low variability in the distribution”.

b) *Interquartile range*

Gawali (2021), page 2, stated that interquartile range “is used to measure variability by splitting a data set into four equal quartiles and then determining the range (the boundary between the first and second quartile) and quartile 3 (the boundary between the third and fourth quartile)”.

c) *Variance*

Gawali (2021), page 3, stated that the variance “is a simple measure of dispersion. Variance measures how far each number in the dataset is from the mean. It calculates the average squared difference between each data observation and the mean”.

d) *Standard deviation*

Gawali (2021), page 5, stated that standard deviation “is a squared root of the variance and is a measure of the spread of the data. Standard deviation is measure in the same units as the data. Low standard deviation indicates data points close to the mean”.

5.2.3. Shape of data

Third it is important to consider the data’s shape, which indicates how the data is spread or dispersed by looking at its histogram. First, if the data values seem to pile up into a single ‘mound’, the distribution is unimodal, or if it is in two ‘mounds’ it is bimodal, or if it is in more than two ‘mounds’ it is multimodal. Second whether the distribution is symmetric or if it has a longer ‘tail’ on one side or another (Emory, 2023).

When there is a longer ‘tail’ the distribution is skewed in the direction of the longer tail. Where the longer tail is associated with larger data values the distribution is skewed right or positively. Where the longer tail is associated with smaller or more negative values the distribution is skewed left or negative. If the distribution is symmetric, it is necessary to check if it is bell-shaped or if it has a different shape. If the distribution of each rectangle is the same height it is a uniform distribution (Emory, 2023). Examples of distribution shapes (Figure 14):

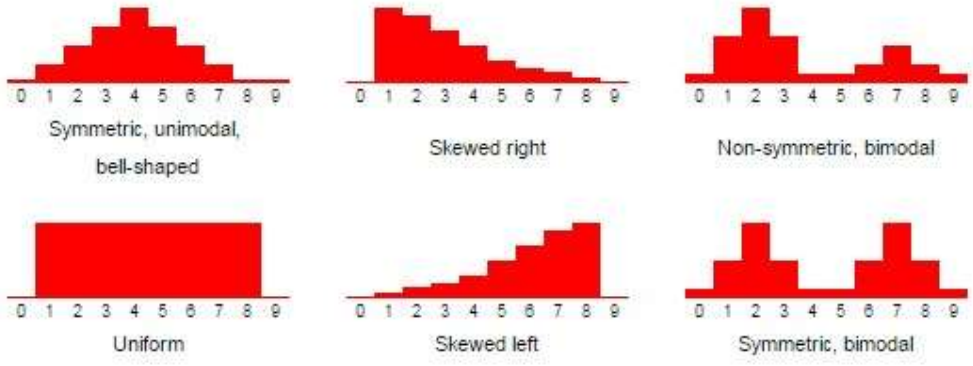


Figure 14: Examples of distribution shapes (Emory, 2023)

a) *Determining significant skewness*

Skewness (outliers) could affect where the mean and median end up, as depicted in the following examples (Figure 15):

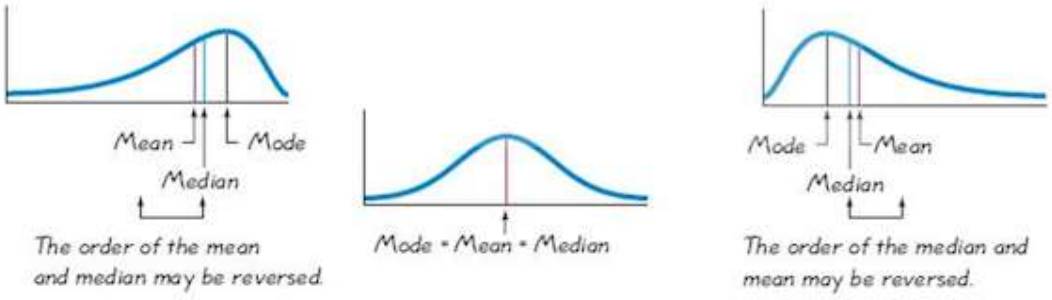


Figure 15: Examples of the presence of skewness (Emory, 2023)

The mean and median can end up in different places when significant skewness is present. The significance of the skewness could be determined by applying Pearson’s Skewness Index, I:

$$I = \frac{3(\bar{x} - Q_2)}{s}$$

Equation 1: Pearson's Skewness Index (Emory, 2023)

where I indicated Pearson's skewness index, $\bar{x}$ the arithmetic mean, Q_2 the median and s the standard deviation. The data set is significantly skewed when I ≥ 1. Since the nature of this study's data (e.g., testing knowledge of a document or when an event should happen with provided options), data cannot be less than zero, the study's datasets will typically be right skewed.

5.3. Qualitative data

This study included the collecting and analysis of qualitative data collected through pre-determined set of close- and open-ended questions in the interviews. Close-ended questions provided qualitative data in statistics (e.g. main function, type of company working for, providing additional list of items).. Open-ended questions provided the interviewer with the opportunity to explore particular themes or responses. Fullstory (2023), page 3, stated that qualitative data is "descriptive, expressed feelings rather than numerical values and qualitative data analysis cannot be counted or measured because it describes the data. It refers to the words or labels used to describe certain characteristics or traits".

Fullstory (2023), page 12, also stated that to perform successful data analysis the following characteristics of qualitative data should be understood:

- "*Descriptive*. Describing or classifying in an objective and nonjudgmental way.
- *Detailed*. Give an account in words with full particulars.
- *Open-ended*. Having no determined limit or boundary.
- *Non-numeric*al. Not containing numbers.
- *Subjective*. Based on or influenced by personal feelings, tastes or opinions".

The above traits could assist in understanding the meaning behind the equation, or what is behind the results (Fullstory, 2023). In addition, to assist in analysing qualitative data it is important to understand the three types of qualitative data: (1) binary, (2) nominal and (3) ordinal (Fullstory, 2023).

5.3.1. Binary data

Binary data is numerically represented by a combination of zeros and ones and could be directly understood. This type of data could be used to create statistical models (Fullstory, 2023).

5.3.2. Nominal data

Nominal data is also called ‘named, labelled data’ or ‘nominal scaled data’ and is any type of data used to label something without giving it a numerical value. This type of data is used to determine statistically significant differences between sets of qualitative data (Fullstory, 2023).

5.3.3. Ordinal data

Ordinal data categorised qualitative data in a particular order or on a ranging scale. The order of the qualitative information matters more than the difference between each category. This type of data is used to create charts, classify groups (e.g. age, gender, or class) (Fullstory, 2023).

5.4. Population profile and sample size

In Section 4.2 it was confirmed that interviews with 25 registered professional QSs was included in this study as the sample size for the given population as well as receiving comments on Draft 2 of the FAT and guidance notes by five registered professional QSs. The data provides the opinion of the profession regarding creating a FAT and guidance notes. Section 5.5 and 5.6 present the results.

5.5. Data analysis

5.5.1. Background information

Background information of the participants was collected to determine the level of employment, the main function and the type of company participants are working for.

Section 1, Question 1: Current level of employment

It is important that participants with high level of experience (more than 10 years post-degree) provides their insights into providing a FA template and to ensure that the right level of information are covered in the guidance notes. This question gave five options for the participant to choose: (1) partner, (2) director, (3) senior management, (4) mid-management and (5) junior. In Figure 16 most the participants were either in senior management level or Partner level, which indicates that high level of experience is represented within the participants. The one in junior level still have more than 10 years post-degree experience. This confirmed that all participants’ answers can be utilised as part of the data as they make the minimum data criteria.

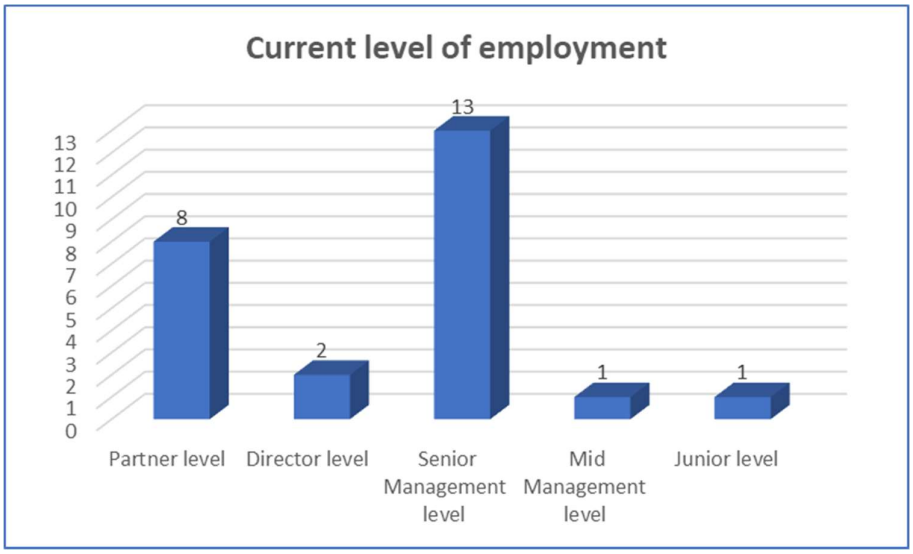


Figure 16: Employment level

Section 1, Question 2: What is your current main function or line of business?

The question gave only six options for the participant from which to choose: (1) QS, (2) architect, (3) engineer, (4) project manager, (5) contractor, (6) other. The participant in 'other' lines of business indicated that he/she is practicing as a QS in an auditing firm. Figure 17 indicates that all the participants are QSs; which ties in with the population and sample required for this study.

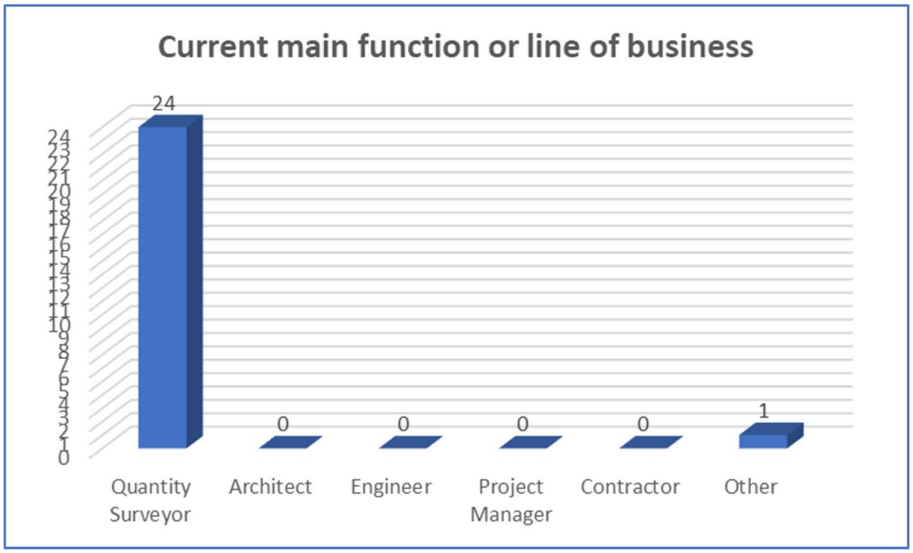


Figure 17: Main function

Section 1, Question 3: What type of company are the participants currently working for?
Professional consulting and contracting companies produce FAs. Therefore the participants from these two types of companies should know FAs and should be able to give a good opinion regarding the creation of a FA.

Figure 18 shows that 92% of the participants are currently working for a professional consulting company. One participant works for an auditing company and the participant in 'other' type of company indicated that he/she is working for a government organisation within the construction industry. This confirmed that all participants have the right skills in compiling FAs as consulting companies, auditing companies and government organisations are involved in creating FAs.

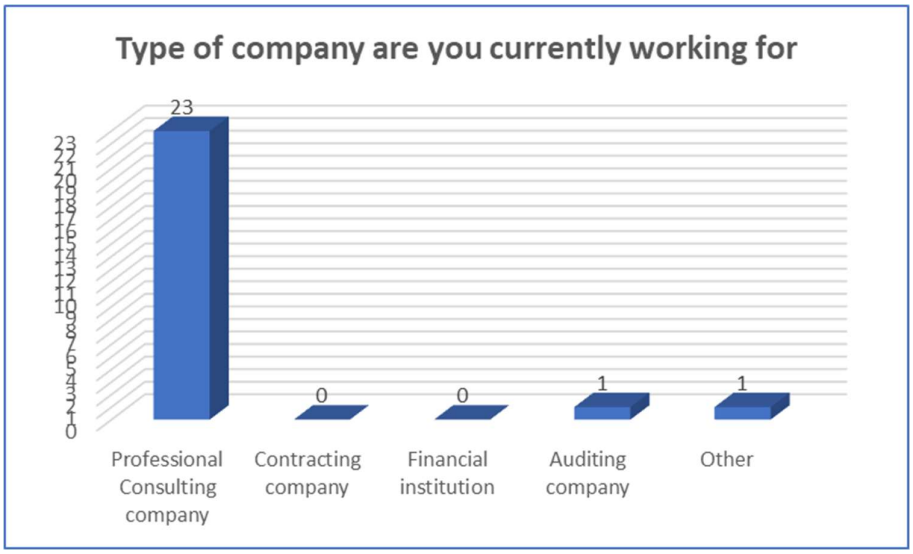


Figure 18: Company type

5.5.2. Expectation of FAT and guidance notes

Based on the main research problem this study aimed to develop a FAT and guidance notes. Therefore, it was important to determine from the participants what should form part, as a minimum, of the FAT and guidance notes.

Section 3, Question 1: Indicate which of these items should form part of the FAT
To confirm what should form part of a FAT a list of 14 items were provided to the participants, from which they could choose to include in the FAT, not include in the FAT or indicate that they are unsure whether it should form part of the FAT. Table 6 summarises the results of provided items to be included or not in the FAT.

Table 6: Final Account Template summary items

Items	Yes (%)	No (%)	Unsure (%)
Provisional sum adjustments	100	0	0
Changes in quantities	92	8	0
Prime cost amount adjustments	88	8	4
Daywork allowances	64	36	0
Variations based on instructions and/or agreed extension of time claims	100	0	0
Escalation adjustments	100	0	0
Risk allowance adjustments	60	20	20
Loss and expenses	52	32	16
Set-off costs/contra-charges	92	8	0
Disputes settled before FA agreement	100	0	0
Retention releases	72	28	0
Settled insurance claims	80	20	0
Project programme/schedule	32	64	4
Penalties/delay damages deduction	100	0	0

Abbreviations: final account (FA)

Items indicated as a 'yes' for most of the participants were included in the FAT and items indicated as a 'no' were not included in the FAT but were considered as an attachment to the FAT. Participants could provide other items not included in the provided list that they include in their FAs. These items were either included in the FAT or as an attachment to the FAT or included in the guidance notes.

The following items were provided:

- preliminaries adjustments,
- checklist of completion as an attachment,
- price fixing fee (if applicable),
- mark-up on selected subcontractors,
- additional commentary to give context to the FA from the QS' perspective,
- guarantee information as an attachment,
- safety, health, environment and quality (SHEQ) information as an attachment, and
- selected subcontractor FA as an attachment.

Section 3, Question 2: Should the following documents form part of the signed FA, or should it be kept as separate supporting information?

To ascertain what the participants would consider as part of the signed FA pack that goes to the client and what they will maintain as separate supporting information a list of 16 items were provided to the participants, from which they could choose to include with the pack, maintain separately or they don't consider the item as part of a FA.

Table 7 summarises the results of provided items to be included in the FA pack.

Table 7: Final account pack summary items

Items	With (%)	Separate (%)	Not necessary (%)
Signed-off site and drawing remeasurements	30	70	0
Signed-off daily dairies	8	72	20
Signed-off daywork schedules	24	68	8
Approved and signed-off contract instructions	68	32	0
Signed-off variations (including all supporting documentation)	68	32	0
Agreed extension of time documentation (including agreed updates of the project programme/schedule)	72	28	0
Agreed provisional sum and prime cost amount calculations	76	24	0
Agreed escalation calculations	80	20	0
Agreed final BOQ (including non-scheduled rates determination)	84	16	0
FA meeting minutes	24	64	12
Agreed penalties/delay damages calculations	76	24	0
Insurance claims details	56	36	8
Monthly cost and schedule reports	12	72	16
Final certificate	68	24	8
Formal test results	4	64	32
Project programmes/schedules	16	72	12

Abbreviations: bill of quantities (BOQ), final account (FA)

Items indicated as a 'with' for most of the participants were indicated in the guidance notes as forming part of the FAT pack and items indicated as a 'separate' were indicated in the guidance notes as maintaining the information separate as supporting information and not part of the FAT pack. Items indicated as "not needed for FA" is not mentioned in guidance notes as part of the FAT pack.

Section 3, Question 3: Rate each of the following information that you believe should be included in the FA's guidance notes

To ensure that all the required topics are covered within the FAT guidance notes a list of 18 items were provided to the participants, to indicate their rating of importance. They could choose from the following ratings:

- Very low – 1
- Low – 2
- Average – 3
- High – 4
- Very high – 5

Table **8** summarises the results of provided items to be included in the FA pack.

Table 8: Rating of guidance notes summary topics

Items	Average rating	Rating
Definitions and abbreviations	4	High
Document purpose	4	High
Who should compile FA	4	High
Model FA template	5	Very high
Project flow chart	4	High
FA project execution plan	4	High
FA process and reporting	5	Very high
Time scale to complete FA	4	High
FA meetings	4	High
Recordkeeping	5	Very high
Change control	4	High
Retention	4	High
Disputes	4	High
Insurances	4	High
Defects	4	High
Termination	5	Very high
FA compilation	5	Very high
FA checklist	5	Very high

Abbreviations: final account (FA)

Topics indicated from “average” to “very high” by the participants were included in the FAT guidance notes. Participants could provide other topics not included in the provided list that they want to be covered within the FAT guidance notes.

The following topics were provided:

- Signing and dating FAs
- How to handle disputes falling outside the FA in the FA
- Agreeing timeframes between the parties
- Preliminaries adjustments (Fixed, time and value)
- Variations – handling changes to drawings, agreeing new rates and how to ensure value for money for the client
- Interest calculations
- Escalation
- Information on types of contract
- Site instructions
- Meeting with clients, including collating information on direct payments by the client
- Guarantees

- Client's supply chain policies and procedures
- Upfront payments
- Additional commentary to provide enough information on FA
- Impartiality and compliance to ethical behaviour
- Staying within the CoC allowances.
- Communications, including social media groups
- Filing (hard and soft) of information, including emails
- Response times to be included in FA execution plan
- Handling small and medium-sized enterprises (SMEs)
- Information from rest of the professional team.

5.5.3. Level of knowledge of existing FA standards

The objective for collecting the level of knowledge of existing FA standards from the participant was to answer the first sub-question: "What are the current known FA procedures, format/structures and standards and which ones are being used within the SA construction industry?

Section 2, Question 1: Which of the following FA procedures and standards do you know exits?

The first part of this study's first sub-question is to investigate which procedures and standards are known to QSs. This question looks at which of the existing standards are known to the participants. Out of the three listed standards, 20% know the RICS: FA procedures; 32% know the DPWI Manual and 4% know the KZN Public Works: Format of FAs.

Figure 19 shows under each procedure/standard the number of participants that know it exists. It confirmed that FA procedures currently available in SA is not well known to participants involved in producing FAs.

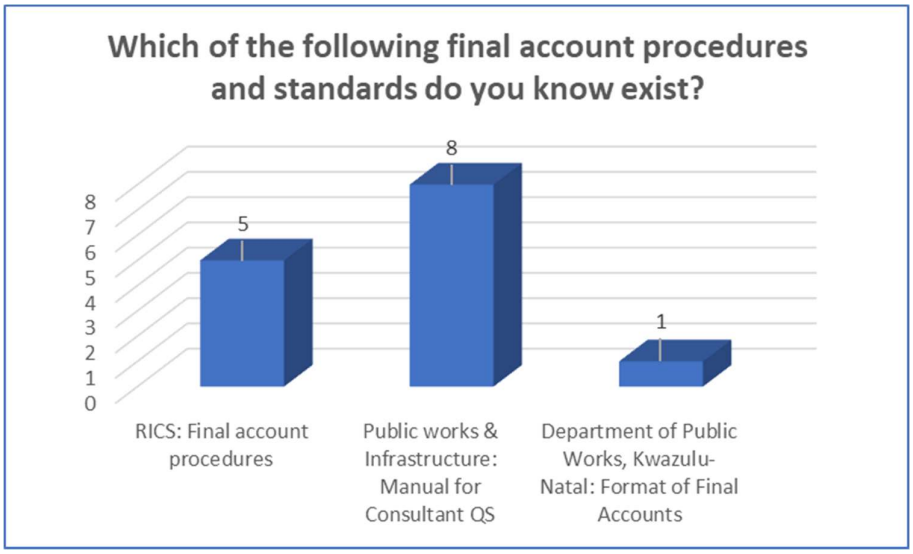


Figure 19: Known final account procedures

Section 2, Question 2: which of the following FA procedures and standards have you personally used?

Section 2, Question 3: How would you rate your knowledge of the following FA procedures and standards?

Furthermore, Questions 2 and 3 investigate this study's first sub-question. Question 2 aim to answer the second part of the sub-question to determine if the current FA procedures and standards are being used by the SA construction industry.

Figure 20 shows that out of the three procedures/standards, 0% of the responding participants have used RICS: FA procedure; 16% have used the DPWI: Manual; and 4% have used the KZN Public Works: Format of FAs. This confirmed that although there is currently one international and two local FA procedures and standards, almost none of the participants used these standards in creating their FAs. Therefore the FAT and guidance notes produced in this study for SA should add value for participants in creating FAs.

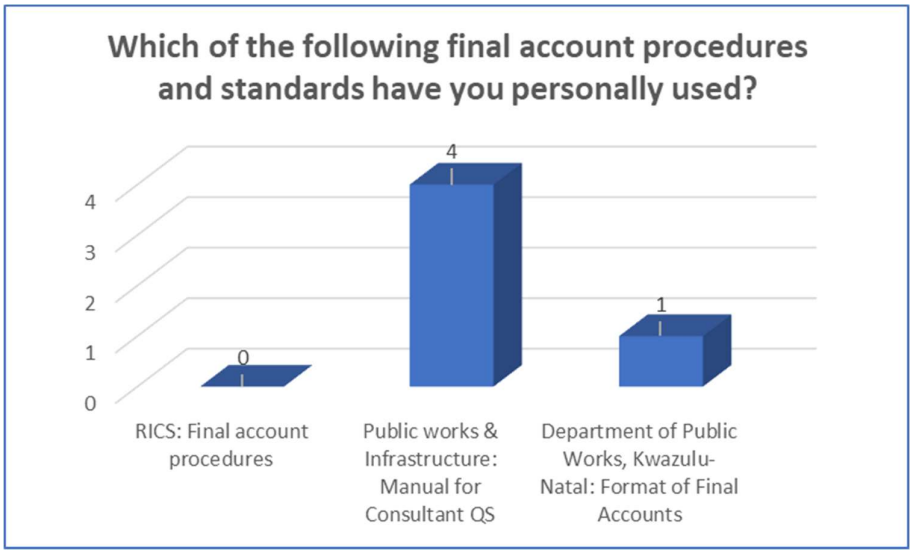


Figure 20: Final account procedures personally used by participants

To know that a FA procedure and/or standard exists (question 1) does not mean that the procedure and/or standard is fully known to the QS. Therefore, it does not answer the first part of the sub-question fully. When a procedure and standard is personally used by the QS, he must understand the procedure and standard; and he should be able to apply all the procedures contained within the document. This then gives a good indication of which procedure and standard are fully known to the QS.

To rate the participants' knowledge of the procedures/standards the participants could choose one of the following ratings:

- Very low – 1
- Low – 2
- Average – 3
- High – 4
- Very high – 5

Figure 21 shows that out of the three procedures/standards the responding participants know all three of the provided procedures/standards between very low and low.

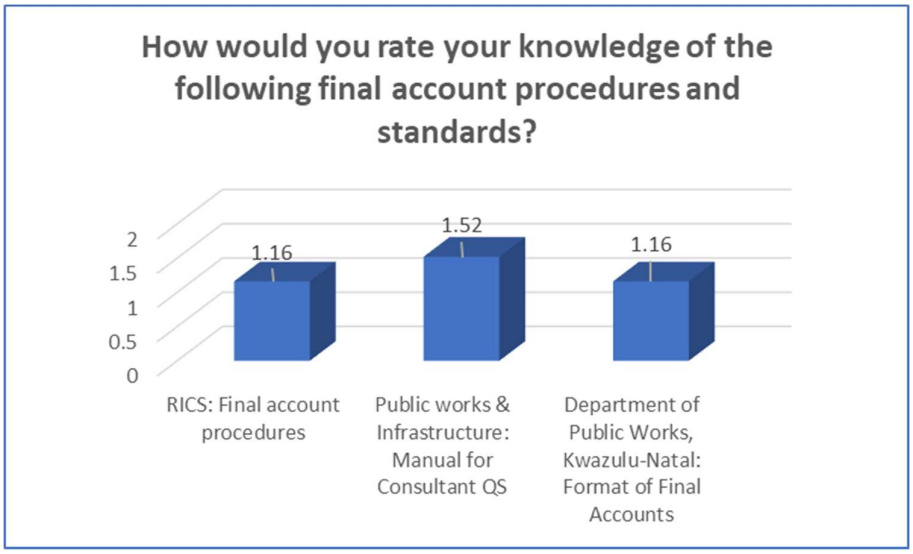


Figure 21: Knowledge of final account procedures

From all the results in this section, this study's first sub-question was answered (Table 9).

Table 9: Rating of procedures/standards' results summary

Procedure/standard	Know it exists (%)	Used it (%)	Knowledge level
RICS: FA procedure	20	0	Very low
DPWI: Manual	32	16	Very low/Low
KZN Public Works: Format of FA	4	4	Very low

Abbreviations: final account (FA), Department of Public Works and Infrastructure (DPWI), Kwazulu-Natal Department of Public Works (KZN Public Works), Royal Institution of Chartered Surveyors (RICS)

5.5.4. Material irregularities

To answer the second sub-question in this study: "Which AGSA key material irregularities should be mitigated with and improved FA?", participants were asked what the essential items in the FA were that could ensure an auditable improved FA and if a FAT and guidance notes would reduce material irregularities.

Section 3, Question 8: Which of these items are essential in ensuring an auditable FA?

Only 3 of the 25 participants have been audited on a project. However, all 25 provided their opinion in rating a provided list of 17 items as either essential, non-essential or unsure in ensuring an auditable FA.

Table 10 summarises the results of provided items ensuring an auditable FA.

Table 10: Summary of essential items for auditable final account

Items	Yes (%)	No (%)	Unsure (%)
Delegation of authority	92	4	4
FA project execution plan	92	4	4
Change control mechanism	88	0	12
Clear methods for adjusting provisional sums, prime cost amounts, retention releases	100	0	0
All supporting information	96	0	4
All meeting minutes	64	28	8
All contractual completion/final certificates	92	8	0
Formal test results	40	44	16
Clear methods for adjusting overheads, profit, preliminaries	96	0	4
Quality management system applied	32	44	20
Dispute submissions and documentations	96	4	0
Clear methods for set-off/contra-charges and defect costs	96	4	0
Clear methods for applying penalties/delay damages	100	0	0
All project programmes/schedules	64	32	4
Site photos	92	8	0
Monthly cost and schedule reports	80	16	4
Internal FA procedure	92	4	4

Abbreviations: final account (FA)

Items indicated as a “yes” for most of the participants were included in the FAT and items indicated as a “no” were not included in the FAT but were considered as an attachment to the FAT.

Participants could provide other items not included in the provided list that they perceive as essential in ensuring an auditable FA. The following items were provided:

- Dated site photos
- Reference to final drawings (construction/red line) to ensure traceability
- Commentary on non-performance of contractor (e.g., late submissions, overstated claims, continuous misrepresentation).
- Commentary on agreement of items (e.g., arguments, trends applied).
- Details of adjustment of claims ensuring right principles applied
- Accurate monthly remeasurement of quantities
- Videos
- supporting information kept in, such a way to answer any question

Section 4, Question 2: Do you believe that if a FAT and guidance notes are developed and applied, it should reduce audit material irregularities on FAs?

The following options were given to choose from:

- I absolutely disagree
- I disagree somewhat
- I agree somewhat

- I absolutely agree

Figure 22 indicates that 84% of participants absolutely agree that a FAT and guidance notes should reduce audit material irregularities on FAs, and 16% agree somewhat.

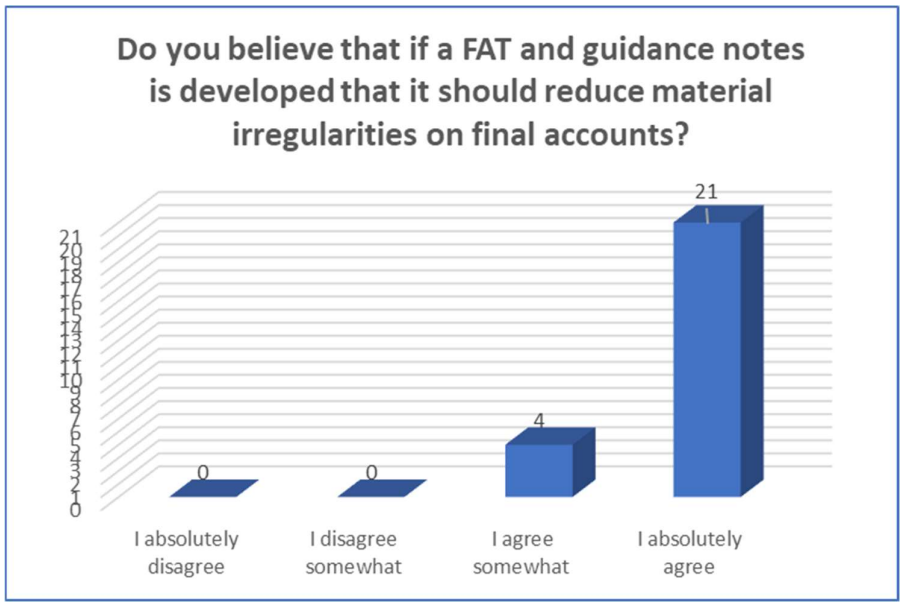


Figure 22: Whether final account template and guidance notes would reduce audit material irregularities

5.5.5. Improved FAs

To answer the study's third sub-question (i.e., "What could be implemented to ensure improved FAs?") participants were asked various questions concerning different elements that could improve the development of FAs.

Section 3, Question 4: Do you believe that a FAPEP, setting out the procedure for administrating the project to ensure a smoother FA process, should be developed at the beginning of a project?

The participants were asked whether they agreed that a FAPEP should be drawn up and agreed upon by the parties at the beginning of the project. Four options were given to the participants, from which to choose:

- I absolutely disagree
- I disagree somewhat
- I agree somewhat
- I absolutely agree

Figure 23 indicates that 72% of participants absolutely agree; 16% agree somewhat; and 12% disagree somewhat that a FA project execution plan should be developed in the beginning of a project. Although there is currently no consensus on when the FAPEP should be developed between the participants, based on the majority participants it should be done as early as possible when a project starts – preverbally in the beginning of the project and therefore this should be promoted within the project team.

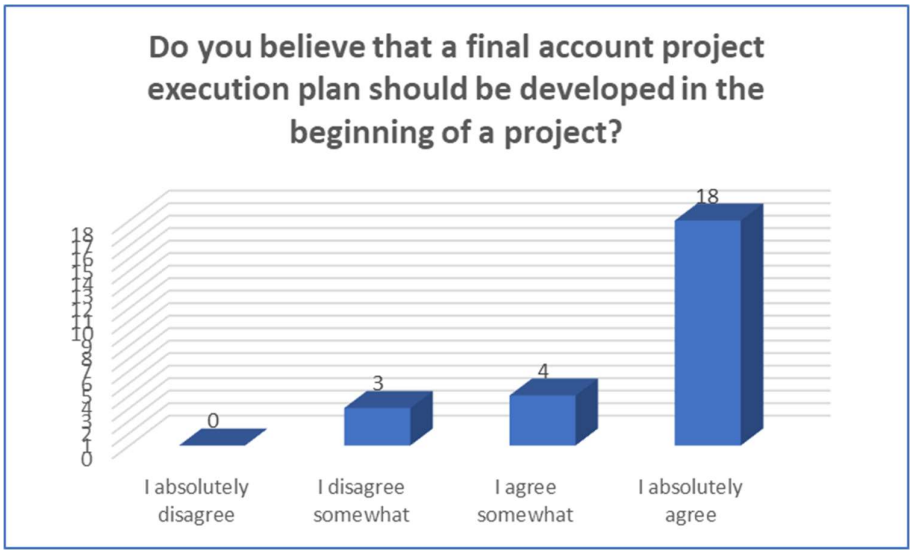


Figure 23: Belief that final account project execution plan should be developed at project's start

Section 3, Question 5: How important do you think recordkeeping during the execution of a project is to assist in agreement of the FA?

To ascertain whether participants agree that recordkeeping is important during the execution of a project four options were given to the participants, from which to choose: not important, important, important and extremely important.

Figure 24 indicates that 4% of participants think it is important; and 96% think it is extremely important for recordkeeping during the execution of a project to assist in the agreement of a FA.

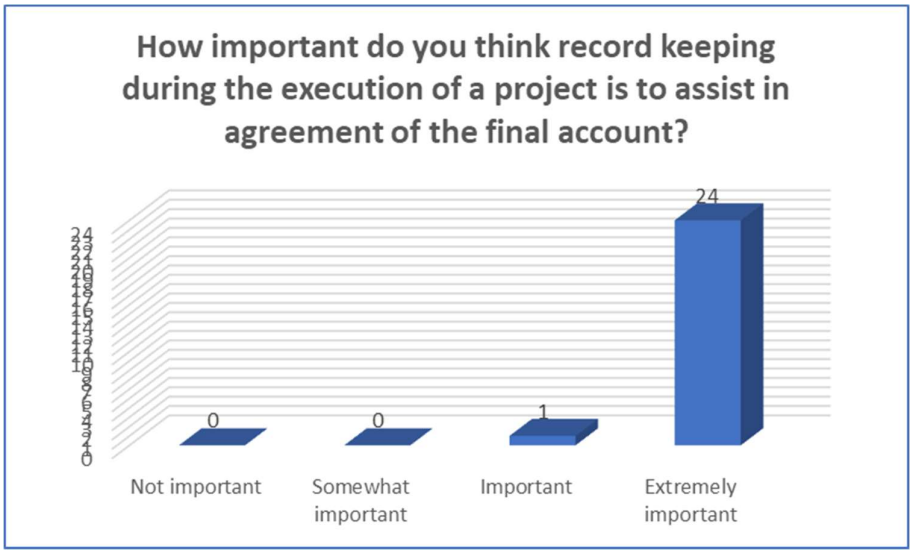


Figure 24: Importance of recordkeeping during project's execution

Section 3, Question 6: When in the project lifecycle, in your opinion, does the FA process start?

Four phase options were given to the participants to provide an opinion of when the FA process start in a project lifecycle:

- Before the beginning of construction
- in the beginning of construction
- halfway through construction
- at the end of the construction

Figure 25 indicates that 12% of participants think the FA process start before the beginning of the construction phase; 72% think in the beginning of the construction phase; and 16% think halfway through the construction phase. Although there is currently no consensus on when the FA process starts, based on the majority participants it starts before or at the beginning of a project, therefore this should be applied by the project team.

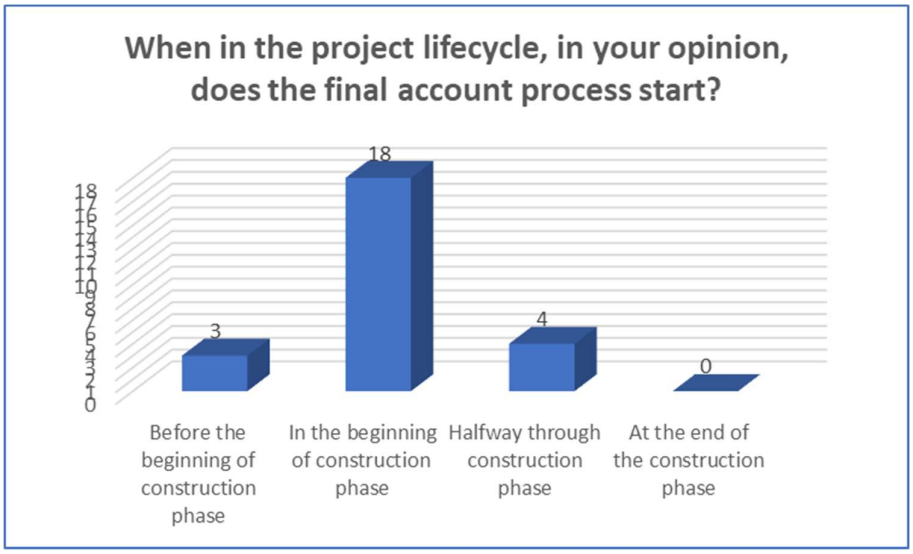


Figure 25: When the final account process starts

Section 3, Question 7: Which of the following assist in the development and settling of a FA?

A list of 20 items were provided to the participants, to indicate their rating of importance. They could choose from the following ratings:

- Very low – 1
- Low – 2
- Average – 3
- High – 4
- Very high – 5

Table 11 summarises the results of provided items to be included in the FAT guidance notes.

Table 11: Items that assist final account's development and settling

Items	Average rating	Rating
Agreed FA project execution plan	4	High
Recordkeeping of all site-specific documentations	5	Very high
Monthly cost and schedule reports	4	High
Monthly remeasurement of quantities	5	Very high
Variation calculations and supporting information	5	Very high
Provisional sum adjustment calculations	5	Very high
Prime cost amount adjustment calculations	5	Very high
Extension of time calculations and supporting information	5	Very high
Set-off/contra-charges calculations	4	High
Monthly escalation calculations	5	Very high
Non-scheduled rates build-up	4	High
Meeting minutes	3	Average
Certificates of completion and final certificate	4	High
Formal test results	3	Average
Retention release calculations	4	High

Items	Average rating	Rating
Risk register	3	Average
Penalties/delay damages calculations	5	Very high
Insurance claims details	4	High
Defect list	3	Average
Dispute register	4	High

Abbreviations: final account (FA)

Items indicated from “average” to “very high” by the participants were included in the FAT guidance notes in assisting settling of FAs and should be in place to ensure applied project management will result in an improved FA.

Participants could provide other items not included in the provided list that they would want to be covered within the FAT guidance notes in settling compliant FAs. The following items were provided:

- agreed BOQ,
- approved and agreed trades between parties,
- interim FAs approved by both parties,
- contractual decision register,
- agreed preliminaries calculations,
- escalation calculations,
- performing post contract administration with close out phase in mind, and
- other professional consultant’s backups, certificates, comments.

Section 3, Question 9: When should a QS remeasure provisional quantities?

To assess when the QS should start remeasuring provisional quantities in the BOQ four options were given to the participants, from which to choose:

- When the ‘preliminary’ drawings are issued
- when the ‘for construction’ drawings are issued
- in the last month of the construction phase
- the moment construction is complete

Figure 26 indicates that 4% of participants think a QS should start remeasuring provisional quantities when the ‘preliminary’ drawings are issued and 96% think it should start when the ‘for construction’ drawings are issued. This confirmed that remeasuring should begin, as a minimum, when construction drawings are issued.

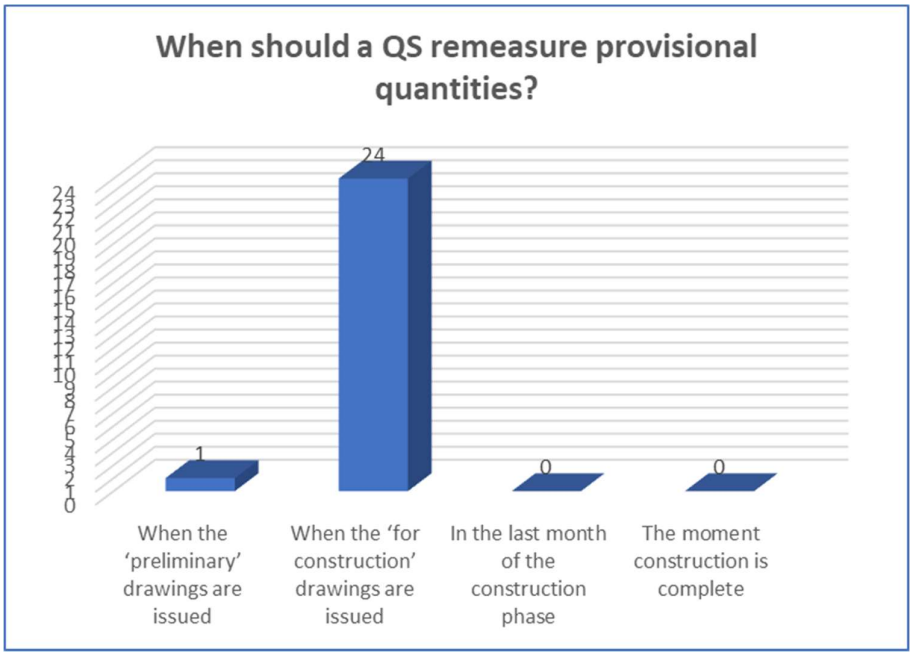


Figure 26: When a quantity surveyor should start remeasuring provisional quantities

Section 3, Question 10: When should FA meetings beheld between the parties?

To assess when FA meetings should be held between the parties four phase options were given to the participants:

- Regularly during the construction
- monthly during the construction
- in the last month of the construction
- the moment construction is complete

Figure 27 indicates that 52% of participants think meetings should be held regularly during the construction phase; 36% think monthly during the construction phase; and 12% think only in the last month of the construction phase. Although there is currently no consensus on when FA meetings should be held between the participants, based on the majority participants stating previously (question 6, section 3) that the FA process starts at the beginning of the project and that majority of the participants think FA meetings should be held regularly during the construction phase, FA meetings should be held from the beginning of a project until the construction is completed.

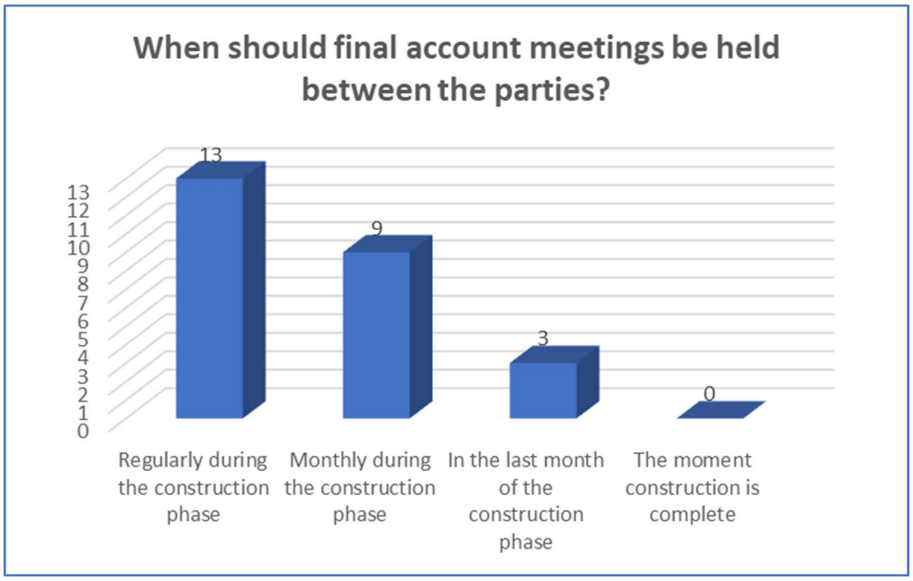


Figure 27: When final account meetings should be held

5.5.6. FAT and guidance notes benefits

To test sub-question four: "How would QSs and project teams within SA benefit from a newly developed FAT, including guidance notes?" the following question were incorporated into the interviews.

Section 4, Question 1: If a FA template and guidance notes is developed, which of the given options regarding use of the FAT and guidance notes would the participant choose?

The following options were given from which to choose:

- Start using it immediately
- Study it intensely and if acceptable start using it
- Not even look at it, current way of producing FAs is acceptable
- Other

Figure 28 indicates that 28% of participants will start using the FAT and guidance notes immediately; and 72% will study it intensely and if acceptable, start using it.

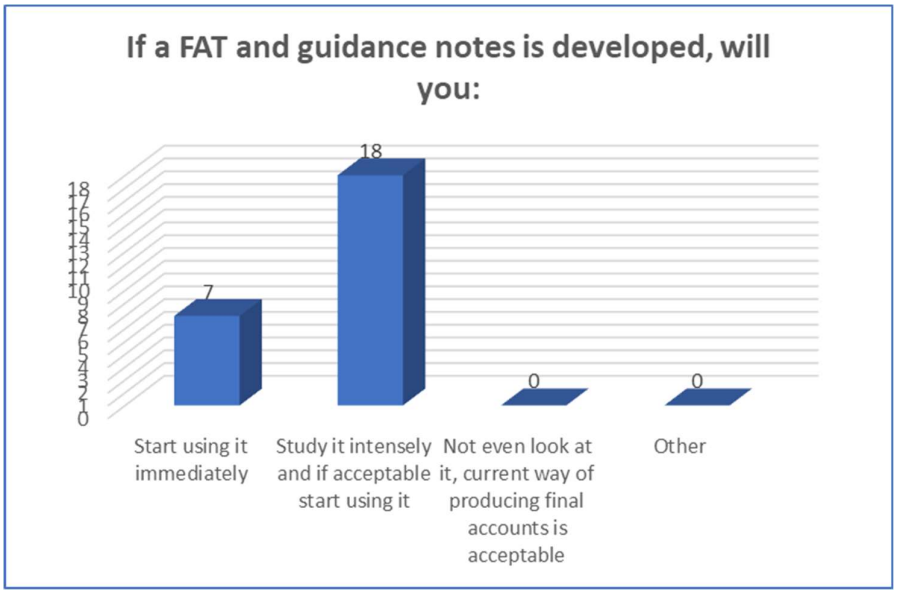


Figure 28: How participants use final account template and guidance notes

Section 4, Question 3: If a FAT and guidance notes is developed in your opinion do you think it should be incorporated in Tertiary Institutions' curriculums?

The question was incorporated into the interview to test hypothesis number two: It will benefit the Quantity Surveying industry in SA if a developed FAT and guidance notes is included in tertiary institutions' curriculum.

Figure 29 indicates that 100% of participants think the developed FAT and guidance notes should be included in tertiary institutions' curriculum.

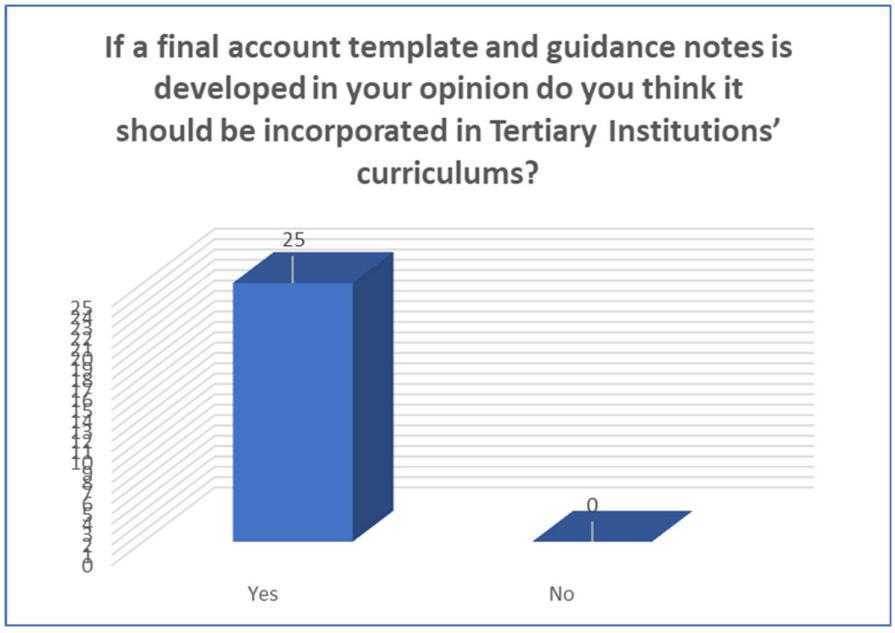


Figure 29: Whether final account template and guidance notes should be included in tertiary institutions' curriculums

5.5.7. Non-structured questions

A section was incorporated in the interview with non-structured questions to create conversations around the following three topics:

1. accuracy of interim payment certificates,
2. handling of disputed and undisputed portions of FAs, and
3. material irregularities on FAs.

On the first topic: because payment certificates build up to the final amount to be included in the FA, the researcher wanted to ascertain why the accuracy of an interim payment certificate is essential in the participant's point of view. Because construction projects are sometimes cancelled, for various reasons, before the end of the project, it was also necessary to hear if accurate payment certificates will assist in this process. Participants gave various reasons why it is essential to ensure that each interim payment certificate of a project should be as accurate as possible:

- To ensure no underpayment of contractor, which creates cashflow problems for the contractor
- To ensure no overpayment of contractor, which creates cashflow problems for the client
- Pay for actual progress (work done) thus ensuring good project controls and cost management on the project
- To manage the client's financial risk
- Avoid disputes between the parties
- Spending time to ensure accurate certificate result in a faster FA process
- Payment certificates, project reports and FA should talk to each other
- Mitigate both parties' risks
- Difficult if the contractor hides their actual financial status and tries to over claim
- Project could be stopped at any time for various reasons
- Ensures as accurate as payment if the project is terminated during the project execution. If overpaid it is difficult to recover overpayment from the contractor once the project is terminated, especially due to contractor insolvency

The above information discussed were taken into consideration in various sections of the FAT and guidance notes such as termination, creating FAPEP and FA process & reporting.

To determine whether the participants will assist the contractor with their cashflow by raising an interim payment certificate when the FA is not yet agreed and the contractor requests

retention release on the undisputed portion of the FA the participants responded per Figure 30 below.

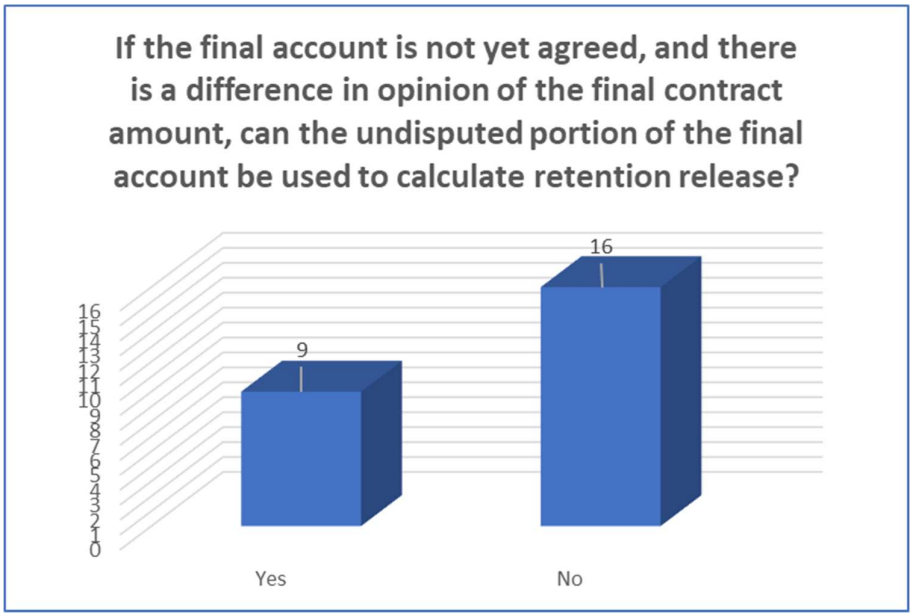


Figure 30: Release of retention on undisputed portion of final accounts

Most of the participants qualified their answer in the following way:

- It depends on the value of the disputed FA portion – if small most participants leaned towards assisting the contractor with release of retention money
- Releasing retention takes away the urgency of agreeing the FA and most participants stated that they will push to agree FA before issuing one final payment certificate

The above information discussed were taken into consideration in the Retention section of the FAT and guidance notes.

Because only three participants have been audited on projects, with no findings, most participants provided information concerning avoid material irregularities on FAs based on their general project experience. All participants mentioned having good supporting information was essential to avoid material irregularities. Other items were mentioned (e.g. accurate monthly remeasurement of quantities, keeping notes, applying good governance and being prepared to answer any questions). These items were included in the Ensuring and auditable FA section of the FAT and guidance notes.

5.6. Testing Draft 2

Following Draft 2's creation of the suggested FAT and guidance notes, the draft was circulated to six professional QSs for testing, of which five responded. The decision to send to this number of professional people was covered in Chapter 3. Comments and suggestions from the professionals were accumulated and summarised. This was done to comply with the theory of 'method of alternating point of view', based on (Routio, 2007), as explained in Chapter 3.

All comments and suggestions were collated in one word document. After scrutinising the comments and suggestions, the following changes were included in the third and final draft of the suggested FAT and guidance notes:

- Ensuring all CoC used in SA's definitions are covered in the FAT and guidance notes:
    - Updated abbreviations and definitions to ensure references included wordings used in the following standard CoC:
        - FIDIC (FIDIC, 1999) (FIDIC, 2017)
        - NEC (NEC3, 2005) (NEC4, 2017)
        - GCC (GCC, 2015)
        - JBCC (JBCC, 2018)
- Adding information concerning attic/spare stock:
    - Add section to the guidance notes to cover attic/spare stock where (e.g. additional tiles for the bathrooms are ordered, paid for and kept as spare stock to replace any tiles that obtain damaged after the project is concluded. This ensures cost savings eventually as damaged tiles could be replaced in lieu of whole areas of tile to be replaced. It could be included in the remeasurements as an item, or it could be shown separately in the FAT
- Adding information concerning three-dimensional (3D) scanning and modelling:
    - Adding 3D scanning and modelling as an item in the section covering retaining of information
    - Adding 3D scanning and modelling as an item in the checklist
- Adding reference to the RICS Rules of Conduct (RICS, 2021) and SACQSP Code of Conduct (SACQSP, 2020) in ethical behaviour section of the guidance notes
- Adding an example of cession agreement for direct payment to a subcontractor by the client
- Provide more clarity within the risk allowance section of the guidance notes in which type of contract risk allowances could be made
- Provide examples of different types of guarantees that could be included in a contract within the guarantees section of the guidance notes

- Provide a list of reasons for termination within the termination section of the guidance notes
- Add the following items to the provided list of issues to be included in the QS's commentary within the commentary section of the guidance notes:
    - List of concessions from both parties
    - General information on progress of the project
- Correcting of minor definitions, abbreviations and grammar throughout the FAT and guidance notes

5.7. Summary

In Chapter 5, the study data were analysed and discussed in a comprehensive and structured manner. Chapter 5 started with discussing the properties of quantitative data with references to central tendencies, dispersion and shape of the data. The primary focus of Chapter 5 was to discuss the interview data, including background information, expectations concerning FAT and guidance notes, level of knowledge of existing FA standards, material irregularities, improved FAs, benefits of FA and guidance notes and discussing non structured questions. Testing Draft 2's data were discussed. Chapter 6 describes the research plan's findings.

CHAPTER 6 - Research findings and discussion to establish FA framework

6.1. Introduction

Chapter 5 discussed the study data, including background information, expectations concerning FAT and guidance notes, level of knowledge of existing FA standards, material irregularities, improved FAs, benefits of FA and guidance notes and discussing non structured questions. Chapter 5's main focus was to discuss the interview data and second FAT and guidance notes draft review data. Chapter 6 describes the research plan's findings.

6.2. Sub-question 1

Sub-question 1 asked what are the current known FA procedures, format/structures and standards and which ones are being used within the SA construction industry?

The following set of sequential actions were performed in executing this sub-question:

- identified established FA standards
- conducted interviews
- captured data from interviews
- analysed and interpreted data

6.2.1. Identified established FA standards

From the literature review it became clear that the following established FA procedures, format/structures and standards exist and are currently being used within SA:

- The DPWI's published manual for consultant QS (D.P.W., 2020)
- The Royal Institute of Chartered Surveyor's published guidance in FA procedures (RICS, 2015)
- The DPWI, Kwazulu-Natal: Format of FA (D.P.W., 2022)

6.2.2. Conducted interviews

Following the above the researcher then wanted to establish whether these FA standards are well known and widely used within SA. To establish these the following three questions were asked in the interviews:

- Section 2, Question 1: "Which of the following FA procedures and standards do you know exist?", providing the three procedures / manuals mentioned above as options (Reference Paragraph 5.5.3 for full data analysis of this Question)

- Section 2, Question 2: “Which of the following FA procedures and standards have you personally used?”, providing the three procedures / manuals mentioned above as options (Reference Paragraph 5.5.3 for full data analysis of this Question)
- Section 2, Question 3: “How would you rate your knowledge of the following FA procedures and standards?”, providing the three procedures / manuals mentioned above as options (Reference Paragraph 5.5.3 for full data analysis of this Question)

6.2.3. Captured data from interviews

Table 12 shows the summary results to the above-mentioned three questions.

Table 12: Knowledge of existing Final Account Template and guidance notes

Procedure/Manual/Standard	Know it exists (%)	Used it (%)	Knowledge
RICS: FA procedure	20	0	Very low
DPWI: Manual for consultant QS	32	16	Very low to low
KZN Public Works: Format of FA	4	4	Very low

Abbreviations: final account (FA), Department of Public Works and Infrastructure (DPWI), Kwazulu-Natal Department of Public Works (KZN Public Works), quantity surveyor (QS), Royal Institution of Chartered Surveyors (RICS)

6.2.4. Interpretation of data

Based on the data provided it is clear that there are three established FA standards available for use in SA. However, from the data provided during the interviews a very low percentage (on average 19%) of registered professional QSs know about the established FA standards and a lower percentage (on average 7%) of registered professional QSs have used the two local DPWI FA standards.

6.3. Sub-question 2

Sub-question two asked which AGSA key material irregularities should be mitigated with and improved FA?

The following set of sequential actions were performed in executing this sub-question:

- identified AGSA material irregularities
- conducted interviews
- captured data from interviews
- analysed and interpreted data

6.3.1. Identified AGSA material irregularities

From the literature review it became clear that it is advisable to conduct audits before the FA is agreed and the FA is signed (RICS, 2015). This is to ensure that any discrepancies could be addressed and agreed between the parties before the FA is agreed. The AGSA (2022) defined 'material irregularity' as any non-compliance with, or contravention of, legislation, fraud, theft or a breach of a fiduciary duty under the Public Audit Act. In the AGSA (2021) consolidated general report material irregularities emerged in four key areas: (1) procurement and payments; (2) interest and penalties; (3) revenue management as well as (4) investments and assets. However, the AGSA stated that procurement and payment irregularities are the highest contributor (AGSA, 2022).

6.3.2. Conducted interviews

To determine what the registered professional QSs thought would be essential to avoid material irregularities in a FA and if the FAT and guidance notes will reduce material irregularities, if implemented, the following two questions were asked during the interview process (Reference Paragraph 5.5.34 for full data analysis of this Question):

- Section 3, Question 8: "Which of the following is essential in ensuring an auditable FA?", together with 25 items that the participant could choose from.
- Section 4, Question 2: "Do you believe that if a FAT and guidance notes are developed that it should reduce audit material irregularities on FA?".

6.3.3. Captured data from interviews

Participants were given the following 25 listed items which could be seen as essential in ensuring an auditable FA:

- DoA
- FPEP
- Change control mechanism
- Clear methods for adjusting provisional sums, prime cost amounts, retention releases, escalation
- All supporting information
- Meeting minutes
- Contractual completion / final certificates
- Clear methods for adjustments of overheads, profit, preliminaries
- Dispute submissions and documentations
- Clear methods for set-off/contra-charges and defect costs
- Clear methods for applying penalties/delay damages

- Project programs/schedules
- Dated site photos and videos
- Monthly cost and schedule reports
- Internal FA procedure
- References to final drawings to ensure traceability
- Commentary on non-performance of contractor and agreed items
- Details of adjustment of claims

From the 25 listed items for Section 3, Question 8 only two items were not believed to be essential in ensuring an auditable FA; i.e., “formal test results” and “quality management system applied”.

Participants added the following items, not listed, which they believed essential in ensuring an auditable FA:

- dated site photos included in project reports, signed off by both parties;
- reference to final drawings (construction/red line) to ensure traceability;
- commentary on non-performance of contractor (e.g., late submissions, overstated claims, continuous misrepresentation);
- commentary on agreement of items (e.g., arguments, trends applied);
- details of adjustment of claims ensuring right principles applied;
- accurate monthly remeasurement of quantities;
- dated videos taken when both parties’ representatives are present; and
- supporting information kept in, such a way to answer any question.

All the participants agreed that the FAT and guidance notes would reduce audit material irregularities on FAs – Question 2 above.

6.3.4. Interpretation of data

From the list of essential items chosen by the interview participants as essential for an auditable FA, together with the list of additional items provided by the participants, most of the items talks to three of the four key areas where material irregularities emerged from: (1) payments, (2) interest, (3) penalties and (4) revenue management. Therefore, if all of the listed items, which covers good expenditure management and correct reporting, are addressed within the FA process correctly it has the potential to reduce material irregularities. All of the listed items were included in the proposed FAT and guidance notes contained in this study and it was clear from the interviews that all of the participants agreed that a FAT and guidance

notes will reduce audit material irregularities on FAs and should be referenced during the FA process.

6.4. Sub-question 3

Sub-question three asked what could be implemented to ensure improved FAs? The following set of sequential actions were performed in executing this sub-question:

- conducted interviews
- captured data from interviews
- analysed and interpreted data

6.4.1. Conducted interviews

To determine what is important for the registered professional QSs to have in place to ensure improved FAs, the following six questions were asked during the interview process (Reference paragraph 5.5.35 for full data analysis of these questions):

- Section 3, Question 4: “Do you believe that a FAPEP, setting out the procedure for administrating the project to ensure a smoother FA process, should be developed in the beginning of a project?”
- Section 3, Question 5: “How important do you think recordkeeping during the execution of a project is to assist in agreement of the FA?”
- Section 3, Question 6: “When in the project lifecycle, in your opinion, dos the FA process start?”
- Section 3, Question 7: “Which of the following assist in the development and settling of a FA?” together with 20 items that the participant could choose from
- Section 3, Question 9: “When should a QS remeasure provisional quantities?”
- Section 3, Question 10: “When should FA meetings be held between the parties?”

6.4.2. Captured data from interviews

Seventy-two per cent of participants think that the FA process start at the beginning of the construction phase (12% believe it actually starts before the beginning of the construction phase), 72% of participants absolutely agree that a FAPEP should be developed in the beginning of a project, while 96% of participants believe it is extremely important to keep records during the execution of the project. Ninety-six per cent of the participants agreed that a QS should start remeasurements of provisional quantities when the construction drawings are issued, while 52% of participants believe FA meetings should be held regularly during the construction phase and 36% believe it should be held monthly.

The following list were provided to participants to indicate which items assist in the development and settling of a FA:

- agreed FAPEP
- recordkeeping of all site-specific documentations
- monthly cost and schedule reports
- monthly remeasurement of quantities
- variation calculations and supporting information
- provisional sum adjustment calculations
- prime cost amount adjustment calculations
- extension of time calculations and supporting information
- set-off/contra-charges calculations
- monthly escalation calculations
- non-scheduled rates build-up
- meeting minutes
- certificates of completion and final certificate
- formal test results
- retention release calculations
- risk register
- penalties/delay damages calculations
- insurance claims details
- defect list
- dispute register

Of Section 3, Question 7's 20 listed items only four were rated as 'average' in assisting settling of FAs: "meeting minutes", "formal test results", risk register" and "defect list". All other items were rated "high" or "very high".

Participants added the following items, not listed, which they believed necessary in assisting in the development and settling of a FA:

- agreed BOQ,
- approved and agreed trades between parties,
- interim FAs approved by both parties,
- contractual decision register,
- agreed preliminaries calculations,
- escalation calculations,
- performing post contract administration with close out phase in mind, and

- other professional consultant's backups, certificates, comments.

6.4.3. Interpretation of data

The interview data supports that the FA process starts at the beginning of a project and that a FAPEP should be developed the moment a project kicks off. It is very important to keep all supporting information throughout the execution phase to support in developing a FA and remeasuring of provisional quantities should not wait until the end of the project but should start the moment construction drawings are issued. FA meetings should be held either regularly or monthly during the construction phase. In other words, being pro-active in starting the FA process as early as possible, holding regular FA meetings to settle issues, keeping all essential documents for the FA throughout the project and keeping up with remeasurement of provisional quantities should ensure an improved FA. All of the listed items provided to assist in the development and settling of a FA should be performed continuously as it provides essential information to agree a FA timeously and correctly. The full list of items were considered in developing the FAT and guidance notes in this study.

6.5. Sub-question 4

Sub-question 4 asked how would QSs and project teams within SA benefit from a newly developed FAT, including guidance notes? The following set of sequential actions were performed in executing this sub-question:

- conducted interviews
- captured data from interviews
- analysed and interpreted data

6.5.1. Conducted interviews

To determine if QSs see any benefit in a newly developed FAT, including guidance notes, the following two questions were asked during the interview process (Reference paragraph 5.5.36 for full data analysis of this Question):

- Section 4, Question 1: "If a FA template and guidance notes is developed, which of the given options regarding use of the FAT and guidance notes would the participant choose?"
- Section 4, Question 3: "If a FAT and guidance notes is developed in your opinion do you think it should be incorporated in Tertiary Institutions' curriculums?"

6.5.2. Captured data from interviews

Twenty-eight per cent of the participants indicated that they would start using a developed FAT and guidance notes immediately and 72% said they will study it intensely and if acceptable start using it. 100% of the participants indicated that they think the developed FAT and guidance notes should be included in tertiary institutions' curriculum.

6.5.3. Interpretation of data

It is clear from the interview data that the participants think that a developed FAT and guidance notes will add value and benefit the project team to at least study it and if acceptable start using it or to start using it immediately. Due to the fact that participants believe it should be incorporated into tertiary institutions' curriculum indicate that they believe it will enhance students' knowledge concerning FAs and that it will benefit the construction industry to learn the principles and guidance given within the developed FAT and guidance notes.

6.6. Research problem and main question

The main research problem states that many material irregularities are found in FAs within SA. Clear planning and post contract administration should reduce these irregularities and ensure compliant FAs.

The main question asks the following:

"Would a developed, integrated and comprehensive FAT, including guidance notes, be an improvement over the current FA templates used in SA?"

The following set of sequential actions were performed in executing this research problem:

- identifying established FA standards
- conducted interviews
- captured data from interviews
- analysed and interpreted data

6.6.1. Identifying established FA standards

From the literature review it became clear that the following established FA procedures, format/structures and standards exist and are currently being used within SA:

- The DPWI's published manual for consultant QS (D.P.W., 2020)
- The Royal Institute of Chartered Surveyor's published guidance in FA procedures (RICS, 2015)

- The DPWI, Kwazulu-Natal: Format of FA (D.P.W., 2022)

The proposed FAT's first draft and guidance notes were drafted using the above-mentioned FA standards.

6.6.2. Conducted interviews

To determine what QSs believed important to incorporate into a FAT and guidance notes, the following three questions were asked during the interview process (Reference Paragraph 5.5.32 for full data analysis of these questions):

- Section 3, Question 1: "Indicate which of the following items should form part of the FAT", together with 14 items that the participant could choose from
- Section 3, Question 2: "Should the following documents form part of the signed FA, or should it be kept as separate supporting information?", together with 16 items that the participant could choose from
- Section 3, Question 3: "Rate each of the following information that you believe should be included in the FA guidance notes", together with 18 items that the participant could choose from

6.6.3. Captured data from interviews

Participants were given the following 14 listed items which could be part of the FAT:

- provisional sum adjustments
- changes in quantities
- prime cost amount adjustments
- daywork allowances
- variations based on instructions and/or agreed extension of time claims
- escalation adjustments
- risk allowance adjustments
- loss and expenses
- set-off costs/contra-charges
- disputes settled before FA agreement
- retention releases
- settled insurance claims
- project program/schedule
- penalties/delay damages deduction

Of Section 3, Question 1's 14 listed items only one should not form part of the FAT: "project programme/schedule".

Participants added the following items, not listed, which they would include in a FAT:

- preliminaries adjustments
- checklist of completion as an attachment
- price fixing fee (if applicable)
- mark-up on selected subcontractors
- additional commentary to give context to the FA from the QS' perspective
- guarantee information as an attachment
- SHEQ information as an attachment
- selected subcontractor FA as an attachment

Participants were given the following 16 listed items which could be part of the signed FA, or could be kept as separate supporting information:

- Approved site and drawing remeasurements
- Approved daily dairies
- Approved daywork schedules
- Approved contract instructions
- Approved variations (including all supporting documentation)
- Agreed extension of time documentation including agreed updates of the project programme/schedule
- Agreed provisional sum and prime cost amount calculations
- Agreed escalation calculations
- Agreed final BOQ including non-scheduled rates determination
- FA meeting minutes
- Agreed penalties/delay damages calculations
- Insurance claims details
- Monthly cost and schedule reports
- Final certificate
- Formal test results
- Project programs/schedules

From the 16 listed items for
Of Section 3, Question 2's 17 listed items, six should not form part of the signed FA but should be kept as supporting information:

- “approved site and drawing remeasurements”,
- “approved daily dairies”,
- “approved daywork schedules”,
- “FA meeting minutes”,
- “monthly cost and schedule reports”,
- “formal test results” and “project programmes/schedules”.

Participants were given the following 18 listed items which could be included in the FA guidance notes:

- definitions and abbreviations
- document purpose
- who compiles the FA
- model FA template
- project flow chart
- FAPEP
- FA process and reporting
- time scale to complete FA
- FA meetings
- recordkeeping
- change control
- retention
- disputes
- insurances
- defects
- termination
- FA compilation
- FA checklist

Out of the 18 listed items for Section 3, Question 3 all of the items were rated to be included in the FAT guidance notes.

Participants added the following items, not listed, which they would include in the FAT guidance notes:

- signing and dating FAs;
- how to handle disputes falling outside the FA in the FA;
- agreeing timeframes between the parties;

- preliminaries adjustments (Fixed, time and value);
- variations – handling changes to drawings, agreeing new rates and how to ensure value for money for the client;
- interest calculations;
- escalation;
- information on types of contract;
- site instructions;
- meeting with clients including collating information on direct payments by the client;
- guarantees;
- client's supply chain policies and procedures;
- upfront payments;
- additional commentary to provide enough information on FA;
- impartiality and compliance to ethical behaviour;
- staying within the CoC allowances;
- communications including social media groups;
- filing (physical and electronic) of information including emails;
- response times to be included in FA execution plan;
- handling SMEs; and
- information from rest of the professional team.

Some interview participants provided formats of FAs that they are using in settling FAs for the projects they are administering.

6.6.4. Interpretation of data

The participants were very clear in what they want to be included in the FAT itself, what to include as supporting information and what items should be covered in the FAT guidance notes. All of the provided items were considered during the development of Draft 2 of the FAT and guidance notes included in this study. In addition, provided FA formats were used. From Section 6.5.2, data captured from interview question in Section 4, question 1 it is clear that 28% of the participants indicated that they would start using a developed FAT and guidance notes immediately and 72% said they will study it intensely and if acceptable start using it. This indicates that the participants believe that the developed FAT and guidance notes should be an improvement over the current FA templates used in SA.

6.7. FAT and guidance notes

During the following different phases, a proposed FAT and guidance notes were developed:

- Phase 1. Collect information from various sources and stakeholders.
- Phase 2. Test collected information through interviews.
- Phase 3. Test collected information through reviews.

The following FAT and guidance notes could be produced as a separate document:

Final Account Template and Guidance Notes

By

Lydia Christina Carroll

6.8. List of abbreviations/acronyms

Abbreviation	Description
BOQ	Bills of Quantities: detailed statement contained in the contract document defining the details of work, quantities and prices
CoC	Conditions of Contract: applicable signed CoC
DoA	Delegation of authority: division of decision-making responsibilities to an individual that reports to a leader or manager
DPWI	Department of Public Works and Infrastructure
FA	Final Account: document indicating the final agreed amount that the employer/client will pay the contractor for the project
FAT	Final Account Template: template for the final account statement including final account summary
FAPEP	Final account project execution plan: document that sets out the procedure agreed to between the contracting parties for administrating the project to ensure a smoother final account process
Preliminaries	Preliminaries/Preliminary and General
QS(s)	Quantity surveyor(s): construction financial consultant with the required qualifications and registration (per the Quantity Surveying Act 49 of 2000) to advise on cost and contractual arrangements
RFA	Rolling Final Account: performing monthly actual performance determination executed by the representatives of the contractual parties to ensure that a true value of the works be assessed. These assessments should be included in the production of the final account
SFA	Sub-Contractor Final Account: Final account document indicating the details and final agreed amount for a sub-contractor
S/TFAT	Sub-Contractors/Trade Final Account Template: template for the final account statement for sub-contractors or for each completed trade
TFA	Trade Final Account: mini final account document indicating the details and final agreed amount for each completed trade

6.9. List of definitions

Description	Definition
Activity schedule	A schedule compartmentalising sections of the work in packages including costs per package
Cession Agreement	An agreement wherein the cedent transfer a right to the cessionary
Contract Price	The accepted tender amount, also referred to as the Contract Value
Defects Liability/Correction Period	Period stated in the CoC commencing from the date the works are completed during which the contractor has both the right and the obligation to make good defects covered by the contract
Final Contract Price	The Contract Price, including all final contractual adjustments, which is paid to a contractor on completion of the project
Latent Defect	A defect or problem with a product or property not visible or apparent upon inspection of the product or property
Patent Defect	A fault in a product or property that could be noticed by careful examination

Description	Definition
Preliminaries	General preliminaries and/or the items listed in the preliminaries section of the price document, also referred to as Preliminary and General
Price Document	Section or schedule within the contract document containing the priced BOQ/activity schedule/lump sum to the value of the Contract Price
Prime Cost Amounts	An amount included in the Price Document for the delivered cost of materials and goods obtained from a supplier
Private sector	The part of the economy which is owned by private groups
Provisional Sum	An amount included in the Price document for the supply and installation of work by a subcontractor
Public sector	The part of the economy composed of both public services and public enterprises
Risk allowances	Allowances in the price document for any unforeseen event that might be linked to a risk register item, paid to the contractor once the risk is realised during the project execution

6.10. Purpose

The FAT's purpose and guidance notes is to provide information pertaining to producing a FA, to establish an auditable basis for the process of producing a FA and to include a proposed layout of a FA.

6.11. Model FAT

There are no firm rules of how a FAT should be structured. However, it is important to take all the clauses contained in the contract into consideration. The Price document's structure contained within the contract will inform the FA layout. Parties should agree as early as possible in the project the FAT structure to ensure that all contributors to the FAT agree on the necessary information required to complete and sign off the FA. Because the minimum requirements for a FAT in the public sector varies from the minimum requirements for a FAT in the private sector, two separate suggested FAT formats are included in Annexure 1 and Annexure 2 attached in this guidance notes.

6.11.1. FAT for public sector (Annexure 1)

The DPWI published a manual[1] for consultant QS(s) which includes an example of a FAT. This was used as the basis of the proposed FAT for the public sector included in Annexure 1. It is important to note that per the manual, QSs are required to attach various prescribed documentations to FAs submitted to the DWS.

[1] Manual for Consultant Quantity Surveyors, August 2020, Department: Public Works and Infrastructure

6.11.2. FAT for private sector (Annexure 2)

Various FATs provided by QSs were used as the basis of the proposed FAT for the private sector.

6.12. Guidance notes

6.12.1. Project flow chart

The following flow chart depicts FA preparation, during the different project phases, which could be used as a guide through the FA process (Figure 31):

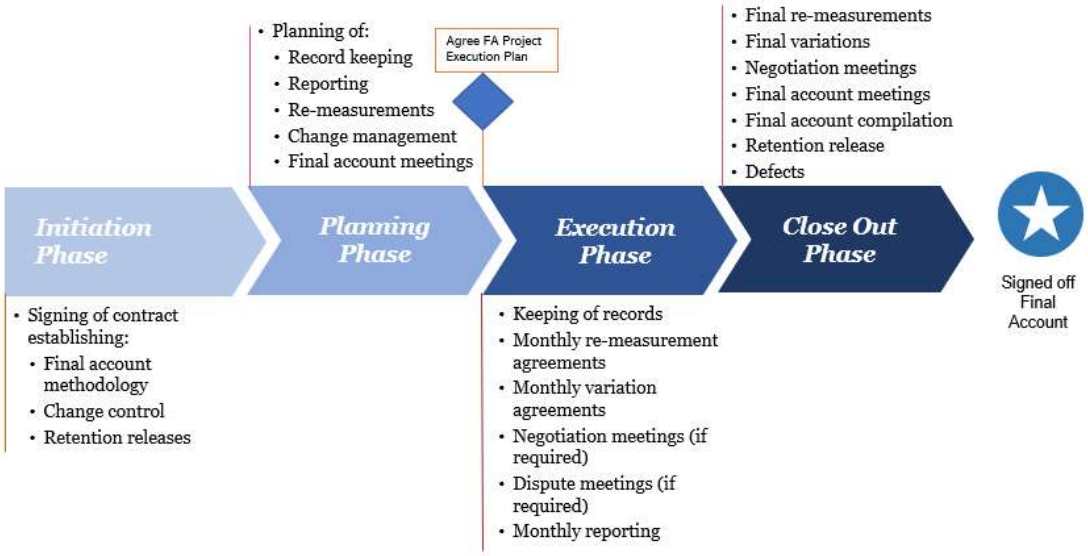


Figure 31: Project flow chart

6.12.2. Who compiles the FA

The applicable CoC indicates who prepares and compiles the FA, which could be the principal agent, contractor, engineer, employer's agent, project manager. Each of these indicated people can, per the prescribed procedure in the applicable CoC, nominate or delegate their responsibilities to agents or assistants. In SA certification of any work, which forms the basis for developing a FA, must be done by a registered professional QS to ensure that all duties are discharged with care, skill competency and diligence in compliance with the laws, rules and regulations applicable to the QS profession and to act ethically with honesty and integrity. Therefore, it is proposed that QSs (representing the two contracting parties) should prepare the FAs. For the purpose of this guidance, it is assumed that all work pertaining to the producing of FAs will be performed by QSs.

The QSs preparing and compiling the FA should as a minimum have competencies in the following areas:

- quantification and costing of work completed (including project drawings and any approved amendments thereto),
- project finance control and reporting,
- procurement,
- contracts,
- teamwork,
- construction practice, and
- construction administration.

All work must be adequately documented by the QSs and fully reviewed before the signing of any FA.

6.12.3. Ethical behaviour

QSs from both parties should act with ethical principles when agreeing the FA[2] (e.g. honesty, integrity, competence, respect and responsibility).

6.12.4. Ensuring an auditable FA

The QSs should ensure that all FA applied procedures and calculations are performed per the applicable CoC. All supporting information must be recorded and kept in, such a manner that an independent person could easily audit it. As a minimum QSs should ensure the following in producing the FA:

- The DoA must be adhered to.
- FAPEP must be based on the applicable CoC and should be approved by both parties' QSs.
- Non-schedule rates must be determined the applicable CoC. New rates must be either de-escalated to the contract's applicable base date or included in the FA as non-escalatable amounts.
- All supporting documentation (invoices, receipts, build-up of non-scheduled rates, daily diaries, daywork schedules, preliminaries adjustments, escalation calculations, remeasurements, meeting minutes) must be included either in the FA pack or as supporting information, clearly cross referenced to the relevant items in the FA to which they refer.

[2] RICS Rules of Conduct and SACQSP Code of Conduct

- All work measured provisionally must be remeasured per the standard method of measurement referenced in the contract.
- Provisional, prime cost amount, preliminaries adjustments must be per the CoC.
- Daywork calculations must be based on approved daywork schedules and rates applied per the daywork rates contained in the contract.
- Approved contract instructions including all applicable notices must be obtained for all the adjustments to the Contract Price and included in the FA.
- Change management must be applied per the applicable CoC.
- Approved extension of time claims must be calculated per the applicable CoC preferably based on baseline and updated programs/schedules, subject matter expert reports, notices.
- All dispute submissions and documentations must be obtained and included in the FA pack or kept as supporting information.
- Clear methods for set-off/contra-charges and defect costs must be obtained and included in the FA pack or kept as supporting information.
- If applicable, penalties are to be deducted for delay in the completion of the contract. Calculation of penalties must be included in the FA pack or kept as supporting information. Waiver of deduction of penalties must be instructed by the employer/client and, such waiver does not constitute that an extension of time is granted.
- Project program/schedules must be obtained and kept as supporting information.
- Monthly cost and schedule reports must be obtained and kept as supporting information.
- Retention releases must be dealt with in strict accordance with the applicable CoC.
- Signed completion and final certificates must be obtained and included in the FA.
- Dated site photos and/or videos must be obtained and kept as supporting information.
- Three-dimensional scans and/or modelling of the works must be kept as supporting information.
- References to final drawings (construction/red line) must be included in FA for traceability.
- Clear internal FA procedure applied must align with the applicable CoC.
- All pages of the FA are to be numbered consecutively to make audit process easier.

Only fully approved variations, disputes and dayworks are included in the FA. All remeasurements and adjustments of sums and rates must comply with the applicable CoC provisions and must be approved by both parties' QSs before inclusion in the FA.

6.12.5. FAPEP

At the beginning of a project the QSs representing both contracting parties should produce and agree a FAPEP, which sets out the procedure for administrating the project to ensure a smoother FA process. The principal of using a rolling FA (RFA)[3] is used in compiling the FAPEP within this guidance. QSs should execute a monthly actual performance determination of both parties which ensures that a true value of the works is assessed when producing interim payment certificates. These assessments should be included in the production of the FA. It is important to note that the signed CoC usually contain an indicated FA procedure and/or framework, which must be adhered to, as well as applicable timescales which should be applied to the FA process. These specific requirements are not considered within this guidance on compiling a FAPEP but rather leaves it up to the QSs to add where applicable.

The FAPEP should as a minimum include the following activities:

- Identification of roles. This should as a minimum identify party representatives, including major subcontractor's representatives, that potentially influence FA negotiations.
- Establish ways of communication (e.g. emails, WhatsApps, messaging)
- Agreed change management procedure per the applicable CoC
- Agreed contract instruction procedure per the applicable CoC
- Agreed dispute resolution procedure per the applicable CoC
- Agreed remeasurement methods per preambles and method of measurement included in the signed contract
- Agreed dates for monthly site remeasurements
- Agreed dates for agreeing remeasurements from drawings
- Contractual dates for issuing of payment certificates
- Dates for issuing formal cost reports
- Proposed dates for FA meetings
- Response times between the parties
- Contractual issues which influence FA procedure (e.g. release of retention money/bond, adjustment of preliminaries costs, guarantees, escalation, exchange rates)
- Contractual decision register layout
- Incorporation of information from rest of the professional team (e.g. test results, completion certificates, final certificates, defects lists)
- Agreed FA layout/structure
- Establish ways of taking dated photos and videos

[3] RICS FA procedures, 1st edition, December 2015

- Establish ways of using 3D scanning and/or modelling of works (if available)

6.12.6. FA process and reporting

The FA process starts at the beginning of the project and must be an ongoing process until the signing of the FA. QSs from both parties should work in a co-operative manner to ensure regular (preferably monthly) on- and off-site remeasurement sessions to measure and agree provisional quantities (if applicable) and to agree to and sign off on all constructed quantities/items. During these sessions adjustments that could already be made to provisional sums, prime cost amounts, escalation, set-off charges and claims that could be settled should be agreed. This will ensure that all actual variation to the contract up to that point is agreed between the parties.

It is essential for QSs to provide as a minimum accurate monthly payment certificates and cost reports that includes:

- agreed remeasured quantities (if provisional),
- agreed variations,
- agreed adjustments to provisional sums,
- agreed adjustments to prime cost amounts,
- agreed extension of time claims, and
- agreed escalation and any agreed set-off charges (if applicable).

These payment certificates and cost reports provide a clear understanding each month of the applicable cost status of a project and could be used in the RFA process. Note: Payment certificates could have a value of zero but must be raised monthly to ensure record of what the month's actual progress was.

As part of the compilation of the FAPEP the FA layout/structure must be agreed between the parties. Model FATs are contained in Annexure 1 and 2. However, as a minimum, the following FA headings/descriptions should be covered:

- variable costs including provisional sum adjustments, changes in quantities (if a remeasurable contract), prime cost amounts adjustments and daywork allowances;
- variations based on instructions and/or agreed extension of time claims;
- escalation adjustments;
- risk allowance adjustments (if applicable);
- loss and expenses including set-off costs/contra-charges; and
- disputes (if settled before FA agreement).

The QS might be asked by the employer/client to administer budgets including professional fees, employer's internal costs. These costs do no form part of the FA but must be included in the overall financial reports.

6.12.7. Time scales for completing FAs

The CoC should provide the applicable time scale for completing the FA which both parties should adhere to. Should one of the parties fail to adhere to the indicated time scale the stated contractual recourse could be applied by the other party. If no such recourse is stated in the contract the aggrieved party will have to follow the indicated formal dispute resolution process. Keeping and agreeing accurate monthly accounts of all work done including applicable variations will ensure a shorter time scale for completing the FA.

6.12.8. FA meetings

Both parties' QS should attend all FA meetings which need to be appropriately delegated to agree the FA between the parties. Regular FA meetings must be held during the execution of the project between the QSs to exchange information and to agree any differences regarding quantities, rates, variations, disputes. Both parties' QSs could request a FA meeting. Agreed methodologies for valuating variations should be agreed during FA meetings. All agreements must be within the applicable CoC and no concessions could be made unless it is formally agreed to by both parties in writing. Other parties (e.g. sub-contractors and/or major suppliers), could be invited to parts of FA meetings if they are a major role player concerning certain pertinent items in the FA. However, the final decision on any agreement still lies between the parties' QSs, necessarily delegated as, such. All items agreed during each FA meeting must be duly recorded and approved by the delegated QSs from each party.

6.12.9. Subcontractor direct payments

In certain instances (e.g. when the client might make direct payments to subcontractors for materials), it is important to have regular meetings with the client to ensure that the right cession is signed, and any direct payments are recorded for the FA purposes. This will ensure that no double payments are made for any provided material supplied by a subcontractor. An example of a cession agreement for direct payment is included as Annexure 3.

6.12.10. Recordkeeping

The following type of records should be kept in a format that could be easily audited to ensure suitable project documentation as supporting information to the FA:

- approved site and drawing remeasurements; daily diaries; daywork schedules; contract instructions; as well as variations (including all supporting documentation)
- agreed extension of time documentation including agreed updates of the project program/schedule
- agreed provisional sum and prime cost amount calculations
- agreed escalation calculations
- agreed rate of exchange calculations
- agreed final BOQ including non-scheduled rates determination
- approved SFAs and/or TFAs
- FA meeting minutes
- certificates of completion
- final certificate
- all contractual professional team supporting information (e.g. formal test results, defects list, risk register, quality issues)

6.12.11. Change control

Each signed contract contains a process/mechanism for instructing changes/variations/ compensation events as well as the process that must be followed in notification and approval of these changes/variations/compensation events. Before a change/variation/compensation event is agreed it is essential to confirm that the applied contractual notification periods were adhered to. The DoA for each party to the contract dictates who could administer what changes/variations/compensation events and must be adhered to during the change control application. During the execution of the project all changes/variations/compensation events should be agreed and recorded between the parties as and when they occur. This will ensure a more affective FA negotiation process. The final total amount for all changes/variations/ compensation events must be included in the FA as a separate item.

6.12.12. Remeasuring

If the contract is based on provisional quantities, the bulk of the FA will consist of on- and off-site remeasurements conducted by both parties' QSs. Off-site remeasurements should be conducted and agreed between the parties as and when the construction drawings are issued. A copy of the priced remeasurement should be issued to the contractor for their agreement as soon as possible.

On site measurements should include the following:

- record of the QS's name, company, time of arrival and departure in the site visitor's book (if any). If measurements are jointly taken between the parties, record of both QS's details should be recorded;
- properly recorded measurements with date of measurement recorded against each entry; and
- if measurements are jointly taken with the contractor, both QSs should initial against the agreed measurements.

Different trades within the BOQ could be agreed progressively and Trade Final Accounts (TFAs) could be raised and signed as and when they are completed. See Annexure 4 for the suggested TFAT. Final agreed trade amounts are included in the FA.

6.12.13. Attic/spare stock

Attic/spare stock, which is not installed material kept by the client in storage for future maintenance, to replace damaged installed material ordered, are measured and paid for in the FA. It could be included in the remeasurements as an item in the final BOQ (refer to 6.12.12) or it could be shown as a separate line item in the FA.

6.12.14. Adjustment of preliminaries costs

Preliminaries costs are usually divided in Fixed-, Time- and Value related items. However, the method of measurement applicable to the contract as well as the CoC itself will dictate the adjustments, if any, to these costs. In addition, it depends on the way the contractor priced their pricing schedule (e.g. they might not have priced value-related items). Therefore no value related adjustment will apply. The adjusted preliminaries amount is included in the FA as a separate item.

6.12.15. Agreeing of new rates

If a new rate must be agreed between the parties for an item not in the price document the method stated in the CoC will dictate the principles to be applied in the calculation. If the CoC is silent, then the applied rate build-up method should be agreed between the parties, using first principles, within the FAPEP. New agreed rates must be either de-escalated to the agreed base date of the contract or included in the FA as non-escalatable amounts. Record of the agreed rate build-up must be kept as backup to the FA.

6.12.16. Provisional sums

Provisional sums must be adjusted per the CoC, usually through a separate tender process, and the final adjusted amount must be included in the FA as a separate item.

6.12.17. Prime cost amounts

Prime cost amounts must be adjusted per the CoC and the final adjusted sums must be included in the FA BOQ.

6.12.18. Dayworks

If dayworks applies the final amount must be included in the FA as a separate item. All daywork sheets must be signed by the authorised person/s and kept as backup to the FA.

6.12.19. Risk allowances

Risk allowances could be made within the price document as an item within the BOQ/Lump Sum/activity schedule for open book transparent type of contracts. This allowance could be for any unforeseen event that might be linked to a risk register item (e.g. community unrest). If the risk connected to the risk allowance is realised and the contractor had actual expenses against the risk allowance, the contractor should be compensated per proven expenses which must be included in the FA as a separate item. If the risk connected to the risk allowance did not realise the allowances should be adjusted accordingly in the FA.

6.12.20. Escalation/CPA

If escalation/CPA applies, calculations should be done every month together with each interim payment certificate based on the CoC provisions. To assist with the FA, each month's escalation/CPA should be agreed between the QSs. The final escalation/CPA must be included in the FA as a separate item. Due to the fact that CPA indices are published approximately three months late QSs should take this time implication in consideration when completing the FA.

6.12.21. Interest

If the contractor is paid late for an interim payment certificate the interest should be calculated per the CoC and included in the FA as a separate item. However, the interest amount should not be included in the final Contract Price used for any professional fee calculations (if applicable).

6.12.22. Set-off/contra-charges

If the CoC provides for set-off/contra-charges and the employer/client need to recover costs from the contractor based on an event caused by the contractor, the agreed amount will be deducted in the FA as a separate item.

6.12.23. Retention

If retention money or a retention bond applies, release of, such money or bond should be administered per the CoC. The retention money or bond is usually a percentage of the price of the contract. The QSs need to ensure that the correct amount is used in calculating the full retention percentage amount. It could either be on the Contract Price or on the Final Contract Price. If it is calculated on the Final Contract Price and the FA has been agreed between the parties before any release of part of the retention, then the retention release amount should be calculated on the FA value. However, if the FA is not yet agreed, and there is a difference in opinion on the final contract price, the undisputed portion of the FA price could be used to calculate the retention release. Once the FA is agreed, another payment certificate could be raised for the difference in retention. However, this is to the discretion of the client's QS together with the client and depends on the value of the disputed portion of the FA price and the time it is taking to finalise the FA. It might be necessary to keep pressure on the parties to agree the FA rather than releasing any interim retention amounts.

6.12.24. Contingencies

Contingencies can only be allocated to additional costs (variations/compensation events) based on the change control procedure included in the CoC and approved by the delegated person/s. All contingency allowances not used during the execution of the project should be deducted in the FA.

6.12.25. Guarantees

Different types of guarantees could be included in the contract (e.g. performance-, upfront). In certain circumstances, such guaranteed amounts should be adjusted during the project execution (e.g. approved extension of time, late completion due to the contractor). The actual final amount paid by the contractor should be included in the FA. However, if the increase is due to the contractor's own fault (late completion), the amount is not adjusted as the additional cost is for the contractor's own account.

6.12.26. Disputes

If all possible options have been exhausted in settling the FA but there is a difference of opinion between the parties on a certain matter a dispute could be declared/notified between the parties. The CoC will have the necessary provisions for settling of such declared/notified disputes. It could be decided between the parties to agree and sign the FA without the settlement of disputed matter/s. However, it must be clearly stipulated within the FA as such. Once the dispute has been decided on, through the various applied dispute resolutions included in the CoC, it could be settled between the parties as a separate matter from the agreed FA. The FA process should not be held back unnecessary in the case where all disputes are not settled. All disputes agreed before the signing of the FA must be included in the FA as a separate item.

6.12.27. Insurances

Insurance recoveries does not form part of the FA.

6.12.28. Penalties/delay damages

If the CoC provides for penalties/delay damages and the employer/client must recover, such penalties/delay damages due to the contractor completing the works late, the agreed amount will be deducted in the FA as a separate item.

6.12.29. Defects

If any patent defects were observed before the signing of the final completion certificate, the contractor must rectify, such defects within the period stated in the CoC. If the contractor does not rectify the defects and the work is completed by another contractor, the agreed set-off/contra-charges could be included in the FA as a separate item. However, could only be done if the CoC provide for, such set-off of applied costs. Retention money could be used to rectify defects not fixed by the contractor within the defects liability/correction period, if so, stipulated in the CoC. Settling of a FA does not affect either party's rights concerning latent defects. If these defects occur within the defects liability/correction period, the contractor must rectify these defects at their own costs. However, if the contractor does not rectify the defect to the satisfaction of the other party, agreed costs for rectifying the defect and/or for payment of an alternative contractor to rectify the defect could be included in the FA as set-off/contra-charges, if the CoC provides for such set-off of applied costs. Any latent defects outside the defects liability/correction period will be subject to a separate claim for damages outside the FA.

6.12.30. Termination

In some cases, the FA does not represent the end of the project but must be agreed in the middle of the project. This could be due to the following reasons:

- the contractor or employer is undergoing a process of liquidation or administration;
- the contract is terminated due to non-performance of the contractor or other reasons as stated in the CoC by the employer;
- the contract is terminated by the contractor on reasons as stated in the CoC; and
- the contract is terminated due to force majeure (neither party's fault).

The CoC should stipulate the type of loss that could be claimed by the parties for each of the above-mentioned termination provisions. If the CoC is not prescriptive then common law remedies will apply. In all of the abovementioned cases agreeing the FA value of work performed is of the utmost importance. This should be executed within the timeframes stipulated in the CoC. However, if no such timeframe is provided for it should be done as soon as possible. All work performed up to the date of termination should be valued, based on the interim valuations/certifications. To avoid the possibility of over payment the accuracy of the interim valuations/certifications is of the utmost importance. It might be very difficult to reclaim over payments in the case of the contractor going into administration and/or liquidation.

In the case of termination due to contractor's non-performance, the value of works completed by the contractor up to the termination date must be agreed so that the negotiations with the new contractor 'stepping in' could begin. Most CoC allows that the difference between the original price and the new contractor's price for completing the works to be deducted from the original contractor's FA. The FA should clarify the scope of work remaining to be completed to the original contractual obligations. The insolvency/administration practitioner will be party to the final negotiations of the FA value of work performed.

6.12.31. Signing and dating FAs

Each FA should be signed and dated as a minimum by the duly delegated QS, Project Manager/Principal Agent and the contractor. FAs for the public sector should be signed by the specific department's representative.

6.12.32. Retaining of information

All documents pertaining to the FA should be kept as physical and/or electronic files for as long as the QS has liability under their contracted consultant services, but as a minimum for a period of five years[4].

All of the following documentations, as a minimum, should be kept:

- *DoA*. This should be used in ensuring that all instructions are given per the DoA, all variations are approved correctly and all agreements are signed by the duly authorised persons.
- FAPEP
- *Contract document's CoC*. This should be used in ensuring all change control mechanisms, all methods of adjusting sums, overheads, profit and preliminaries costs, set-off/contra-charges, defect costs and penalties/delay damages are applied correctly.
- Supporting information for remeasurements, dayworks, instructions, variations/ compensation events, rate build-ups
- Calculation supporting information for remeasurements, dayworks, variations/ compensation events, new rate build-ups, provisional sums, prime cost amounts, escalation
- Meeting minutes including FA meetings
- Contractual completion/final certificates
- Dispute documentations
- All project programs/schedules
- Dated site photos and site videos
- Three-dimensional scanning and/or modelling of works
- Monthly cost and schedule reports
- Internal FA procedure applied
- FA
- Commentary on non-performance of contractor
- Reference to final drawings to ensure traceability
- Commentary on agreement of items (arguments, trends applied)
- Details of adjustment of claims ensuring right principles applied

[4] Professional Client/Consultant Services Agreement, clause 7.3

6.12.33. Commentary

QSs should keep a separate continues commentary giving context to the creation of the FA during the project execution phase which should include all pertinent issues:

- Issues encountered during construction
- List of all items agreed between the parties (e.g. completed trades, new rates, claims, variations/compensation events, provisional sums, prime cost amounts, dayworks) including basis of principles applied to each item
- List of all information received from other consultants (e.g. test results, quality sign offs and/or issues, instructions, risk issues)
- List of items where difference of opinion between the parties applies including explanation thereof
- List of concessions from both parties
- Contractual decision register
- List of disputes
- General information on progress of the project

The above should ensure a smoother transition if the existing QS leaves the project.

6.13. Checklist

To avoid non-conformance or errors in the FA, each QS's company's internal quality management system (which should contain minimum detailed instructions on how to ensure a FA is auditable) should be adhered to. However, as minimum, the following should form part of the FA audit checklist (Table 13).

Table 13: Final account checklist

No	Description	Performed
1.	FAPEP	
2.	Examine contract documents to determine: • Final measurement of the works period • Responsible party for providing the FA • Basis of contract price • Contractual procedures • Methods of adjusting all variable costs • Applicable change controls for changes/variations/compensation events • Set-off/contra-charges method (if applicable) • Method for retention releases • Contractual dates • Contingency and risk allowances (if applicable) • If above not specified in the CoC, agree what will be applied with the contractor	
3.	Staff resources to finalise FA	
4.	Supporting information kept (if applicable):	

No	Description	Performed
	• Approved site and drawing remeasurements • Agreed BOQ • Approved and agreed trades, daily diaries and daywork schedules • Approved contract instructions • Monthly cost reports • Approved variations/compensation events (including all supporting documentation) • Approved extension of time documentation (including agreed updates of the project program/schedule) • Agreed preliminaries calculations; provisional sum and prime cost amount calculations; set-off/contra-charges calculations; escalation calculations as well as non-scheduled rates build-ups • Monthly payment certificates • FA meeting minutes • Certificates of completion • Final certificate • Information received from other consultants • Risk register • Penalties/delay damages calculations • Insurance claims details • Defect list • Disputes details • Contractual decision register • Dated photos and videos • Three-dimensional scanning and/or modelling (if available)	
5.	FA calculations assembled (if applicable): • Adjustment of prime cost amounts and provisional sums; preliminaries; provisional quantities as well as risk allowances • Valuation of variations and dayworks • Final escalation • Contingency and risk allowance adjustments • Loss and expenses • Adjustment of any other amounts per the contract	
6.	Quality check of FA calculations assembled	
7.	Final priced BOQ/activity schedule including new items	
8.	Quality check of final priced BOQ/activity schedule	
9.	Other items (if applicable): • Set-off costs calculations • Settled dispute totals • Defects costs calculations • Termination costs calculations	
10.	Quality check of other items (if applicable)	

No	Description	Performed
11.	Assemble FA pack (public works): • Statement of FA • Final summary • Approved contract instructions and variations (including supporting documents) • Escalation, provisional sums, prime cost amounts, non-scheduled rates, penalties/delay damages calculations • Final BOQ/activity schedule • Insurance claims details • Completion and final certificates • Certificate of compliance and indemnity by consultants • Copies of letter confirming the commencement date; contract data; as well as payment certificates • Contract completion report • Test results • FA certification	
	Assemble FA pack (private works): • Statement of FA • Final summary • Approved contract instructions and variations (including supporting documents) • Escalation, provisional sums, prime cost amounts, non-scheduled rates, penalties/delay damages calculations • Final BOQ/activity schedule • Insurance claims details • Completion and final certificates • FA certification	
12.	Quality check of FA pack	
13.	Printing of FA: • Pages numbered correctly • Pricing document rates and references correct • Calculations arithmetically checked	
14.	Statement of FA and final summary approved by partner/director before issuing	
15.	Signed statement of FA and final summary issued together with cover letter	
16.	Copy of FA to auditors and any other authorised parties	

Abbreviations: final account (FA); final account project execution plan (FAPEP); bill of quantities (BOQ)

Annexure 1: FAT for public sector engagement

FINAL ACCOUNT

PROJECT: _____ **CONTRACT NO.:** _____

CONTRACTOR: _____ **DATE:** _____

INDEX

STATEMENT OF FINAL ACCOUNT

PROJECT: _____

CONTRACTOR: 01 _____

DATE: _____

CONTRACT NO.: _____

		DESCRIPTION	ZAR
1	02	Net amount of contract	
2	LESS: 03	Net omission	
3	ADD: 04	Net addition	
4	ADD: 05	Contract price adjustments	
	SUBTOTAL		
5	LESS: 06	Penalties/Delay damages	
	FINAL ACCOUNT TOTAL (exclusive of VAT)		
6	ADD:	Value added tax	
	FINAL VALUE OF CONTRACT		
7	LESS: 07	Payments received	
	FINAL AMOUNT DUE TO CONTRACTOR		

I/We the undersigned accept the amount as full and final statement of amounts due on the above contract.

_____ _____

Signed by CONSULTING QUANTITY SURVEYOR DATE

_____ _____

Signed by CONTRACTOR DATE

_____ _____

Signed by PROJECT MANAGER/PRINCIPAL AGENT DATE

_____ _____

Signed by DEPARTMENT REPRESENTATIVE DATE

Notes:

No	Description	Comments
01	Project	All information pertaining to the specific project
02	Net amount	Original net Contract Price
03	Net omissions	Total carried over from Final Summary
04	Net additions	Total carried over from Final Summary
05	CPAs	Total carried over from escalation calculations/Final Summary Reference in this document: 6.12.20
06	Penalties/Delay Damages	Total carried over from Final Summary Reference in this document: 6.12.28
07	Payments received	Total payment certified in latest issued payment certificate

Abbreviations: contract price adjustments (CPA)

FINAL SUMMARY

PROJECT: _____

CONTRACTOR: _____

01

DATE: _____

CONTRACT NO.: _____

	ITEMS		OMMISSIONS	ADDITIONS
02	PRELIMINARIES ITEM NO. 1: ..... 03 ITEM NO. 2: .... ITEM NO. ...			
		TOTALS		
	LESS:	NETT OMMISSIONS		
		NETT INCREASE/DECREASE IN CONTRACT CARRIED TO STATEMENT OF FINAL ACCOUNT		

Notes:

No	Description	Comments
01	Project	All information pertaining to the specific project
02	Preliminaries	Original preliminaries including adjustments per contract conditions (if applies). Reference in this document: 6.12.13
03	Works Items	Total of remeasured works, variations, provisional sums, prime cost amounts, dayworks Reference in this document: 6.12.12, 6.12.15, 6.12.17 and 6.12.18

Annexure 2: FAT for private sector engagement

FINAL ACOUNT STATEMENT

PROJECT: _____

CONTRACTOR: _____

DATE: _____

CONTRACT NO.: _____

	ITEMS		TOTAL
02	PRELIMINARIES		
03	WORKS EXTERNAL WORKS		
04	PROVISIONAL SUMS		
05	DAYWORKS		
06	VARIATIONS		
		TOTAL CONTRACT VALUE	
LESS: 07		PENALTIES/DELAY DAMAGES	
ADD: 08		SETTLED DISPUTES	
ADD: 09		CONTRACT PRICE ADJUSTMENT	
		FINAL VALUE OF CONTRACT	
LESS: 10		DIRECT PAYMENTS	
LESS: 11		CONTINGENCIES	
LESS/ADD: 12		RISK ALLOWANCES	
LESS: 13		SET-OFF/CONTRA CHARGES	
ADD: 14		INTEREST ON LATE PAYMENTS	
		SUB TOTAL	
ADD:		VALUE ADDED TAX	
		FINAL AGREED AMOUNT (Incl. VAT)	

I/We the undersigned accept the amount as full and final statement of amounts due on the above contract.

_____ _____

Signed by CONSULTING QUANTITY SURVEYOR DATE

_____ _____

Signed by CONTRACTOR DATE

_____ _____

Signed by PROJECT MANAGER/PRINCIPAL AGENT DATE

Notes:

No	Description	Comments
01	Project	All information pertaining to the specific project
02	Preliminaries	Original preliminaries including adjustments per contract conditions (if applies) Reference in this document: 6.12.13
03	Works	Total of remeasured works Reference in this document: 6.12.12 and 6.12.15
04	Provisional sums	Adjusted provisional sums Reference in this document: 6.12.16
05	Dayworks	Calculated dayworks based on approved daywork schedules and contractual daywork rates. Reference in this document: 6.12.18
06	Variations	Final value of approved and agreed variations
07	Penalties/delay damages	Value of penalties/delay damages Reference in this document: 6.12.28
08	Settled disputes	Agreed value of resolved disputes Reference in this document: 6.12.26
09	CPA	Total carried over from escalation calculations Reference in this document: 6.12.20
10	Direct payments	Total client direct payments to subcontractors Reference in this document: 6.12.9
11	Contingencies	Adjusted contingencies Reference in this document: 6.12.24
12	Risk allowances	Final value of realised risks paid by contractor Reference in this document: 6.12.19
13	Set-off/contra-charges	Agreed value of set-off/contra-charges Reference in this document: 6.12.22
14	Interest on late payments	Total value due to late payments to the contractor Reference in this document: 6.12.21

Abbreviations: contract price adjustments (CPA)

Annexure 3: Cession for direct payment

PROJECT: _____

CONTRACTOR: _____

SUBCONTRACTOR: _____

CONTRACT NO.: _____

CESSION AGREEMENT FOR DIRECT PAYMENT

Entered into by and between:

[●insert]

(The **Cedent**/Contractor)

And

[●insert]

(The **Cessionary**/Client)

Collectively the parties or the party – as the case may be.

RECORDAL

WHEREAS the s**upplier** _____ [●insert], is not a party to this cession agreement, by hereby co-signs this cession agreement to constitute its consent to the cession and direct payment as detailed below (the supplier).

AND WHEREAS The parties hereto record that the cedent signed and entered into an agreement with the client on or about the [●insert] for the construction services (the **works**) at [●insert]**,** such contract is known as the ***Construction Contract*** with contract number [●insert];

AND WHEREAS in terms of the Construction Contract, the client shall affect payment to the cedent for the works and duly delivered ***materials***.

IN TURN the cedent under a separate supply order is obligated to pay the supplier for materials supplied for the purposes of the contractor contract.

NOW the cedent cedes his:

(i) Right to receive the payment for the materials to the supplier; and
(ii) Obligation to pay the supplier to the client (the direct payment).

AND:

(i) The client accepts the cession of the payment obligation of the direct payment in favour of the supplier, as detailed in this cession agreement.

TERMS OF THE CESSION

---

1. Details of the direct payment:

Materials description	[●insert]
Supplier invoice number	[●insert]
Supplier bank details	[●insert]
Payment due to the supplier	[●insert]
Payment due date	[●insert]
Payment reference	[●insert]

2. Effective date

This cession is made and effective on: _____ [●insert]

3. Cedent warranties

1. The cedent hereby warrants and represents that a separate supply order and payment obligation between himself and the supplier is in full force and effect and is fully assignable.

2. Furthermore, the cedent warrants that it has full right and authority to cede and transfer the direct payment to the client, and that the payment obligation herein transferred are free of lien, encumbrance or adverse claim.

3. The cedent hereby cedes and transfers all their rights, title and interest in respect of the payments due to the cedent by the client with regard to **above-mentioned** materials delivered under the construction contract, to the supplier as a direct payment.

4. The direct payment due to the supplier by the cedent under the separate order, shall be settled directly by the client.

5. This cession is limited to direct payment.

6. The cedent hereby authorises the client to pay the direct payment directly to the supplier.

7. The client hereby confirms, agrees and undertakes to pay to the supplier the direct payment into the nominated bank account of the cessionary.

8. This cession does not create any binding commercial or employer relationship between the client and supplier. For absolute clarity, the clients payment obligations to the supplier is limited to payment of the direct payment and shall be fulfilled in total on payment of the direct payment.

9. This cession agreement shall be final and binding and remain in full force and effect for as long as any amount is owing by the cedent to the supplier.

10. This cession agreement constitutes the whole agreement between the parties hereto and no alteration or addition or variation or consensual cancellation hereof and no waiver of any of its rights against the other parties hereunder shall be of any force or effect unless reduced to writing and signed by the parties hereto.

11. All notice shall be addressed by the addressing party to the other party to the email address specified in the Construction Agreement. Such notices shall be believed to have been received by that Party, if sent by email on a business day, on date of transmission of the email, or on a day other than a business day, on the next business day.

12. Any party may change its domicillium et executandi by notice in writing to the other by way email.

13. Each clause of this cession agreement shall be severable, the one from the other, and if any is found to be unenforceable for any reason, the remaining clauses shall be of full force and effect and continue to bind the parties.

14. This cession agreement shall be binding upon liquidators, administrators, assignees or successor's title, as the case may be, of the cedent.

Date and signed at [●insert] on this _____ day of _____202[●insert]

_____

Project Quantity Surveyor

_____	_____	_____
Signed for and on behalf of the CEDENT (Duly authorised)	WITNESS	WITNESS
_____	_____	_____
Signed for and on behalf of the CLIENT (Duly authorised)	WITNESS	WITNESS
_____	_____	_____
Signed for and on behalf of the SUPPLIER (Duly authorised)	WITNESS	WITNESS

Annexure 4 – Subcontractor/trade FA (TFA)

TRADE / SUBCONTRACTOR FINAL ACCOUNT

PROJECT: _____

SUBCONTRACTOR: _____

DATE: _____

CONTRACT NO.: _____

ITEMS		TOTAL
PRELIMINARIES WORKS VARIATIONS		
	TOTAL CONTRACT PRICE	
ADD:	VALUE ADDED TAX	
	FINAL AGREED AMOUNT (Incl. VAT)	

Note: The final amount shown is the net value of work executed and certified by the professional quantity surveyor, this final account statement does therefore not reflect any contra charges that my have been incurred during construction. This will be taken up and dealt between the subcontractor and the main contractor directly.

I/We, the above subcontractor/s, agree to accept as final and correct the above figures, and that this represent the FINAL ACCOUNT in respect of all work executed by us under the subcontract and arising out of the above contract.

Signed by CONSULTING QUANTITY SURVEYOR _____ DATE _____

Signed by SUBCONTRACTOR _____ DATE _____

6.14. Summary

In Chapter 6, the research findings were discussed. Findings were dealt with in a comprehensive and structured manner, following the research plan included in Chapter 4. Sub-question 1, dealing with established FA documents and its use within SA, was discussed. Sub-question 2 involved material irregularities and its mitigation within the FA process. This discussion included ways to avoid material irregularities. Sub-question 3 provided details in ensuring improved FAs giving items in assisting settling of FA. Sub-question 4 addressed the benefits of a newly developed FAT including guidance notes. Chapter 6 concluded with a section on dealing with the research problem in providing a FAT and guidance notes. A further section provided the proposed FAT and guidance notes developed during this study from all the data gathered. Chapter 7 will describe the recommendations made upon the study's completion.

CHAPTER 7 - Conclusions and recommendations

7.1 Introduction

This study's goal was to provide a framework for producing FAs in SA by producing a FAT and guidance notes. The lack of standards for and information available on FAs pose a challenge in creating FAs without material irregularities that cover all aspects of the project. Using data gathered from existing FA standards and interviews held with registered professional QSs, the study findings provided the SA construction industry with a FAT and guidance notes that could be used as a framework in generating FAs.

Chapter 1 set out the study's aims and goals. In Chapter 2 a comprehensive literature review was conducted, and Chapter 3 described the study methodology. Chapter 4 set out the research plan. Chapter 5 dealt with the analyses of the secured data which included all data from interviews held. Chapter 6 provided the data findings concerning the main research problem including the main question and four sub-questions. Chapter 7's main objective was to draw conclusions, to make recommendations from the study's findings, all based on the literature review and interviews and the research questions.

7.2 Conclusions on research questions

Chapter 1 motivated the rationale for the study's importance and included limitations, delimitations and any assumptions. The study's main problem, main question and sub-questions as well as the study goals were stated. Chapter 2 reviewed related literature providing the required context for the study. Although there were three existing FA manuals available for reference in developing a FA, the overall data available on FAs was limited as few studies have been conducted on the FA topic.

Chapter 3 discussed the research methodology chosen for this study, which was indicated and motivated. Research validity is an important aspect that was referenced in the chapter in how the study accommodated the principles of research validity. Research ethics were dealt with and described in detail. Chapter 4 described the research plan in detail, which followed a chronological order. The main research problem, main question and four sub-questions' processes were discussed, which started with procuring the study data, analysing the data and applying findings. The FAT and guidance notes document, solving this study's main research problem, was described in detail with reference details of each section's minimum requirements of the document.

Chapter 5 analysed the data in detail with references to the applicable statistical measures used to describe the data and data findings. Interview data was discussed in chronological order per the research problem, main question and four sub-questions. Chapter 6 dealt with the study findings and answered the study problem. Sub-questions 1 and 2 were answered through a detailed discussion of the data from the literature review and interviews. To answer sub-question 3, data received from various questions covered in the interviews were used to provide a list of items and actions required to ensure improved FAs.

In answering Sub-Question 4, data received from questions covered in the interviews were used to show the perceived benefits in a newly developed FAT and guidance notes. To answer the main question and the main research problem data from the literature review and interviews were used to develop a FAT and guidance notes. The FAT and guidance document was included in this chapter.

7.3 Recommendations

It is important as part of a study to consider the point of departure, the main stated problem, main question and all sub-questions. In conclusion this should be evaluated to see to what extent the study findings addressed the problem and see what should be done to in adding related questions currently falling outside the study's scope. This should then be considered based on merit. This study provided a FAT and guidance notes based on the structure, set limitations and exclusions as well as the knowledge base developed from the data.

Based on the research's findings, and the conclusions drawn, the following recommendations for future studies are made:

- continue the study of FAs to expand the current information knowledge to ensure improved FAs;
- extend the study to other countries as it is currently limited to SA; and
- extend the study to be more industry-specific (e.g. building, engineering, mining).

The following recommendation is made concerning the use of the FAT and guidance notes developed here:

- The developed FAT and guidance notes should be tested first in the SA construction industry. This will be completed by ASAQS through some of their members for a period.
- The developed FAT and guidance notes should be distributed to the AGSA to provide their input from an audit perspective.

- A final FAT and guidance notes could be published by and distributed by ASAQS to members, following the above-mentioned testing.

7.4 Study's practical contribution

Currently, there is a lack of full understanding what a FA process comprises, which sometimes results in material irregularities. First, this study highlighted the importance of developing a FAT and guidance notes. Second, it added value for all professionals in the SA construction industry in developing a FAT and guidance notes. If the whole construction project team applies the developed FAT and guidance notes to their respective projects FAs without material irregularities should be produced. Including the developed FAT and guidance notes to tertiary institutions' curriculum, the QS profession's overall knowledge of final accounts will be enhanced.

7.5 Research questions

The study aim was to answer the following main question: "Would a developed, integrated and comprehensive FAT (including guidance notes) be an improvement of the current FA templates used in SA?"

This was accomplished by answering the following sub-questions in Chapters 5 and 6:

- What are the currently known FA procedures, format/structures and standards, and which ones are being used within the SA construction industry?
- Which AGSA key material irregularities should be mitigated with improved FAs?
- What could be implemented to ensure improved FAs?
- Will QSs and project teams within SA benefit from a newly developed FAT, including guidance notes?

7.6 Summary

This study addressed a problem that originated in the SA construction industry and raised by ASAQS members – material irregularities were identified in FAs. Thus, the need to enhance the knowledge for preparing FAs and to provide a framework (including guidance to better FAs) became necessary. The proposed FAT and guidance notes to be used as a basis for future projects in developing FAs adds knowledge for the project team to better manage all project finance-related matters more effectively. The proposed FAT and guidance notes may be improved in future. Therefore, the proposed recommendations for future research will expand the knowledge and insight into developing better FAs.

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Appendix A – Informed consent form

Informed consent form (Form for research participant's permission)

1. Project information

Title of research project:

Providing audit assurance in creating final accounts for construction projects in South Africa

Researcher details:

Researcher name:	Lydia C Carroll
Department:	Department of Construction Economics, University of Pretoria
Email address:	Lydia.carroll001@gmail.com

Research study description:

Part of the construction project team's core function is to produce a final account/statement at the completion of a construction project. Different final account formats have been developed with various approaches and processes accommodating different project requirements and conditions of contract. However, more and more audit material irregularities on project final accounts as well as incorrect calculations within the final account/statement makes it essential to develop a standard final account template (FAT) together with guidance notes to assist the project team in creating a fully substantiated final account.

Rationale of the research: Producing a FAT including guidance notes, based on sound assurance principles and well-defined procedures which should reduce unauthorised spend and will ensure transparent high-quality work being produced by the project team.

The research aim of this study is to determine what factors should be considered in compiling a final account for a construction project to avoid excess and unauthorised spend and to develop a FAT including guidance notes that project teams can use within South Africa.

The research objectives of this study are:

- To conduct a literature review in order to determine all factors that needs to be considered when compiling a final account for a construction project

- To collect data on published manuals, guidance notes, final account formats, project assurance factors and standard conditions of contracts influencing the generation of final accounts in South Africa
- To analyse the data collected in order to identify what factors should be considered in compiling a FAT and guidance notes
- To look at current curricula of tertiary institutions
- To create a comprehensive FAT including guidance notes to be used within South Africa
- To add knowledge on final accounts and to assess the knowledge of quantity surveyors on final accounts. Therefore, it is imperative to see the outcome of the interviews with quantity surveyors during this study.

  During the interview no personal information will be required and only closed and open questions pertaining to final accounts will be asked. This should cause no risks for the participant.

2. **Informed consent**

I, _____ hereby voluntarily grant my permission for participation in the project as explained to me by **Lydia C Carroll**.

The nature, objective, possible safety and health implications have been explained to me and I understand them.

I understand my right to choose whether to participate in the project and that the information furnished will be treated confidentially. I am aware that the results of the investigation might be used for the purposes of publication.

I understand that the interview will be recorded for the sole purpose of ensuring correct recordkeeping of the interview and hereby give permission for voice recording thereof.

Upon signature of this form, the participant will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

Discussing the informed consent form will be the first section of the interview. Participant must complete the consent form to confirm their acceptance before the rest of the interview can continue.

Appendix B: Company consent form

Company informed consent form

1. Project information

Title of research project:

Providing audit assurance in creating final accounts for construction projects in South Africa

Researcher details:

Researcher name:	Lydia C Carroll
Department:	Department of Construction Economics, University of Pretoria
Email address:	Lydia.carroll001@gmail.com

Research study description:

Part of the construction project team's core function is to produce a final account/statement at the completion of a construction project. Different final account formats have been developed with various approaches and processes accommodating different project requirements and conditions of contract. However, more and more audit material irregularities on project final accounts as well as incorrect calculations within the final account/statement makes it essential to develop a standard final account template (FAT) together with guidance notes to assist the project team in creating a fully substantiated final account.

Rationale of the research: Producing a FAT including guidance notes, based on sound assurance principles and well-defined procedures which should reduce unauthorised spend and will ensure transparent high-quality work being produced by the project team.

The research aim of this study is to determine what factors should be considered in compiling a final account for a construction project to avoid excess and unauthorised spend and to develop a FAT including guidance notes that project teams can use within South Africa.

The research objectives of this study are:

- To conduct a literature review in order to determine all factors that needs to be considered when compiling a final account for a construction project

- To collect data on published manuals, guidance notes, final account formats, project assurance factors and standard conditions of contracts influencing the generation of final accounts in South Africa
- To analyse the data collected in order to identify what factors should be considered in compiling a FAT and guidance notes
- To look at current curricula of tertiary institutions
- To create a comprehensive FAT including guidance notes to be used within South Africa
- To add knowledge on final accounts and to assess the knowledge of quantity surveyors on final accounts. Therefore, it is imperative to see the outcome of the interviews with quantity surveyors during this study.

  During the interview no personal information will be required and only closed and open questions pertaining to final accounts will be asked. This should cause no risks for the participant.

2. Company consent

We, _____**(company name)** hereby voluntarily grant our permission for the following participants to participate in the project as explained to us by **Lydia C Carroll**:

-
-

The nature, objective, possible safety and health implications have been explained to us and we understand them.

We are aware that the results of the investigation might be used for the purposes of publication.

We understand that the interview will be recorded for the sole purpose of ensuring correct recordkeeping of the interview and hereby give permission for voice recording thereof.

Upon signature of this form, the company will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

Appendix C: Interview guide

Providing audit assurance in creating final accounts for construction projects in South Africa: Analysis of role player's knowledge of existing final accounts and expectations of a final account template and guidance notes

Interview guide including structured and open-ended questions

Section 1: Background information

1. Current level of employment

Partner level	
Director level	
Senior management level	
Mid-management level	
Junior level	

2. What is your current main function or line of business?

Quantity surveyor	
Architect	
Engineer	
Project manager	
Contractor	
Other (specify):	

3. What type of company are you currently working for?

Professional consulting company	
Contracting company	
Financial institution	
Auditing company	
Other (specify):	

Section 2: Level of knowledge of existing final account standards

1. Which of the following final account procedures and standards do you know exist?

RICS: Final account procedures, First edition, December 2015	
Department of Public Works and Infrastructure: Manual for Consultant QS – 14 Final account and example of final account, QS 001, August 2020	

Department of Public Works, provincial administration of Kwazulu-Natal: Format of Final Accounts, Specimen 5	

2. Which of the following final account procedures and standards have you personally used?

RICS: Final account procedures, First edition, December 2015	
Department of Public Works and Infrastructure: Manual for Consultant QS – 14 Final account and example of final account (QS 001, August 2020)	
Department of Public Works, provincial administration of Kwazulu-Natal: Format of Final Accounts, Specimen 5	

3. How would you rate your knowledge of the following final account procedures and standards?

	Very low	Low	Average	High	Very high
	1	**2**	**3**	**4**	**5**
RICS: Final account procedures, First edition, December 2015					
Department of Public Works and Infrastructure: Manual for Consultant Quantity Surveyor – 14 Final Account and example of final account (QS001, August 2020)					
Department of Public Works, provincial administration of Kwazulu-Natal: Format of Final Accounts, Specimen 5					

Section 3: Expectation of final account template and guidance notes

1. Indicate which of the following items should form part of a **final account template**:

	Yes	No	Unsure
Provisional sum adjustments			
Changes in quantities			
Prime cost adjustments			
Daywork allowances			
Variations based on instructions and/or agreed extension of time claims			
Escalation adjustments			
Risk allowance adjustments			
Loss and expenses			
Set-off costs/contra-charges			
All disputes			

Only disputes settled before final account agreement			
Retention releases			
Settled insurance claims			
Project programmes/schedules			
Penalties/delay damages deduction			

Please provide other items not covered in above list that you feel should form part of a final account:

_____

_____

2. Should the following documents form part of the **signed final account**, or should it be kept as **separate supporting information**?

	With FA	**Separate**	**Info not needed for FA**
Approved site and drawing remeasurements			
Approved daily diaries			
Approved daywork schedules			
Approved contract instructions			
Approved variations including all supporting documentation			
Agreed extension of time documentation including agreed updates of the project programme/schedule			
Agreed provisional sum and prime sum calculations			
Agreed escalation calculations			
Agreed final bill of quantities (including non-scheduled rates determination)			
Final account meeting minutes			
Agreed penalties/delay damages calculations			
Insurance claims details			
Monthly cost and schedule reports			
Certificates of completion			
Final certificate			
Formal test result			
Project programmes/schedules			

3. Rate each of the following information that you believe should be included in a **final account guidance notes**:

	Very low	Low	Average	High	Very high
	1	**2**	**3**	**4**	**5**
Definitions and abbreviations					
Purpose of the document					
Who should compile a final account					
A model final account template					
Project flow chart					
Final account project execution plan					
Final account process and reporting					
Time scales for completing a final account					
Final account meetings					
Recordkeeping					
Change control					
Retention					
Disputes					
Insurances					
Defects					
Termination					
Final account compilation					
Final account checklist					

Please provide other items not covered in above list that you feel should form part of a final account guidance notes:

_____

_____

4. Do you believe that a **final account project execution plan**, setting out the procedure for administrating the project to ensure a smoother final account process, should be developed in the beginning of a project? (Choose one option)

I absolutely disagree	
I disagree somewhat	
I agree somewhat	
I absolutely agree	

5. How important do you think **recordkeeping** is during the execution of a project to assist in agreement of the final account? (Choose one option)

Not important	
Somewhat important	
Important	
Extremely important	

6. When in the project lifecycle, in your opinion, does the final account **process** start? (Choose one option)

Before the beginning of construction phase	
In the beginning of construction phase	
Halfway through construction phase	
At the end of the construction phase	

7. Which of the following **assist** in the development and settling of a final account?

	Very low	Low	Average	High	Very high
	1	2	3	4	5
An agreed final account project execution plan					
Recordkeeping of all site-specific documentations, such as daily diaries, daywork schedules, instructions					
Monthly cost and schedule reports					
Monthly remeasurement of quantities					
Variation calculations and supporting information					
Provisional sum adjustment calculations					
Prime cost adjustment calculations					
Extension of time calculations and supporting information					
Set-off/contra-charges calculations					
Monthly escalation calculations					
Non-scheduled rates build-up					
Meeting minutes (monthly, final account, dispute)					
Certificates of completion and final certificate					
Formal test results					
Retention release calculations					
Risk register					
Penalties/delay damages calculations					
Insurance claims details					
Defects list					
Dispute register					

Please provide other items not covered in the above list that you think will assist the development and settling of a final account:

_____

_____

8. Which of the following is essential in ensuring an **auditable final account**?

	Yes	**No**	**Unsure**
Delegation of authority			
Final account project execution plan			
Change control mechanism			
Clear methods for adjusting provisional sums, prime sums, retention release			
Supporting information kept for remeasurements, daily diaries, daywork schedules, instructions, variations, rate build-ups			
All meeting minutes			
All contractual completion/final certificates			
Formal test results			
Clear methods for adjustments of overheads, profit, preliminary and general costs			
Quality management system applied			
Dispute submissions and documentations			
Clear methods for set-off/contra-charges and defect costs			
Clear methods for applying penalties/delay damages			
All project programmes/schedules			
Site photos			
Monthly cost and schedule reports			
Internal final account procedure			

Please provide other items not covered in the above list that you think will assist in ensuring an auditable final account:

_____

_____

9. When should a quantity surveyor remeasure provisional quantities? (Choose one option)

When the ‘preliminary’ drawings are issued	
When the ‘for construction’ drawings are issued	
In the last month of the construction phase	
The moment construction is completed	

10. When should final account meetings be held between parties? (Choose one option)

Regularly during the construction phase	
Monthly during the construction phase	
In the last month of the construction phase	
The moment construction is completed	

Section 4: Possible solution to improve final accounts in South Africa?

1. If a final account template and guidance notes are developed, will you:

Start using it immediately	
Study it intensely and if acceptable start using it	
Not even look at it, current way of producing final accounts is acceptable	
Other (specify):	

2. Do you believe that if a final account template and guidance are developed, it would reduce audit material irregularities on final accounts? (Choose one option)

I absolutely disagree	
I disagree somewhat	
I agree somewhat	
I absolutely agree	

3. If a final account template and guidance notes is developed in your opinion, do you think it should be incorporated in tertiary institutions' curriculums?

Yes	
No	
If no, why:	

Section 5: Non-structured questions

1. Why is it essential to ensure that each interim payment certificate of a project is as accurate as possible?

_____

_____

(Interviewer guide: Talk about termination, non-performance, insolvency/administration)

2. If the final account is not yet agreed, and there is a difference in opinion of the final contract amount, can the undisputed portion of the final account be used to calculate retention release?

3. Follow on of previous question: If the answer is yes, can another payment certificate be raised once the final account is agreed for the difference in retention?

4. Have you been audited on a final account? If so, what was the result, and, in your opinion, how can negative material irregularities be avoided?

Appendix D: Signed memorandum of agreement

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Engineering,
Built Environment and Information Technology

Memorandum of Agreement
for Academic Supervision of Postgraduate Students

Name of student: .Lydia Carroll.....

Student number: ..86393104.....

Degree: .PhD (QS).....

Department: Construction Economics .....

School: Built Environment .....

Faculty: ...Engineering, Built Environmental and Information Technology.....

This document should be read in conjunction with the following University of Pretoria policy documents:

1. Fact Finder, General Rules and Regulations (2019) (see Master's: G.30-G.41 Doctoral: G.42-G.54)
2. Code of ethics for research (33 p)
3. Policy for the Preservation and Retention of Research Data (5 p)
4. Intellectual Property Policy (38 p)
5. Plagiarism Prevention Policy (30 p)
6. Declaration of Originality-Form (1 p) and in doc format

Please note: Clear mediation mechanisms are available to deal with any grievances, personal problems or disagreements that may arise between a postgraduate candidate and the Supervisor. (Refer to the General Regulations and Information of the University of Pretoria pertaining to the **Student Communication Channel**, Section B.15).

Memorandum of Agreement between Postgraduate Student and Supervisor

THE STUDENT ...Lydia Carroll..... (name)

accepts and undertakes the following roles and responsibilities:

1. Abiding by the relevant rules and regulations of the University.
2. Working independently under the guidance of the Supervisor, and ensuring that she or he stays abreast of the latest developments in the field of study.
3. Agreeing with the Supervisor, and abiding by, a time schedule which outlines the expected completion dates of various stages of the research work (See Supervisor section, #4 below).
4. Attending pre-scheduled meetings with the Supervisor, and being adequately prepared for these consultation sessions (See Supervisor section, #5 below).
5. Submitting written work at times agreed upon by the student and the Supervisor.
6. Taking account of the feedback provided by the Supervisor before subsequent submission of written work.

Initial – Student	
Initial – Supervisor	

Page 1

EBIT: Postgraduate Administration office
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa. Eng 1, Level 6, Room 6-8.1
Tel +27 (0)12 420 6735
eng@up.ac.za ; www.up.ac.za

7. Undertaking to submit the dissertation or thesis within the prescribed time for the completion of the degree unless exceptional circumstances arise, and to plan accordingly.
8. Accepting responsibility for the overall coherent structure of the final dissertation or thesis and, as far as possible, submitting written work that is free of spelling mistakes, grammatical errors and incorrect punctuation.
9. Undertaking to submit draft papers for publication, taking into account advice provided by the Supervisor.
10. Informing the Supervisor of any absence or circumstances that may affect the research progress and time line.

THE SUPERVISOR ...Hoffie Cruywagen..... (name)

accepts and undertakes the following roles and responsibilities:

1. Abiding by the relevant rules and regulations of the University.
2. Assisting the student in building knowledge and research skills in the specific area of postgraduate study and relevant to the level of the degree.
3. Ensuring that the proposed research project is feasible, of an appropriate level for the degree under consideration, and that the necessary resources and facilities will be available to enable the student to complete the research timeously.
4. Providing information on the conditions to be met in order to achieve satisfactory progress/performance and assisting with the construction of a written time schedule which outlines the expected completion dates of various stages of the research work.
5. Being accessible to the student by attending meetings in line with a schedule agreed upon in advance by the Supervisor and the student, and being prepared for the meetings.
6. Implementing an arrangement for student supervision in cases where the Supervisor is away from the University e.g. sick leave, sabbatical leave, or leaves the employ of the University, and communicating these arrangements to the student timeously.
7. Accepting submission of written work at intervals agreed on by the student and Supervisor, providing constructive comment and criticism within a time frame jointly agreed on at the start of the research, and informing the student, in writing, of any inadequacy relating to progress or work, in relation to the expectations previously agreed on by the student and Supervisor.
8. Assisting the student with the production of the dissertation or thesis, providing guidance on technical aspects of writing including discipline-specific requirements.
9. Assisting with the publication of research articles as appropriate and agreeing the ownership of research results in accordance with the University's policy on intellectual property.
10. Contributing to the student's academic development by introducing her or him to relevant academic and professional networks through conferences, seminars and other events where possible.

Initial – Student	
Initial – Supervisor	

EBIT: Postgraduate Administration office
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa. Eng 1, Level 6, Room 6-8.1
Tel +27 (0)12 420 6735
epo@up.ac.za : www.up.ac.za

THE STUDENT and THE SUPERVISOR

- confirm that we have read and understood the Memorandum of Agreement, and
- agree to accept its content for the duration of the period of study in respect of the degree as specified on page four.

Details of student			
Surname and initials:	Lydia C Carroll	Student number:	86393104
Department:	Construction Economics	Mobile number:	0836318906
Email address:	lydia@qscc.co.za		
Degree:	Phd (QS)	Focus area:	Final Accounts
Year of commencement:	2022	Anticipated date of completion:	December 2023
Proposed title (Take special care with the grammatical correctness of the title, e.g. the use of capital letters.) Any amendment to this title must be re-submitted to the committee for approval.			
Providing audit assurance in creating final accounts for construction projects in South Africa			
Supervisor:	Hoffie Cruywagen	Co-supervisor:	
Department:	Construction Economics	Department:	
Contact number	0731593314	Contact number	
Email address:	hoffie.cruywagen@up.ac.za	Email address:	

Student's signature: .....

Signed at: Midstream on 23 March 2022 (date)

Supervisor's signature: .....

Signed at: Pretoria on 16 March 2022 (date)

Date forwarded to the Head of Department: .....

HOD's signature: .....

Signed at: ..... on .....(date)

[Student hands in document to Head: EBIT Postgraduate Studies. Student, Supervisor(s) & HOD should keep copy for themselves.)

Initial – Student	
Initial – Supervisor	

EBIT: Postgraduate Administration office
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa. Eng 1, Level 6, Room 6-8.1
Tel +27 (0)12 420 6735
eng@up.ac.za ; www.up.ac.za

Appendix E: PHD research contract with UP

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

86393104

UNIVERSITY OF PRETORIA: STUDENT CONTRACT
BETWEEN
THE UNIVERSITY OF PRETORIA
And
Lydia Christina Carroll, 6704300097087

1.	**Instructions about signing and returning the contract**
1.1	**Who must sign this contract**
	If you are not 18 years old yet, your parent or guardian must sign the contract too as proof that they give their permission for you to enter into this contract with us. If you are married in community of property then your spouse must also sign the contract.
	If you are under the age of 25 years, the University requires a surety. The surety can be a parent, guardian or someone else. If your studies are being funded by a bursary, we still require a suretyship by a person other than the person or entity who gave you the bursary.
	If you are over the age of 18 but under 25 and ticked the *'Financially Independent'* checkbox, no surety is required. BUT you must attach proof of income in your name to the contract (salary advice or bank statement).
1.2	**How to sign this contract**
	You must: • print the contract, • initial each page and sign in full on the last page, • submit the signed contract by hand to the Student Service Centre or • send it by post to / or courier it to Student Service Centre University of Pretoria Private Bag X20 Hatfield 0028 Student Service Centre (Contracts) University of Pretoria c/o Lynnwood Road and Roper Street Hatfield 0083
	Please: • write clearly and inside the blocks, • use capital letters, • use a black pen, • do not use correcting fluid (e.g. tipp-ex).

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness _____

2. About this contract

This contract, your application form and the annual registration form make up the agreement between you and the University of Pretoria ("the University"or "us" or "we").

The provisions of this contract are incorporated by reference into the annual registration form and it must therefore be read with the annual registration form.

It takes effect when you register for the first time at the University, and is renewed annually when you register again.

3. The university's responsibilities to you

3.1 To provide a high quality education

The University will take all reasonable steps to provide a high quality of teaching and learning in the classroom, online, or in communities

We will provide the support you need to graduate on time.

However, we cannot guarantee that:

- you will graduate on time (to a large degree that will depend on the effort you put into your studies);
- the subjects offered as part of your degree or programme will remain the same;
- the way in which your degree is taught (e.g. face to face or online) will stay the same.

3.2 To look after your health and safety

The University must look after your health and safety and the health and safety of all students, staff or other individuals when they are on University-controlled premises.

If a student or staff member behaves in a way that is dangerous to others or to themselves, the University will take all necessary steps to address the situation, including removing the student from the premises or residences, where appropriate.

If the University has reason to believe that you have an infectious or contagious disease, or suffer from any other illness or condition that may pose a risk to yourself or others, the University has the right to:

- require that you undergo a medical test or treatment,
- to limit your movement on University-controlled premises,
- to refuse access altogether to its premises while tests are being conducted and results are made available, and
- depending on the results of the tests, the University may require further medical tests or treatment to prove that you have recovered.

The University may also perform a reasonable search of your personal belongings if the University believes it is necessary to protect the health, safety and security of its students, staff or other individuals when they are on University-controlled premises and the University's property.

3.3 To protect your personal information

The University explains how we collect, use, and protect your personal information in the student privacy notice. Please read this carefully.

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness _____

4. The limits of the university's responsibility

The following terms are very important, because they limit your ability to claim for any harm or damage to you, your property, or the loss of your property while you are:

- on University-controlled property
- participating in or attending any activity relating to your studies;
- participating in sport, cultural or any other official recreational activities;
- using University premises, buildings, equipment, or facilities; or
- staying in or visiting any of our residences or any of our other accommodation.

The University is responsible to ensure that its property, facilities, and equipment are safe and that you are given proper instructions or warnings for their use.

If the University does not meet these requirements, it is responsible for harm or damage caused to you or your property, or the loss of your property as long as your claim falls within section 61 of the Consumer Protection Act 68 of 2008 ("the CPA").

Aside from our responsibilities under the CPA, the University will not be responsible for any harm or damage to you or your property (including damages flowing from claims by your dependents).

The University will not be responsible for any harm or damage caused by you to any other party or property whilst you are a registered student at the University.

The University has limited insurance cover against injuries you might sustain while you engage in activities relating to your studies.

The cover includes activities on campus, in our laboratories, and on field trips.

If you have a claim, you must let the University know immediately.

You must also complete the insurance claim form as soon as possible but not later than 24 hours after the incident.

The University is not liable for any claims that are not covered by this insurance.

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness

5. The student's responsibilities

5.1 You must follow the University's rules

You agree to follow the policies, rules and regulations that apply to you as a student, including the policies, rules and regulations of:

- the University,
- the particular faculty to which you will be admitted,
- any unit, institute, centre or organisation affiliated to the University,
- any activities you take part in during your studies,
- University accommodation

In this contract we will refer to these policies, rules and regulations as "the rules".

The rules are published in the University Yearbook under General Rules and Regulations and the rules of specific Faculties, on the University's website, on other official communication channels (e.g. ClickUP, notice boards, email notifications) or may be communicated to you by University employees when you take part in a particular activity.

The rules may change from time to time. It is your responsibility to make sure that you understand and follow the latest rules that apply to you.

If this contract contradicts the rules, the rules will apply.

Not complying with the rules may lead to disciplinary action including suspension, expulsion and further legal action (e.g. a claim for damages or criminal proceedings, or both).

5.2 You must make sure your fees are paid on time

You must pay your tuition fees, residence fees and any other fees as indicated on your financial statement and/or account on the dates as communicated by the University from time to time.

You are responsible to make sure that the fees are paid on time, even if your fees are paid by someone else (e.g. a parent/guardian, funder or bursar).

A certificate signed by any manager of the University shall be sufficient proof of any applicable rate of interest and of the amount due,owing and payable by you to the University.

If you do not make payment on time:

- all of your outstanding fees will become due and payable immediately;
- you will be charged interest on all payments in arrears calculated as provided for in section 101(1)(d) of the National Credit Act 34 of 2005 at the prime rate charged by the University's bankers expressed as a percentage per annum, as determined on 1 February every year;
- you will be liable to pay any costs relating to debt collection ,including tracing fees, as well as all legal costs on an attorney-and -client scale,or as taxed ,to the University;
- you may be listed as a defaulting debtor at any credit bureau and reported to the National Credit Regulator;
- we may, as part of the debt collection process, request and obtain relevant information from credit bureaus, tracing agents or any other third parties in order to collect the debt, to which you consent.

5.3 Pay for medical treatment

If you are in need of urgent medical treatment and the University arranges for medical assistance, you must pay all costs relating to the treatment even if you could not personally give consent for the treatment.

5.4 Do not damage University property or the property of others

You may not damage the University's property or the property of others that is on the University's premises.

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness

	You will be held responsible for any damage to the University's property or the property of others, that is on the University's premises, that you do cause. This clause is applicable whether you were on the University's premises or not.
5.5	**Get immediate treatment for infectious or contagious disease or any other illness or condition that may pose a risk to yourself or to others**
	If you suspect that you have an infectious or contagious disease or are suffering from any other illness or condition that may pose a risk to yourself or to others, you must get medical assistance immediately, and, where appropriate, you must withdraw yourself from all University activities and accommodation and you must take all reasonable steps to make sure that you do not infect other students or staff.
	If you do not take these steps you may be held responsible for any claims that are instituted against the University and you may also have to pay all legal fees at an attorney-and-client scale.
5.6	**Provide accurate information**
	You must provide accurate and complete information to the University and may not make any misleading or false representations, for instance, during the registration process.
	We have the right to independently verify the information that you give us.
	If you do provide inaccurate, false or incomplete or misleading information, the Universtiy may cancel your registration immediately.
	You must ensure that you update the personal information which the University has about you as soon as it changes.
	You must regularly check the information the University has about you to ensure it is still accurate.
5.7	**Assign your intellectual property to the University**
	By signing this contract, you assign to the University all intellectual property rights in any work you create, entirely or in part, during your studies or by using University equipment or resources.
	This includes assignments, theses, dissertations, assessment scripts, personal class notes, summaries, posters, presentations, transcripts, recordings, software, hardware, data or databases or any other work created, adapted or amended by you.
	You are not entitled to distribute any recordings of lectures or of the notes made during lectures without the University's written permission.
	The intellectual property in these works belongs to the University and you may not share or allow others to copy or distribute these works or infringe the intellectual property rights of the University.
	These clauses will apply, unless the University has agreed otherwise in writing, that the intellectual property rights may be shared or transferred.
	You must avoid infringing on the intellectual property rights of others, including third parties, and are responsible for obtaining permission to use, share or copy the work where necessary. You must take care to avoid committing plagiarism and must acknowledge the work or ideas of others.
	This applies to all material made available to you for the purpose of studying such as textbooks, podcasts, illustrations, class notes, online course material, presentations and/or any other teaching and learning aids.

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness _____

6. Early termination of this contract

If you terminate your studies, accommodation, or both for any reason:

- before the start of the academic year, you will be liable for an administrative fee;
- during the academic year, you will be liable for a reasonable cancellation penalty.

7. Responsibilities of parents/guardians

If the student is not 18 years old yet, a parent or guardian must sign the contract too as proof that they give their permission for the student to enter into this contract with the University.

By signing this contract, the parent or guardian consents to the agreement between the University and the student.

8. Responsibilities of the surety

If the student is under the age of 25 years, the University requires a surety.

The surety can be a parent or guardian.

If the student is being funded by a bursary, we still require a surety by a person other than the person who gave you the bursary.

By signing this agreement you become a surety and co-principal debtor for all the debts of the student.

This means that the University can hold you accountable for any debt the student owes to it, whether or not the student incurred the debt with your consent.

The University can claim the entire amount including interest, debt collection costs, tracing fees and legal costs that is owed by the student from you without claiming against the student first (in legal terms, you are jointly and severally liable as surety and co-principal debtor).

9. Whole Agreement

The contract comprises the entire agreement between the University and the student and any amendment thereof shall only be valid if it is in writing and signed by both the University and the student.

10. Indulgence

No indulgence, latitude or extension of time which may be allowed by the University to the student shall be regarded to be a waiver of the rights of the University or a novation of the student's liability.

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness

11.	**Signatures**
11.1	**The student**
	Name: Lydia Christina Carroll
	ID/Passport number: 6704300097087
	Email address:
	Cell number:
	Address for legal notices in terms of this agreement (domicilium citandi et executandi): The physical address provided in your application form or latest registration form will be used if we want to send any legal notice to you.
	Signature:
	Date:
	Place: Signature of Witness:
11.2	**The student's spouse (if married in community of property)**
	Name:
	ID/Passport number:
	Email address:
	Address for legal notices in terms of this agreement (*domicilium citandi et executandi*):
	Signature:
	Date:
	Place:
11.3	**Parent or guardian (only if you are under 18)**
	Name:
	ID/Passport number:
	Email address:
	Address for legal notices in terms of this agreement (domicilium citandi et executandi):
	Signature:
	Date:
	Place: Signature of Witness:
11.4	**Your surety (only if you are under 25 and not financially independent)**

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness

	Is the surety your parent or guardian?	**Yes**		**No**	
	Name:				
	ID/Passport number:				
	Email address:				
	Address for legal notices in terms of this agreement (*domicilium citandi et executandi*):				
	Signature:				
	Date:				
	Place: Signature of Witness:				
11.5	**Your surety's spouse (if married in community of property)**				
	Name:				
	ID/Passport number:				
	Email address:				
	Address for legal notices in terms of this agreement (*domicilium citandi et executandi*):				
	Signature:				
	Date:				
	Place:				

ALL PARTIES (AND WITNESSES) THAT HAVE SIGNED THIS CONTRACT MUST INITIAL HERE

Student _____

Spouse of student (if married in community of property)_____

Witness

Appendix F: PHD student registration

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Student no: 86393104
Enquiries: Student Service Centre
Email: ssc@up.ac.za

2022-02-08

Mrs LC Carroll
43 Brite Lite Crescent
Midstream Estate
1692

Dear Mrs Carroll

APPLICATION FOR ADMISSION: 2022
Programme: PhD
Plan: Quantity Surveying

I am pleased to advise you that you have been admitted to the abovementioned programme unconditionally.

Please note the following:

1. Please visit your Student Centre on the UP Portal the UP Portal as soon as possible at www.up.ac.za/portalstudent
   - to accept or reject this admission offer;
   - to conclude the contract between the student and the University of Pretoria; [Students are requested to complete the contract online, and then to print and sign the contract. As soon as possible thereafter the completed and signed contract must be sent per courier to Student Service Centre, c/o Lynnwood and Roper Streets, Hatfield, 0083 or sent by post to Student Service Centre, University of Pretoria, Private Bag X20, Hatfield, 0028.
   - to pay your registration fee before the closing date for registration;
     [For enquiries: Send an email to ssc@up.ac.za. For information on fees, visit: https://www.up.ac.za/student-fees. For information on funding, visit: https://www.up.ac.za/student-funding.] and
   - to register online.
     Should the online registration be closed, please contact EBIT: Postgraduate Administration office at enq@up.ac.za to assist you to register for your degree.

2. All students who are not South African citizens must contact the International Cooperation Division prior to registration to ensure that they comply with all the necessary requirements. [Enquiries: isd@up.ac.za]

3. After registration, please contact your Supervisor to discuss, complete, sign and submit the Memorandum of Agreement (MoA) online.

4. On signing the MoA the Head of the Department will give you a letter to be able to apply for Ethics clearance (https://www.up.ac.za/en/faculty-of-engineering-built-environment-it/article/15815/faculty-committee-for-research-ethics-integrity)

5. You must renew your registration at the beginning of each academic year until you comply with all the requirements for the degree. Should you fail to renew your registration at the beginning of a particular year, your registration for that year will not be accepted and, consequently, you will not be

University of Pretoria
Private Bag X20
Hatfield
0028

Tel: +27 (0)12 420 3111
Email: ssc@up.ac.za

www.up.ac.za/student-fees

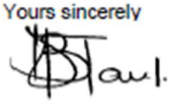
entitled to class attendance or to guidance by your lecturers/supervisor.

6. If you have obtained a degree at another university, you are required to submit original documents as proof of the qualification(s) when you register. Unfortunately, certified copies are not acceptable for this purpose.

Important: Please quote your student number and proposed programme in all correspondence and enquiries.

We wish you all the best in the preparation and submission of your research proposal.

Yours sincerely



for **DEAN**
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND IT
EP2

Appendix G: Ethical clearance approval

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo

3 March 2023

Reference number: EBIT/281/2022

Mrs LC Carroll
Department: Construction Economics
University of Pretoria
Pretoria
0083

Dear Mrs LC Carroll,

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Conditional approval is granted.

This means that the research project entitled "Providing audit assurance in creating final accounts for construction projects in South Africa" is approved under the strict conditions indicated below. If these conditions are not met, approval is withdrawn automatically.

Conditions for approval:

Contacts of the participants are to be sourced with compliance to POPIA. Interview question on Age is to be excluded (unless a strong motivation linking to theory and research objective is provided). No data is to be collected without first obtaining permission letter(s). The permission letter(s) from the organisation(s) must be signed by an authorized person and the name of the organisation(s) cannot be disclosed without consent.

This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Ethics Committee.

If action is taken beyond the approved application, approval is withdrawn automatically.

According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.

The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof K.-Y. Chan
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

Appendix H: Proof reading certificate

Strikethrough
PROFESSIONAL ACADEMIC EDITING SERVICES

Louise Keuler
Academic Editor

M: 072 263 6805
E: louisejean.greyling@gmail.com

Proof of Edit

UP|2024|01

To whom it may concern,

2024/02/15

Declaration

With this I certify that I, Louise Jean Keuler, was paid as freelance academic editor to proofread Lydia Carroll's doctorate degree treatise (Framework to develop credible final accounts system for South African construction projects) for submission to the Department of Construction Economics, Faculty of Engineering, Built Environment and Information Technology, University of Pretoria (UP). It should be noted that as Ms Carroll's proofreader, I did not contribute to the content or research of the treatise. The work is entirely her own and my contribution to it was merely for the sake of clarity and readability.

Services rendered

Proofreading

- Worked on the edited text in final layout.
- Checked and corrected essential errors in spelling, grammar and punctuation.
- Made minor changes or suggestions for sense.
- Ensured that all page elements were consistent and correctly placed and style requirements were applied.
- Checked that figures and tables were consecutively numbered and referenced.
- Excluded in-text citations and reference formatting.

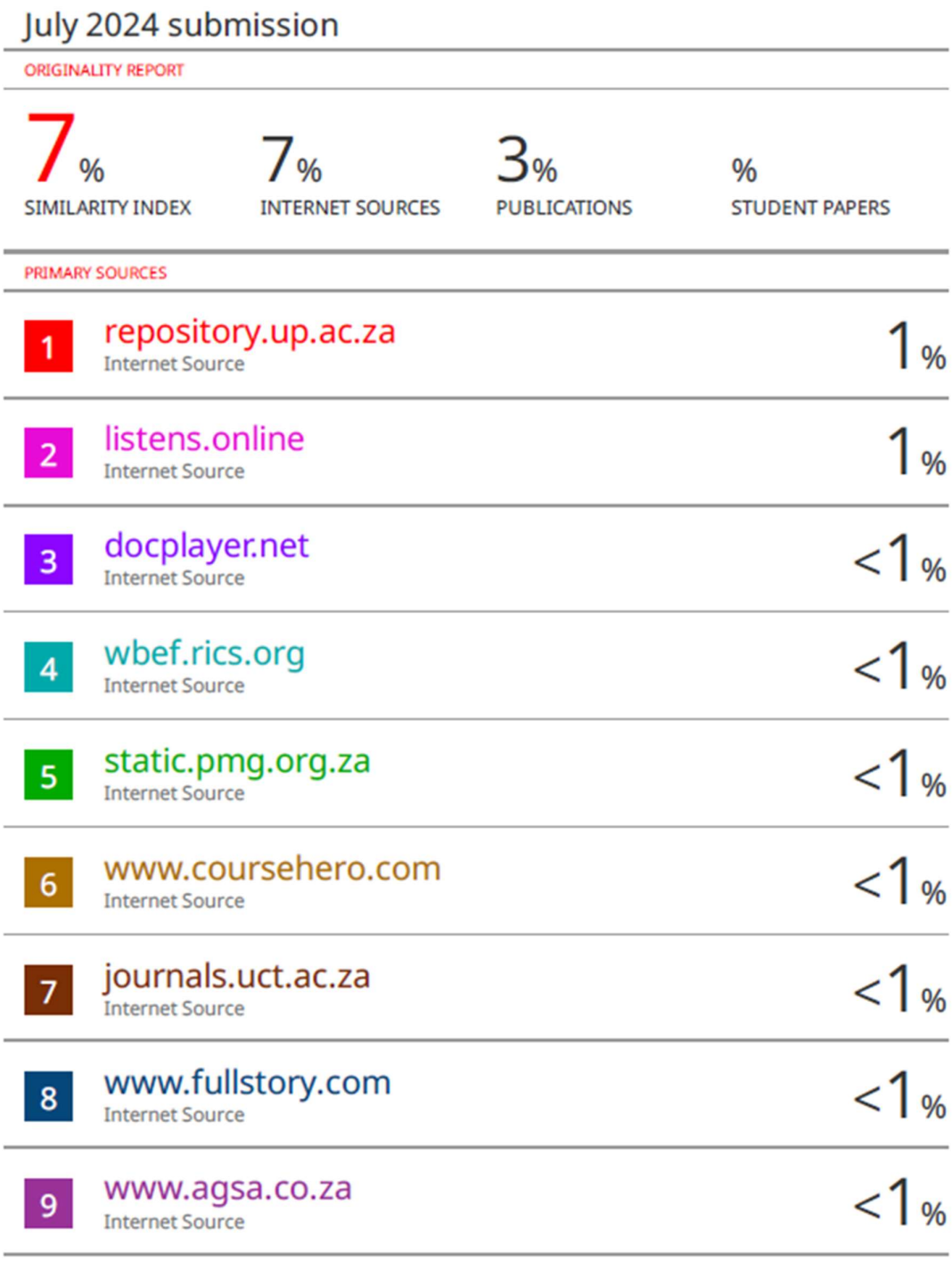
Description	Proofreading of doctorate degree treatise
Charged To	L Carroll
Received By	LJ Keuler

Sincerely,

LKeuler

Louise Keuler
Strikethrough | Owner

Appendix I: Turnitin certificate



July 2024 submission

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