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DCOM Manual

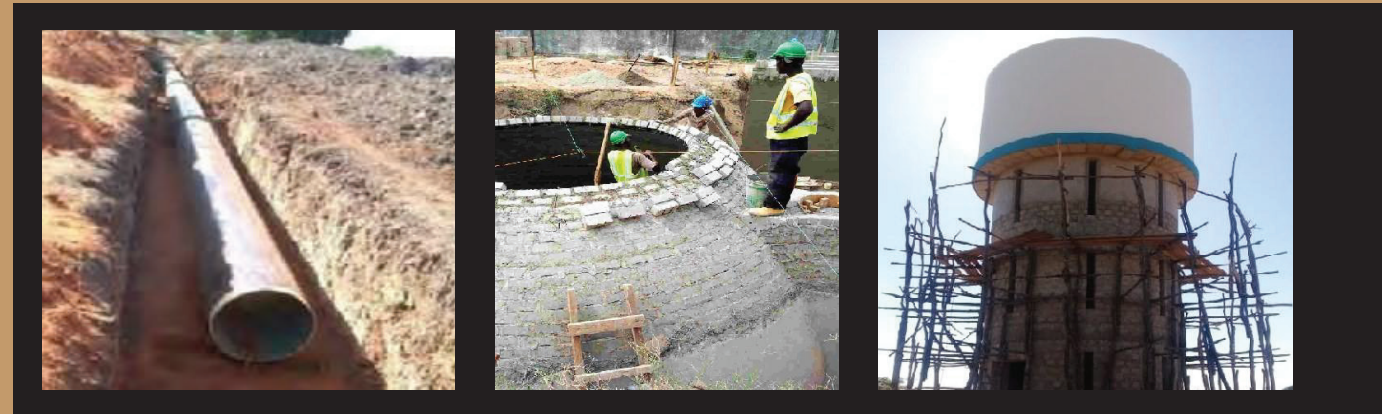
Volume III

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF WATER



| DESIGN |
| CONSTRUCTION SUPERVISION |
| OPERATION & MAINTENANCE |
(DCOM) MANUAL

VOLUME III
CONSTRUCTION SUPERVISION OF WATER
SUPPLY AND SANITATION PROJECTS



MAY 2020

4TH EDITION

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF WATER



**DESIGN, CONSTRUCTION SUPERVISION,
OPERATION AND MAINTENANCE (DCOM)
MANUAL FOURTH EDITION**

VOLUME III

**CONSTRUCTION SUPERVISION OF WATER
SUPPLY AND SANITATION PROJECTS**

**Edited by Ninatubu Lema,
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**PROJECT PREPARATION, COORDINATION AND
DELIVERY UNIT (PCDU)**

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PREFACE

The Government of the United Republic of Tanzania, through the Ministry of Water, oversees the implementation of the Water Supply and Sanitation projects in the country. The Ministry of Water has published several editions of the relevant Design Manuals. The First Edition was the Water Supply and Wastewater Disposal Manual of 1985/86. The Second Edition was titled “Design Manual for Water Supply and Wastewater Disposal of 1997”. The Third Edition was titled “Design Manual for Water Supply and Wastewater Disposal of 2009”. These manuals guided the Ministry and the general public in the planning and design of water supply and sanitation projects in the country.

As it is now well over ten years since the Third Edition of the Design manual was adopted, and since many scientific and technological changes have taken place, including the conclusion of MDGs and adoption of the SDGs in 2015 as well as useful lessons learnt out of implementation of the WSDP I and WSDP II (which is still on-going), it has become necessary to revise the 2009 design manual. Notably, the 3rd Edition Design Manual has, among other things, limited coverage on the impact of climate change, application software and sanitation management issues.

The Ministry is now at various stages of instituting policy and legal reforms that are deemed necessary for futuristic improvement in the design, construction supervision, operation and maintenance of water supply and sanitation projects in Tanzania. Therefore, the 4th Edition of the Design, Construction Supervision, Operation and Maintenance (DCOM) Manual will make invaluable contribution in this regard. It is important to recall that the Government has established the Rural Water Supply and Sanitation Agency (RUWASA), which is responsible for the supervision, execution and management of rural water supply and sanitation projects. RUWASA is expected to improve the existing responsibility and accountability in the management of water and sanitation services in rural areas. The 4th Edition DCOM Manual will support the sector development and implementation institutions (including RUWASA, Water Supply and Sanitation Authorities, development partners, and civil society organisations), and will provide valuable information relating to implementation of water supply and sanitation projects in their various stages, from pre-feasibility and feasibility studies, to planning, designing, construction supervision and operation and maintenance.

It is expected that the 4th Edition of the DCOM Manual will position the Ministry well to systematically and comprehensively implement the design, construction

supervision, operation and maintenance of water supply and sanitation projects in order to ensure the sustainability of water supply and sanitation projects in the country. This is also expected to contribute in realising the water sector's contribution towards achieving the Tanzania Development Vision 2025, as well as the various national and international commitments and milestones in the water sector as also specified in the Agenda 2063 in the "Africa that we want" and the Sustainable Development Goals (SDGs) on water and sanitation (SDG No. 6).

The preparation of this Water Supply and Sanitation Projects DCOM Manual required contributions in form of both human and financial resources. The Ministry of Water, therefore, takes this opportunity to thank the members of the Special Committee for Reviewing and Updating the 3rd Edition of the Design Manual for Water Supply and Wastewater Disposal of 2009, specifically for their efforts in preparation of this comprehensive 4th Edition of the DCOM Manual. Thanks are also due to the World Bank for financing the major part of the activities, and to all others who contributed in the preparation of this new DCOM Manual.

In the future, the Ministry plans to periodically review and update the DCOM Manual in order to keep in pace and address emerging changes in policy and societal needs, emerging technologies, and sustainability concerns in the implementation of water supply and sanitation projects in the country.

Prof. Makame Mbarawa (MP)

Minister

Ministry of Water

May, 2020

ACKNOWLEDGEMENTS

Changes of policy and technology have necessitated the preparation of this new edition of the DCOM Manual for the design, construction supervision, operation and maintenance of water supply and sanitation projects in Tanzania. The 4th Edition of the DCOM Manual is expected to guide engineers and technicians in their design work, construction supervision as well as in operation and maintenance of relevant projects. The manual is to be adopted for all water supply and sanitation projects in the country.

The 4th Edition of the DCOM Manual has been developed using the following approaches:

- Review of the 3rd Edition, including benchmarking with design manuals from other countries,
- Website reviews and review of other manuals prepared by consultants who have had working experience in Tanzania,
- Review of Literature data collection and design methods review,
- Data collection from stakeholders, namely: Primary stakeholders-MoW technical and management staff; Private companies that deal with implementation of water supply and sanitation projects; Beneficiaries of water supply and sanitation projects,
- Collection and digitization of existing standard drawings after conversion into metric units as felt necessary,
- Review of the 4th Edition drafts by various stakeholders including MoW staff and other stakeholders outside the MoW,
- Revision of the 4th Edition by incorporating comments and views from all the stakeholders,
- Preparation and submission of the 4th Edition of the DCOM Manual.

The review and updating of the 3rd Edition of the DCOM Manual is considered to be a continuous process involving regular updating to incorporate changes in policy and societal needs, emerging issues, technologies or methods. The MoW welcomes comments on this new edition of the DCOM Manual from users in order to facilitate further improvement of future editions.

The new features in the 4th Edition of the DCOM Manual include mainstreaming of climate change impacts and use of various types of software in the design of water supply and sanitation projects. These features have facilitated the faster and more accurate analysis of pertinent data. The DCOM manual has also

encouraged the use of Supervisory Control and Data Acquisition Systems (SCADA) for large urban and generally national projects where local capacity building can be guaranteed by the providers. It should be borne in mind that relevant software allows a wide variety of scenarios to be considered. However, it should also be noted that, despite the critical role of software/models in guiding decision-making, its limits should be realised so as to avoid its becoming a substitute for critical practical evaluation.

I wish to thank the different stakeholders for their active participation and support in contributing towards the various inputs during the course of preparation of this DCOM Manual. They include those from within and outside the Ministry of Water as well as Development Partners, NGOs, Consultants, Suppliers and Contractors as well as other Ministries. The review team of engineers and technicians from MoW, RUWASA, WSSA who worked with the Special Committee for three days in March 2020 are hereby gratefully acknowledged.













Finally, I take this opportunity to thank the members of the Special Committee on Reviewing and Updating the 3rd Design Manual of 2009 under the Chairmanship of Eng. Prof. Tolly S. A. Mbwette for diligently undertaking this assignment.



Prof. Kitila Mkumbo
Permanent Secretary
Ministry of Water

May, 2020

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Dodoma May, 2020



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LIST OF ABBREVIATIONS

AO	Accounting Officer
ATAWAS	Association of Tanzania Water Suppliers
BOQ	Bills of Quantities
BRELA	Business Registrations and Licensing Agency
CBWSO	Community Based Water Supply Organisations
CMP	Contract Management Plan
COWSOs	Community Owned Water Supply Organizations
CRB	Contractors Registration Board
CV	Curriculum Vitae
DCOM	Design, Construction Supervision, Operation and Maintenance
DCS	Documents Control System
EC	Evaluation Committee
ERB	Engineers' Registration Board
EWURA	Energy and Water Utilities Regulating Authority
FPC	Final Payment Certificate
GCC	General Conditions of Contract
GPSA	Government Procurement Service Agency
IPC	Interim Payment Certificate
IWA	International Water Association
LGA	Local Government Authorities
NAWAPO	National Water Policy
NMAIST	Nelson Mandela African Institution of Science and Technology
NWSDS	National Water Sector Development Strategy
PM	Project Manager
PMU	Procurement Management Unit
PPA 2011	Public Procurement 2011 as amended in 2016
PPR 2013	Public Procurement Regulations 2013 as amended in 2016
QAP	Quality Assurance Plan
RUWASA	Rural Water Supply and Sanitation Agency
SADC	Southern Africa Development Community

LIST OF ABBREVIATIONS

SCC	Special Conditions of a Contract
SDGs	Sustainable Development Goals
TAWASANET	Tanzania Water Supply and Sanitation Network
TB	Tender Board
UD	User Department
UDSM	University of Dar es Salaam
UNESCO	United Nations Educational, Scientific and Cultural Organisation
URT	United Republic of Tanzania
UWSSA	Urban Water Supply and Sanitation Authority
VO	Variation Order
WMO	World Meteorological Organization
WSDP	Water Sector Development Programme

The preparation of this DCOM manual was preceded by an overview of five important global considerations of Water Supply and Sanitation prior to reviewing the water and sanitation sector in Tanzania. This was followed by an explanation of the rationale for the preparation of the 4th Edition. The introductory chapter is concluded by presenting the organization of the manual as well as the purpose and content of this volume of the DCOM manual.

1.1 GLOBAL CONSIDERATIONS ON WATER SUPPLY AND SANITATION

1.1.1 Sustainable Development Goals (SDGs)

In 2015, world leaders convened at the United Nations Headquarters in New York and adopted the 2030 Agenda for Sustainable Development. Governments responded to the common development challenges then faced and to the changing world around them by uniting behind a truly forward-looking, yet urgent plan to end poverty and create shared prosperity on a healthy and peaceful planet. The central principle of Agenda 2030 is leaving no one behind in achieving the 17 SDGs through 169 targets.

The 2030 Agenda for Sustainable Development adopted at the UN Summit includes SDG 6 on *Water and Sanitation* and in December 2016, the United Nations General Assembly unanimously adopted the resolution “International Decade for Action-Water for Sustainable Development” (2018–2028) in support of the achievement of SDG 6 on water and sanitation and the related targets (<https://sustainabledevelopment.un.org/>). It should also be noted that, water and sanitation are at the heart of the Paris Agreement on climate change 2015 (<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>).

Ensuring availability and sustainable management of water and sanitation for all has therefore been, for a long while, an important topic at the United Nations and is now turning this vision into a reality, through national leadership and global partnerships. Water and sanitation are at the core of sustainable development and the range of services they provide, underpin poverty reduction, economic growth and environmental sustainability. The world needs to transform the way

it manages water resources and the way it delivers water and sanitation services to billions of people (<https://sustainabledevelopment.un.org/sdg6>).

The designers and engineers, therefore, have the responsibility to support the Government of Tanzania in achieving the SDG 6, where population growth and rapid urbanisation have intensified demand for water and sanitation services beyond all past thresholds.

1.1.2 Climate Change and Resilience to Climate Change

Climate change is now recognized as one of the defining challenges for the 21st century. More frequent, intense and extreme weather events continue to result in higher incidences of floods and droughts around the planet. The ensuing adverse impacts of climate change on water and sanitation services constitute a serious threat to human health and overall development of nations. Ensuring optimal resilience of water and sanitation services in a globally changing climate context will continue to be crucial for maintaining the momentum of making progress in health and general socio-economic development. Climate variability is already a threat to the sustainability of water supplies and sanitation infrastructure.

Flood occurrences continue to cause shocks for affected populations and to challenge water and sanitation managers. In many places floods are likely to become more frequent with intensification of climate change, thus:

- Floods can have catastrophic consequences for basic water and sanitation infrastructure. Such damages can take years to repair.
- On a smaller scale, drinking-water infrastructure can be flooded and put out of commission for days, weeks or months.
- Where flooding of sanitation facilities occurs, there may not only be a break in services, but the resultant flooding may distribute human excreta and its attendant health risks across entire neighbourhoods and communities.

Droughts occur unpredictably worldwide. In many places they are likely to become more frequent and more widespread with climate change. For example: Falling groundwater tables and reduced surface water flows can lead to wells drying up, extending distances that must be travelled to collect water, and increasing water source pollution. In response, drilling rigs, which would otherwise be used to increase access, may be redeployed to renew or replace out-of-service wells, slowing the actual progress in extending access.

Since climate change is likely to affect water sources and infrastructure in Tanzania, it must therefore be taken into consideration (i.e. ensure enhanced adaptation capacity) in design, operation and maintenance of water and sanitation infrastructure or projects. Globally, climate change studies are coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) and the Inter-Governmental Panel on Climate Change (IPCC). Accordingly, designers should use the latest information, data and model predictions available and include statements on what measures, if any, have been allowed for in order

to cope up with (or adapt to) climate change within the time frame of pertinent project design (i.e. design period).

1.1.3 Public Private Partnership in Water Supply and Sanitation Projects in Developing Countries

One of the key challenges faced by water authorities in Developing Countries (DC) is how best to manage service delivery obligations to rural communities. Even in decentralized sectors, water authorities may find it hard to provide services to remote rural communities. It is recognized that water user associations and/or local private operators may be best placed to provide services as they are close to the users. The majority of the agreements are currently in place in the short term (1 to 3 years) management or operation and maintenance contracts for existing systems that involve minimal investment from the private sector. One key issue that arises repeatedly though is how to effectively regulate and monitor performance of activities under these contracts.

Globally, activities undertaken in 2005 suggest that private participation in the water sector is entering a new phase. New private firm involvement is continuously focusing on smaller projects and bulk facilities. Contractual arrangements involving utilities are combining private operations with public financing and new players are entering the market.

In an infrastructure-intensive sector, improving access and service quality to meet the SDGs cannot be done without massive investment. Around the developing world, the water sector is chronically under-funded and inefficient in addition to giving low priority to sanitation. In this context, Public-Private Partnerships (PPPs) can be a mechanism (among others) to help Governments in funding the much needed investment and deploying technologies and efficiency that can improve the performance and financial sustainability of the water and sanitation sector.

Governments are currently using private firms in the water and sanitation sector increasingly to finance and operate bulk water supply and wastewater treatment. New technologies and innovations such as desalination and wastewater re-use are currently being increasingly introduced, where traditional water sources have become scarce. Utilities are drawing on specific expertise, such as Non-Revenue Water (NRW) reduction and pressure management, to promote efficiency and improvement of services. Private investors and providers are increasingly becoming local and regional, and so raising competition and pushing down charges.

Most utilities are increasingly turning to the private sector for turnkey solutions to the designing, building and operating water and wastewater treatment plants, and in some cases they also provide financing. With new technologies such as membrane filtration and in wastewater treatment; utilities have faced challenges in finding the capacity to operate and maintain these facilities and in selecting the most appropriate technology.

Where a utility has the funds or is seeking financing to develop water or wastewater treatment plants but wishes to draw on the private sector to Design, Build and Operate (DBO) a facility, then the DBO approach is used. The International Financial Institutions (IFIs) are being asked to finance such approaches. In response, the WB has recently developed a suite of documents for DBO deployment in water supply and sanitation projects, including an initial selection document; a Request for Proposal (RFP) with DBO document based on The International Federation of Consulting Engineers (FIDIC), an acronym for its French name *Fédération Internationale Des Ingénieurs-Conseils*) Gold Book and a guidance note with guidance on when the DBO approach is appropriate and how to approach such projects; draft framework for Employer Requirements and draft Terms of Reference for Consultancy support to carry out the requisite studies and develop the documents (<https://ppp.worldbank.org/public-private-partnership/sector/water-sanitation>).

1.1.4 International Water Law

The URT is riparian to the following trans-boundary International River Basins: Congo River Basin, Kagera River Basin, Nile River Basin and Zambezi River Basin. These water sources are managed using international law on trans-boundary resources.

International law is a culture of communication that “constitutes a method of communicating claims, counter-claims, expectations and anticipations, as well as providing a framework for assisting and prioritizing such demands” (Shaw, 2008). International water law is the law of non-navigational uses of international watercourses (<https://www.siwi.org/icwc-course-international-water-law/>).

In international water law, there are two substantive principles that ought to be taken into consideration when sharing international waters:

- The principle of *equitable utilization* which is a more subtle version of the doctrine of absolute sovereign territory. It argues that a (nation) state has absolute rights to all water flowing through its territory.
- The principle of *no significant harm* is the delicate version of the doctrine of both absolute riparian integrity (every riparian state is entitled to the natural flow of a river system crossing its borders) and historic rights (where every riparian state is entitled to water that is tied to a prior or existing use) (Wolf, 1999).

There are two relevant international water conventions for trans-boundary water cooperation. The 1997 Convention on the Law of the Non-navigational Uses of International Watercourses (i.e. UN Watercourses Convention, 1997), and the 1992 UNECE Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes (i.e. UNECE Water Convention, 1992) which recently broadened its membership beyond the EU to a global audience. In March 2016, Water Convention became a global multilateral legal and Inter-Governmental framework for trans-boundary water cooperation that is open to

accession by all UN member states. The soft law of the SDGs provides further impetus to the management of trans-boundary water resources directly through Goal 6.5: *“Implement integrated water resources management at all levels, and through trans-boundary cooperation as appropriate”*, and indirectly through Goal 16: *“Promote peaceful and inclusive societies for sustainable development”*. In this case, the contribution of designers and engineers is in the provision of tools and information or data to support the needed decision making.

The management of water resources that entails extraction of shared international water resources in the form of rivers, lakes, seas and oceans as sources are guided by International Conventions and/or Protocols that have to be subsequently ratified by respective national Parliaments before they become enforceable. Because Tanzania is a member of the EAC, SADC and the African Union, it has ratified a number of the conventions and/or protocols that are associated with water resources management and water supply and sanitation services. At an African level, Tanzania fully subscribes to the *Agenda 2063* that ensures African development is guided by African experts to attain the aspirations of *“The Africa that we want”* with respect to water supply and sanitation services. Furthermore, as a member of the United Nations, Tanzania’s water supply and sanitation services are guided by the UN SDGs of 2015 as well as the UNFCCC (2015) as mentioned earlier on.

1.2 DEVELOPMENT AGENDA AND WATER AND SANITATION SECTOR IN TANZANIA

The Tanzania Development Agenda includes the Tanzania Development Vision (TDV) 2025 (<https://www.mof.go.tz/mofdocs/overarch/vision2025.htm>). The realization of TVD is through Five Year Development Plans. Currently, the GoT is implementing the Second Five Year Development Plan (FYDP II), 2016/17–2020/21 (https://mof.go.tz/mofdocs/msemaji/Five%202016_17_2020_21.pdf) (URT, 2016). The Government adopted the TDV in the mid-1986s for socio-economic reforms and has continued to implement it to date. Better and improved water and sanitation services contribute to one of the attributes of Vision 2025 which is on high quality livelihood. Thus, the review and update of this manual will better shape the future in which water and sanitation services will be delivered to enhance the health of normal citizens who are a very important national labour force.

The FYDP II has integrated development frameworks of the first Five Year Development Plan (FYDP I, 2011/2012-2015/2016) and the National Strategy for Growth and Reduction of Poverty (NSGRP/*MKUKUTA II*, 2010/2011-2014/2015), further extended to 2015/2016-2019/2020. The FYDP II is built on three pillars of transformation, namely industrialization, human development, and implementation effectiveness, and is aligned well to its SDGs. Importantly, industrialization will place a huge demand on utility supplies e.g. energy and water, so subscribing on addressing the SDG Goals 6: on water and sanitation.

Chapter 4 of FYDP II, sub-chapter 4.3.4 on Water Supply and Sanitation Services sets key targets by 2020 as follows; Access to safe water in rural areas, 85%; regional centres and Dar es Salaam, 95%. Proportion of rural households with improved sanitation facilities, 75%; regional centres, 50% and Dar es Salaam, 40%. Non-revenue water (NRW) for regional centres, 25%; for Dar es Salaam, 30%. The Key targets by 2025 include: Access to safe water in rural areas, 90%; regional centres and Dar es Salaam, 100%. Proportion of rural households with improved sanitation facilities, 85%; regional centres, 70% and Dar es Salaam, 60%. Non-revenue water (NRW) for regional centres, 20%; for Dar es Salaam, 25%. One of the tools for achieving the key targets of water supply and sanitation is effective application of the DCOM manual.

The Government has a comprehensive framework for sustainable development and management of water resources where there is an effective policy, legal and institutional framework. The water sector policy and strategy contains operational targets to be achieved in terms of coverage and timescale for improving water resources management, water supply and sanitation. The targets are reflected in the National Water Sector Development Strategy (NWSDS) of 2006. Based on the targets of the ruling party manifesto in relation to water coverage for rural areas and urban areas are 85% and 95% by 2025, respectively which are also articulated in the WSDP.

In the context of water supply and sanitation services in Tanzania Mainland, the Water Supply and Sanitation Authorities (WSSAs), in collaboration with Rural Water Supply and Sanitation Agency (RUWASA), are responsible for management of water supply and sanitation services mostly in the urban, towns and rural areas as well as in areas that used to be managed by National Water Utilities. The water sector status report of 2017/18 has set water coverage targets of 95% for Dar es Salaam, 90% for other WSSAs and rural areas, 85%.

The Community Based Water Supply Organisations (CBWSOs) are the basic units responsible for management of water supply and sanitation services in rural areas under the overall coordination of RUWASA. The WSSAs are regulated by the Energy and Water Utilities Regulating Authority (EWURA), while CBWSOs are regulated by the RUWASA under the Ministry of Water that is in turn responsible for rural water supply and sanitation services in Tanzania. As part of the on-going reforms in the MoW, a number of small WSSAs have been clustered with urban WSSAs leading to reduction of WSSAs from 130 to 71. RUWASA has been charged with the task of supervising the operations of 50 small town WSSAs in addition to the CBWSO managed projects.

The regulatory role of WSSAs is provided by the Energy and Water Utilities Regulatory Authority (EWURA) and to some extent by RUWASA. With regard sanitation, the water sector status report 2017/18 has estimated an average coverage of sewerage systems to be 30% (2018) in urban areas. On sanitation achievements, the same report indicates that by 2018, safely managed sanitation was available to only 21.2% of the population compared to the target of 25%.

When this is compared to the SDG target of 100% by 2030, it can be seen that Tanzania is lagging behind by far.

1.2.1 National Water Policy

The National Water Policy (NAWAPO) of 2002 guides the management of the water sector in Tanzania with major emphasis being on the active participation of communities, the private sector and the local governments in protecting and conserving water sources, supplying water and management of water and sanitation infrastructure. Currently, the review of the NAWAPO is at fairly advanced stages.

The main objective of the National Water Policy of 2002 was to develop a comprehensive framework for sustainable development and management of the Nation's water resources, in which an effective legal and institutional framework for its implementation was put in place. The policy aimed at ensuring that water beneficiaries participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes. This policy sought to address cross-sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. Also, the policy laid a foundation for sustainable development and management of water resources in the changing roles of the Government from service provider to that of coordination, policy and guidelines formulation, and regulation. Other objectives of the water policy included: increasing the productivity and health of the population through the assurance of improved water supply and sanitation services to the water users and to identify and preserve water sources.

1.2.2 Legal and Institutional Framework for Water Supply and Sanitation Services

Basically, the water and sanitation sector is governed by two main broad legal frameworks namely:

- I. Water Resource Management Act No.11 of 2009
- II. Water Supply and Sanitation Act No. 5 of 2019.

In the institutional framework, there are several organs under the Ministry of Water, which coordinate water supply and sanitation delivery service: the Directorate of Program Preparation, Coordination and Delivery Unit (PCDU), Directorate of Water Resources Management, Basin Water Boards (BWBs), Directorate of Water Supply and Sanitation, Directorate of Water Quality Services, Rural Water Supply and Sanitation Agency (RUWASA) and Water Supply and Sanitation Authorities (WSSAs). Special attention is hereby paid to RUWASA as, in collaboration with respective regional or district authorities is responsible for planning and managing, and supervising the rural water supply and sanitation projects, including financial and procurement management, as well as monitoring

and evaluation for contracting consultants and local service providers to assist with planning and implementation of the projects at the district level and in the communities.

Through implementation of WSDP I and II (up to 2019) projects, the role or participation of the beneficiaries in planning, construction, operation, maintenance and management of community based domestic water supply schemes was guaranteed in most of the implemented projects through establishments of COWSOs in every completed project that was given all the mandate of making sure the project is sustainable. Among the lessons learnt from the implementation of WSDP I & II projects was the need for engineers and consultants to use the MoW Design manuals in order to reduce or eliminate the many design flaws already observed.

However, according to the Water Supply and Sanitation Act No. 5 of 2019, the COWSOs were replaced by CBWSOs and these are expected to have the frontline responsibility for sustaining rural water supply and sanitation services on behalf of the beneficiaries (communities). The members of CBWSOs are drawn from the users but their qualifications and experiences have been better specified under the Act No.5. The minimum qualifications of the technical staff employed by CBWSOs has also been explicitly specified to ensure they have the requisite capability and experience. Their roles as well as the assumed responsibility of CBWSOs are also explicitly highlighted in the Act No.5 as well as the roles of RUWASA at different levels.

1.2.3 Coverage and Access to Water Supply Services

While the responsibility for provision of sanitation services in rural areas is principally under the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC); following enactment of the Water and Sanitation Act No. 5 of 2019, RUWASA has also been given some responsibility to coordinate delivery of sanitation services in areas that are under its jurisdiction. In areas served by former National Project Water Utilities (WSSA), it is expected that the MoHCDGEC will liaise closely with both the latter and RUWASA to deliver sanitation services. It is estimated that by 2019, on average 21.2% of Tanzanians had access to safely managed sanitation (MoW AGM, 2019) against a National target of 25%.

1.2.4 Policy Environment for Water and Sanitation Services in Tanzania

The management of water resources in Tanzania is guided by the National water policy of 2002 (URT, 2002). The policy has been in use for the last 18 years. The policy was articulated by the National Water Sector Development Strategy of 2006-2015 (URT, 2008) and the WSDP of 2006-2025. There are currently efforts by the Ministry of Water to update the national water policy. The most important

national legislation guiding the country's water resources management include the Water Resources Management Act No.11 (URT, 2009) and all subsequent amendments as well as the various regulations that continue to be issued by the Ministry responsible for Water. The Water Supply and Sanitation Act No.5 (URT, 2019) and the associated regulations as issued by the Ministry responsible for Water guide the development of water supply and sanitation services in Tanzania. The users of this manual are referred to the URT website (www.maji.go.tz) for further information.

As regards sanitation, The Public Health Act of 2009 and The Health Policy of 2007 provide the relevant legal guidance. Other relevant guiding documents include The National Guidelines for Water, Sanitation and Hygiene for Tanzania Schools (URT, 2016), National Guidelines for Water, Sanitation and Hygiene in Health Care Facilities (URT, 2017), Guidelines for the Preparation of Water Safety Plans (MoW, 2015), National Guidelines on Drinking Water Quality Monitoring & Reporting (MoW, 2018), Guidelines for the Application of Small-Scale, Decentralized Wastewater Treatment Systems and A Code of Practice for Decision Makers (MoW, 2018). Another Swahili document is titled "*Mwongozo wa Ujenzi wa Vyoo Bora na wa Usafi wa Mazingira*" (Guidelines for Construction of Toilets and Sanitation), (URT, 2014).

1.2.5 Major Stakeholders in Water Supply and Sanitation Projects

Effective and efficient implementation of water supply and sanitation projects will be achieved through the contribution of a number of stakeholders. The stakeholders of significant importance are described below.

(i) Regulatory Authorities

In order to ensure the smooth implementation of water supply and sanitation projects, various regulatory authorities have been established. These authorities monitor the professional conduct of the different parties involved in water and sanitation projects. The authorities include:

- The Public Procurement Regulatory Authority (PPRA) (<https://www.ppra.go.tz/>),
- The Tanzania Bureau of Standards (TBS) (<http://www.tbs.go.tz/>),
- The Engineers' Registration Board (ERB) (<https://www.erb.go.tz/>),
- The Contractors' Registration Board (CRB) (<http://www.crb.go.tz/>),
- The Energy and Water Utilities Regulating Authority (EWURA) (<https://www.ewura.go.tz/>),
- The National Environmental Management Council (NEMC) (<http://www.nemc.go.tz>).

(ii) Contractors and Consultants

Contractors are the firms that perform the actual construction of water supply projects according to agreed terms in relevant contracts. Consultants/Project Managers are the firms that design water supply and sanitation projects and supervise the construction works in line with the terms and conditions specified in the respective contracts. A consultant, on behalf of the client, approves completed structures in compliance with the specifications given and the standards required as elaborated in chapter twelve of Volume I of the DCOM manual.

(iii) National Water Supply and Sanitation NGOs and networks

The following is a sample list of Non-Governmental Organizations (NGOs) that deals with water supply and sanitation services in Tanzania and hence have a contributing role to the MoW:

- Association of Tanzania Water Suppliers (ATAWAS) (<http://atawas.or.tz/>),
- Tanzania Water Supply and Sanitation Network (TAWASANET) (<http://www.tawasanet.or.tz/>),
- Tanzania Global Water Partnership (GWPTZ) (<https://www.gwptz.org/about/>).

1.2.6 Water Supply and Sanitation Public- Private Partnership in Tanzania

The National Water Policy (NAWAPO) of 2002 (URT), envisaged devolution of elements to be introduced as well as public and civil service reforms. It had assumed that the Central Government would provide technical and financial support, coordination and regulation of water supply development while the private sector was expected to support the communities in planning, designing, construction and supply of materials, equipment, spare parts and to support operations in some cases. Development Partners (DPs), NGOs and CBOs were expected to provide funding and technical assistance to supplement the Government efforts through basket funding.

In support of the Government Public-Private Partnership (PPP), the policy of 2009 as also supported by EWURA prepared the PPP guidelines for water supply and sanitation (EWURA, 2017), and the relevant legislation that was stipulated in NAWAPO 2002, MoW managed to create the necessary environment to support the private sector such that, a sizable proportion of the works, services and goods are procured from private sector Service Providers (SPs) hence assisting the Government in fulfilling its roles. Essentially, one of the successes of NAWAPO 2002 is the inclusion of the private sector in water supply and sanitation projects implementation. Notwithstanding the good experiences, the MoW (2018), indicated that even though the Water Sector Development Programme (WSDP) Project Implementation Manual gave a lot of opportunities to the private sector that procured most of the works, field experience has shown that the capacity of

the private sector in Tanzania is still limited in terms of staff and thereby fail to supervise the works closely and effectively.

On the other hand, the MoW organized a forum on enhancing public private partnership in the water sector. This was held in Dar es Salaam from 19 to 20 July 2018. In this forum, discussions were held with the private sector stakeholders where experiences, challenges and recommendations were obtained with regard to implementation of rural water supply projects in Tanzania. The forum was a follow up of the Five-Year Development Plan (FYDP) 2016/17-2020/21. The fourth priority area of the FYDP is strengthening implementation effectiveness, which earmarked water supply and sanitation as among the key interventions. In the forum, the following key issues were captured:

- (a) Contract management issues such as delays in decision making by the clients,
- (b) Payment problems,
- (c) Procurement problems,
- (d) Policy issues especially on Tax exemption for imports,
- (e) Political interference in the execution of works,
- (f) Knowledge gap on current technology available for groundwater exploration based on quality and quantity of water,
- (g) Shortage of contractors with needed capacity to execute water supply projects,
- (h) Database issues especially on water resources information, which may end up with over-or under-designing water supply facilities.
- (i) Design specifications based on the use of obsolete technologies was also indicated to be a critical problem.

Privatization of some or all the functions of Operation and Maintenance of water projects can be considered to have achieved: (i) efficiency (ii) economy (iii) professionalism and (iv) financial viability of the system. In order to achieve the above stated objectives, the private entrepreneur needs to possess: (i) adequately trained and qualified staff for operation and supervision of the services (ii) equipment, material, testing and repairing facilities (iii) experience in operating similar systems (iv) financial soundness (v) capacity to meet the emergency situations.

In order to assist service providers/operators in ensuring financial viability of their projects through Public-Private Partnerships, the following are recommended:

- (a) The MoW, through the established in-house Design Unit should provide an option for on demand engagement of the private sector at project level, in cases where in-house capacity or technology is limited;
- (b) Awareness on other operational modes in PPP as per water policy be enhanced;
- (c) Where applicable, private operators should be engaged in the operation and maintenance of water supply and sanitation services with due diligence. The same applies to contracting personnel with specialized skills for the repair

and maintenance of specialized equipment or instrumentation as specialized services for maintenance of such equipment instead of employing additional staff. Such a practice may ensure the proper functioning of the equipment with least cost.

Private operators should be supervised closely to avoid challenges in operation and maintenance of water supply and sanitation projects (i.e. water supply connections, facilities and finances).

1.3 RATIONALE FOR THE PREPARATION OF THE FOURTH EDITION OF THE DCOM MANUAL

The need to review and update the 2009 Design Manual was emphasised during the Public-Private Partnership (PPP) stakeholders' meeting hosted by the MoW in 2018. During that meeting, the issue of providing the designs/specifications that use old technologies in the procurement was mentioned. Also the need to adopt the latest and appropriate technologies was stressed. Among the recommendations of the Special Committee on Audit of WSDP I & II projects in rural areas in Tanzania (URT, Nov. 2018), the need was emphasized to review and update the design manual and to ensure that all consultants use it. The four volumes of the DCOM manual have been prepared in order to facilitate effective complimentary planning, design, construction supervision as well as operation and maintenance of water supply and sanitation projects for urban, peri-urban and rural areas of Tanzania.

The manuals will assist the staff of the Ministry responsible for water and sanitation projects to effectively undertake supervisory and coordination roles and the consultants to undertake designs using only the guidelines recommended in the MoW manual. For Urban and National WSSA or RUWASA staff who may be involved in design, construction supervision of projects using the *Force Account* mode of implementation, the four manuals will prove to be useful in facilitating due step by step supervision. On the other hand, for staff who will be implementing water supply and sanitation projects, the manuals will provide guidance on how to involve all the principal stakeholders including the Community Based Water Supply Organisations (CBWSO) as foreseen in both the NAWAPO (URT, 2002) as well as the NWSDS (URT, 2008).

The manuals have been formatted such as to be more user friendly by allowing navigation within and across the manuals as well as to have the capability to navigate into or from website links with ease using subject indices that enable the user to search for the needed information almost instantly. It is hoped that, the manuals will contribute towards improvement of the contract management capacity of the staff involved in project management and will eliminate the recurring problem of consultants designing water supply and sanitation management projects that are below minimum quality standards.

1.4 ABOUT THE FOURTH EDITION OF THE DCOM MANUAL

The 4th Edition of the DCOM Manual has been prepared in the year 2020, following the outcomes of the review and updating of the Third Edition of the Water Supply and Wastewater Disposal Design Manual of 2009. The former Manual was prepared in three separate volumes. These volumes included eight chapters on water supply, three chapters on wastewater disposal and one chapter on water pipelines standards and specifications. It should, however, be remembered that the 2nd Edition of the Design Manual that was titled *Design Manual for Water Supply and Wastewater Disposal*, was prepared in July 1997 in two volumes with eight chapters and three chapters, respectively. The 1st Edition of the Design Manual was prepared in 1985/86, a few years after the conclusion of the International Water and Sanitation Decade that ended in 1981. Thus, the current edition of DCOM Manual is adequately informed by previous edition evaluations which incorporate the topical and existing DCOM Manual issues and challenges.

The preparation of the current four volumes was undertaken by a Special Committee of twelve members from The Ministry of Water, RUWASA, University of Dar es Salaam (UDSM), Private sector consultant and The Nelson Mandela African Institute of Science and Technology (NMAIST). The process of preparing the design manuals entailed a number of participatory consultations with key stakeholders from the water and sanitation sector as well as from Ministries of Education, Science & Technology, Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC), President's Office Regional Administration and Local Government (PORALG) as well as Consultants, Contractors, Material suppliers and Development Partners. It also involved an undertaking of an extensive search of literature from libraries, conference proceedings, journal publications, websites of various entities and design manuals from various global entities with particular focus on those in the East African and SADC countries.

1.5 ORGANISATION OF THE 4TH EDITION OF THE DCOM MANUAL

The 4th Edition of the DCOM Manual has been prepared in four separate volumes that are divided as follows:

- **Volume I** presents *Design of Water Supply Projects* organized in thirteen chapters,
- **Volume II** dwells on *Design of Sanitation Projects* and is divided into six chapters,
- **Volume III**, titled *Construction Supervision for Water Supply and Sanitation Projects* has been structured into five chapters, and
- **Volume IV** titled *Operation and Maintenance for Water Supply and Sanitation Projects* is organized into nineteen chapters. This Volume IV is organized into five parts as indicated below and can be offered as separate packages for training of different groups of users of the Manual:

- Part A: Essentials of Operation & Maintenance,
- Part B: O&M of the Water Supply Sources and Network,
- Part C: O&M of Water Treatment, Water & Wastewater Quality Compliance,
- Part D: O&M of Sanitation Projects,
- Part E: Water Audit, Revenue and Community Participation Management.

1.6 PURPOSE OF THIS VOLUME

This Volume is meant to assist the Procuring Entity (PE) to supervise the water supply and sanitation projects adequately through its own staff or by engaging an independent individual or firm as the project supervisor. The tools needed by the Supervisor to do his work will be developed under the guidance of the Contract Management Plan (CMP) that is detailed in this Volume. In no case will the CMP form part of the Contract between the PE and the Contractor but may be part of the Contract between the Supervisor and the PE. That notwithstanding, the Supervisor must be issued, by the PE, a site visit/inspection checklist that has to be filled and evaluated in every visit. The checklist can also be jointly prepared between the parties to reflect commonality in thinking of those construction areas pertinent to the specific project under consideration.

Experience in Tanzania has shown that hardly does either party to the contract apply the contractual remedies provided in the contract. Contractors, for example, fear that by demanding remedy through charging interest in late payment of certificates may jeopardize their future award of other projects. Similarly the PEs, for example, may not recall a performance guarantee of a poorly performing Contractor for the fear of starting the lengthy procurement process all over again. This Volume encourages all parties to heed to the articles of the contract by establishing a strong construction supervision mechanism for all water supply and sanitation projects.

1.7 ORGANIZATION/DESCRIPTION OF THIS VOLUME

This Volume comprises five chapters.

Chapter 1 presents the Introduction.

Chapter 2 covers the procurement process. It gives the definition of procurement, governing principles of public procurement and summarizes the procurement process by means of a flow chart. In this part, focus has been placed on post-qualification of tenderers, which is seen to be a serious problem in getting contractors with capacity and capability to execute the contracts. Detailed criteria for carrying out post-qualification are given. The use of force account for construction works is also discussed with important considerations to be made by a PE planning to use this method.

Chapter 3 covers contract management aspects. All aspects influencing effective contract management are discussed including appointment and roles of project manager; contract effectiveness; formulation of contract management plan; contract delivery follow up; and project progress monitoring and control. Others are preparation of payment certificates and managing payments to the contractor; delays in performance; initial and final acceptance of works; and contract close out. This part also covers management of stakeholders, communication, and relationships issues in the project. Furthermore this part covers claims management, dispute management and contractors' performance evaluation.

Chapter 4 is devoted to contract supervision and administration. It covers general requirements for contract supervision and administration, time control, quality control and cost control. Checklists to assist the Project Manager to ensure quality, cost and time objectives to be achieved are given. Additionally this part covers managing of variation orders and contract amendments, monitoring compliance with the laws of the country, and managing project closure.

Chapter 5 covers essential field construction skills. In this chapter, a number of select essential field construction skills needs have been summarized for implementation of Water Supply and Sanitation Projects with a focus on Dam construction, Boreholes, Intakes, Storages tanks, Gravity mains and Water points.

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PROCUREMENT PROCESS FOR WATER SUPPLY AND SANITATION PROJECTS

2.1 INTRODUCTION

Procurement is the acquisition of appropriate goods, works and/or services at the best possible *total cost of ownership* to meet the needs of a public entity in terms of quality, quantity, time and effective delivery.

The Public Procurement Act No. 7 of PPA 2011- Defines “Procurement” as “buying, purchasing, renting, leasing or otherwise acquiring any goods, works or services by a PE spending public funds on behalf of a ministry, department or regional administration of the Government or public body and includes all functions that pertain to the obtaining of any goods, works or services, including description of requirements, selection and invitation of tenderers, preparation, award and implementation of contracts.

As a function, Procurement should ensure acquisition of the right goods (equipment, materials, consumables), works (construction, repairs, rehabilitation), and services (individual consultants, consulting firms, training, workshops) required to satisfy certain needs at the right time, from the right contractor, in the right quantities, in the right quality and at the right price.

Public procurement enables Public Institutions to procure inputs which are vital for their operations and investments. The procured inputs can be in the form of physical infrastructure built or strengthened institutional and human capacities, both of which lay foundations for and promote national development.

In procurement terms and in line with the PPA 2011 and its Regulations, those inputs are generally grouped into four main categories as follows:

- (a) Works – which includes:
 - (i) all works associated with the construction, reconstruction demolition, repair or renovation of a building, structure, road or airfield; and
 - (ii) any other civil works, such as site preparation, excavation, erection, building, installation of equipment or materials, decoration and finishing;

- (iii) services which are tendered and contracted on the basis of performance of a measurable physical output such as transport of people or goods, drilling, mapping, photography or seismic investigations.

Generally contracts which include the provision of works and services shall be regarded as works contracts if the total value of the works is greater than the value of the service covered by the contract.

- (b) Goods: includes, Raw materials, products, equipment and other physical objects of every kind and description, whether in solid, liquid or gaseous form, electricity, intangible assets and intellectual property, as well as services incidental to the supply of the goods provided that the value of the services does not exceed the value of the goods themselves.
- (c) Consultancy services: means activities of an intellectual and advisory nature that do not lead to a measurable physical output and include design, supervision, training, advisory, auditing, software development and similar services.
- (d) Non-consultancy service: means any object of procurement other than goods, works and consultancy services. It also includes services of a skilled or non-skilled nature, which is not a consultancy service and further includes, but is not limited to, cleaning, security, maintenance, and repair services.

2.2 GUIDING PRINCIPLES OF PUBLIC PROCUREMENT IN TANZANIA

The Tanzania public procurement policies are based on the need to make the best possible use of public funds, whilst conducting all procurement with honesty and fairness. The overall objective of the public procurement system is to provide value for money to the Government by ensuring that public funds are spent in a transparent, efficient and fair manner. All public officers and members of TBs undertaking or approving procurement actions are guided by the following basic consideration of the public procurement policy in Tanzania; namely the need for economy and efficiency in the use of public funds and in the implementation of projects including the provision of related goods and services;

Economy: Procurement is a process that aims at providing the PE best value for the money spent. For complex purchases, value may imply more than just price. Other factors such as quality and delivery and appropriateness (just to mention a few) also need to be addressed. Moreover, lowest initial price may not equate to lowest cost over the operating life of the item procured. But the basic point is the same: the ultimate purpose of sound procurement is to obtain maximum value for money.

Efficiency: The best public procurement system is simple and swift, producing positive results without protracted delays. In addition, efficiency implies practicality, especially in terms of compatibility with the administrative resources and professional capabilities of the PE and the procurement personnel. The

promotion of economy, efficiency and value for money practices is fundamental to any good public procurement system. Diligent application of principles value for money and economic efficiency can bring substantial savings of public funds. Savings can either be in the form of direct savings obtained through cheaper prices for goods or services or can be in the form of indirect savings obtained through provision of quality goods or services thus eliminating the need of redoing. PE are therefore, encouraged to adopt procurement practices that promote fair competition in all tenders, discourage the use of fake competition; and use methods of aggregation where appropriate in order to take advantage of economies of scale. The best interests of the PE, in providing all eligible suppliers, contractors, and service providers as per the requirements of the PPA 2011 equal opportunities to compete in the provision of goods, executing works or providing services;

Equal Opportunities: Good procurement is impartial, consistent, and therefore reliable. It offers all interested contractors, suppliers and consultants a level playing field on which to compete and thereby, directly expands the purchaser's options and opportunities. Equal opportunities provides encouragement of national manufacturing, contracting and service industries;

Encouragement through Preference Schemes: Local manufacturing, contracting and service industries are given preference in tendering for public contracts so as to boost the national economy. Goods being procured are "manufactured goods" involving assembly, fabrication, processing etc., where a commercially-recognized final product is substantially different in basic characteristics of its components and raw materials. As for services, local service providers may either bid alone or in joint venture with fellow Tanzanian or foreign firms to qualify for the preference. This policy item emphasizes the importance of integrity, accountability, fairness and transparency in the procurement process.

Integrity and Accountability: Good procurement holds its practitioners responsible for enforcing and obeying the rules. It makes them subject to challenge and to sanction, if appropriate, for neglecting or bending those rules. Accountability is at once a key inducement to individual and institutional probity, a key deterrent to collusion and corruption, and a key prerequisite for procurement credibility. Ethical issues are amongst some of the obstacles in achieving value for money. People involved in procurement should ensure the following: avoidance of collusion, avoidance of conflict of interest, provision of equal opportunities, confidentiality and limited disclosure, avoidance of all corrupt practices in procurement, avoidance of all fraudulent practices in procurement, avoidance of obstruction and undue delays in procurement processing and exerting inappropriate influence on any procurement procedure.

Transparency: Good procurement should also be seen to be transparent and fair. The policy establishes and maintains rules and procedures that are accessible and unambiguous to all parties in the process. The procurement process should not only be fair, but should be seen to be fair.

Promotion of transparency in procurement can act as deterrence for corruption. PPA 2011 and its Regulations require that all PEs to the extent possible make their procurement proceedings transparent through public advertisement of tenders and disclosure of the procurement proceedings, a task which is assigned to PMUS. PEs are therefore, required to keep procurement records. To facilitate this PEs are required to maintain a complete record of the procurement proceedings, which may be made available to any person after the tender has been awarded with a requirement to avoid disclosure of proprietary commercial information.

A sound procurement system is one that combines all the above elements. The desired impact is to inspire the confidence and willingness-to-compete of well-qualified tenderers. This directly and concretely benefits the PE, the tenderers, the Government and other development partners.

A procurement system that does not embrace the above elements stimulates hesitation to compete, submission of inflated tenders containing risk premium, or submission of deflated tenders followed by delayed or defective performance during the contract implementation stage. A poor procurement system may also result in tenderers colluding to defraud the government and other procuring public bodies, bribery by frustrated or unscrupulous tenderers and consultants, bad value for those entities and betrayal and abuse of the public trust for personal gain.

2.3 FUNDAMENTAL CONSIDERATIONS FOR PROCUREMENT OF A CONTRACTOR

Contractor as used in this part means a firm/person who has been engaged by the Ministry and has a contract to supply goods or to carry out construction works or to provide non-consultancy services. Prior to the award of contract, contractors are referred to as tenderers.

It is in the interest of the Ministry that a contractor should have the capacity and capability to supply the goods or provide the intended services. Capacity relates to possession of the necessary resources- equipment, staff and finances while capability relates to possession of expertise and experience required to execute the contract.

2.3.1 Joint Venture (JV) Formation Between Construction Organizations

Joint Venture is an association of firms that pool their resources and skills to undertake a large or complex contract in the role of "Contractor" with all firms (partners in the Joint venture (JV)) being legally liable, jointly and severally, for the execution of the contract in the event of a partner withdrawal.

Joint ventures should be registered by Business Registration and Licensing Agency (BRELA) and the Contractors Registration Board (CRB). Most important factors considered during formation of JVs are the contract agreement, financial stability and commitment while key risks associated with JVs are cultural and social differences, delays in approvals and financial risks. The main challenges facing joint ventures are the identification of possible risks and joint venture agreement interpretation.

All individual firms and all partners of a joint venture should be requested to complete the information with regard to the management of Works contracts.

2.3.2 Procurement Process through TANEPS System

TANEPS (Tanzania National Electronic Procurement System) is a web-based, collaborative system, developed in accordance with the requirements of the public procurement laws and regulations to facilitate public procurement processes in Tanzania. It offers a secure, interactive, dynamic environment for carrying out procurement of all categories, complexity or value. (To access the system, go to www.taneps.go.tz).

2.4 SUMMARY OF THE PROCUREMENT PROCESS

Tanzania's procurement process is governed by the Public Procurement Act 2011 as amended in 2016, and Public Procurement Regulations 2013 as amended in 2016. The chart in Figure 2.1 summarizes the procurement process as required by the relevant legislation. Figure 2.2 has presented a comprehensive summary of the evaluation process for goods, works and non-consultancy service

2.5 CHALLENGES WITH THE PROCUREMENT PROCESS

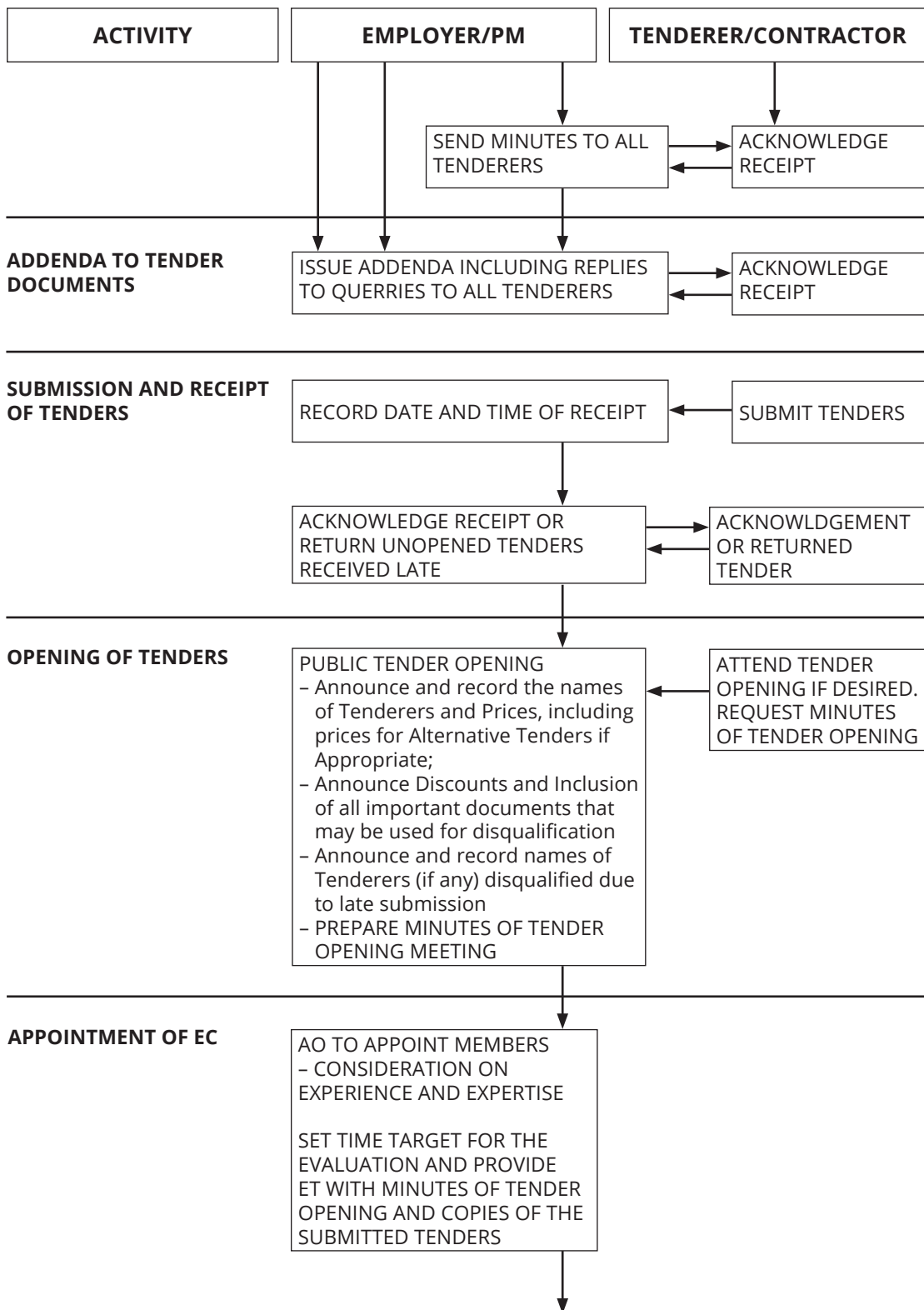
There are many complaints lodged relating to the long time taken to carry out procurement of a contractor from the point of initiation of requirements to the point of award of contract and that the outcome of that lengthy process leads to obtaining a contractor who lacks capacity and capability to execute the contract.

Coordination between the PMU and the User Department, (UD) is very important for the efficiency and effective preparation and implementation of an Annual Procurement Plan. Experience shows that many times a PMU

fails to prepare a consolidated procurement plan as required by Section 38(e) of **PPA 2011** because of the failure to get assistance and co-operation of the UD's as required in Section 39(2) of **PPA 2011**, particularly the failure to submit their

Box 2.1 PE'S DESIRE

1. Procurement Process that is Efficient – takes shortest time possible and without any complaints from tenderers.
2. Procurement Process that leads to obtaining a contractor with capacity and capability to execute the contract to acceptable quality level, within the given completion period and within budget.



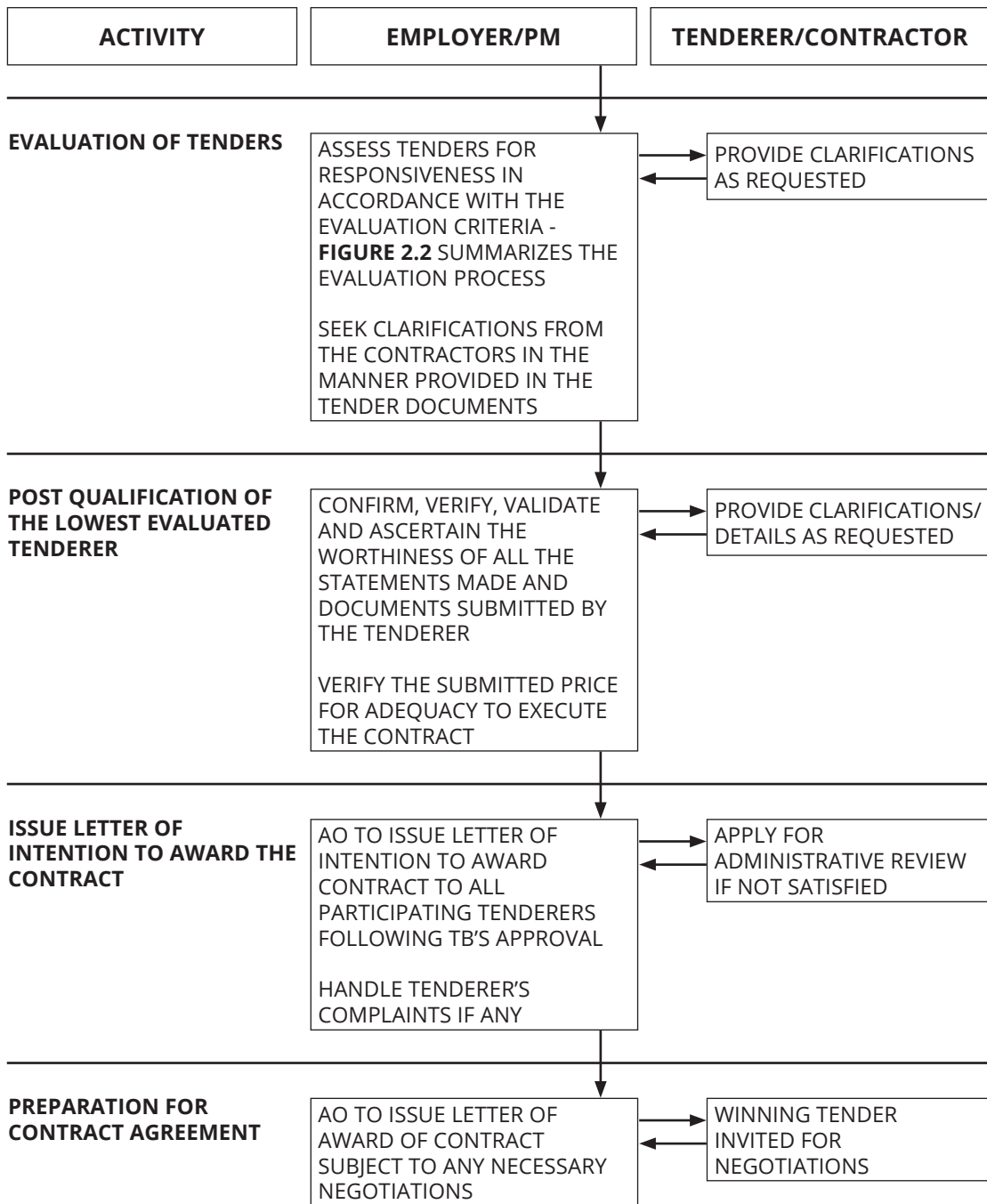


Figure 2.1: Flow Chart Summarizing the Procurement Process for Works

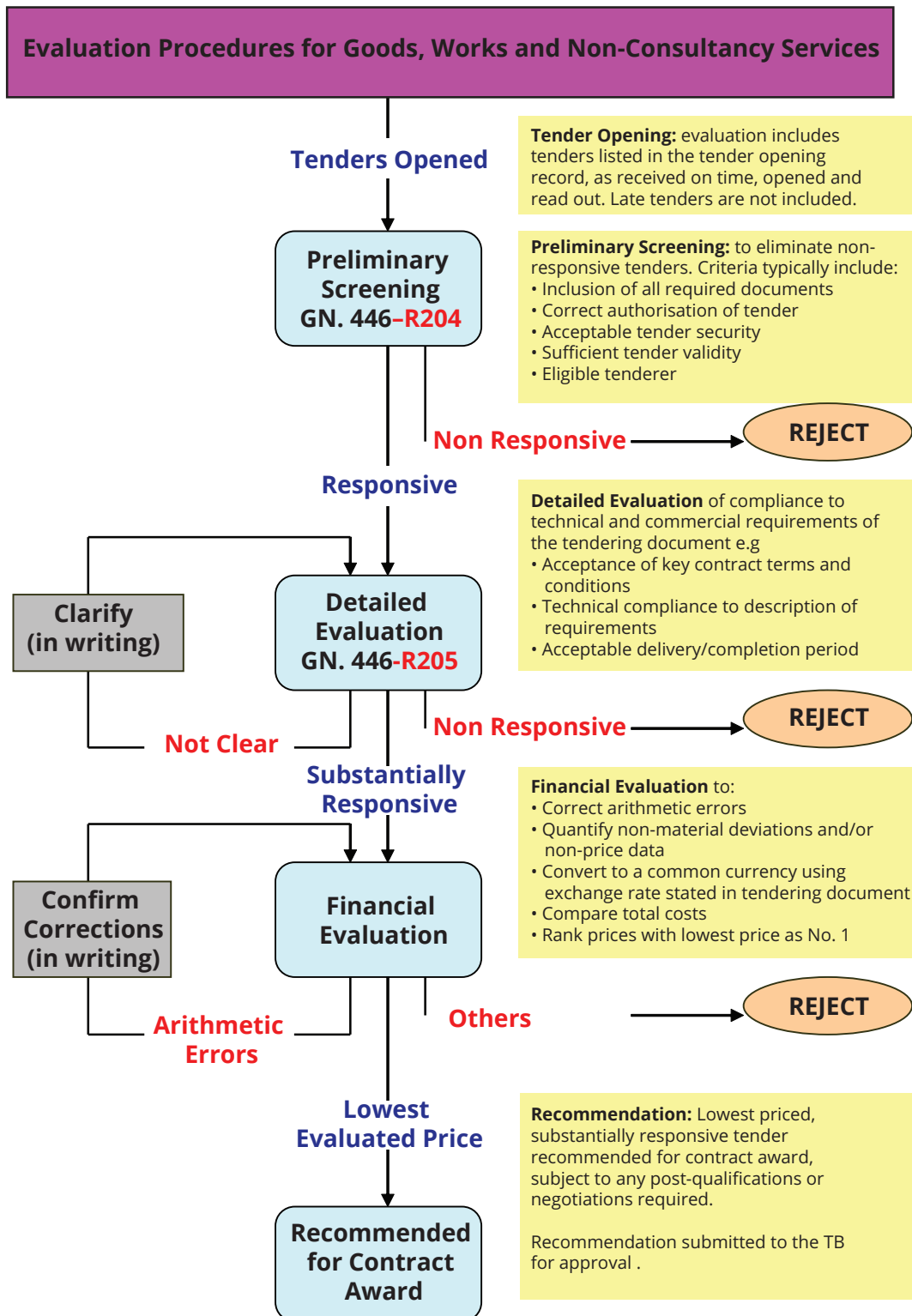


Figure 2.2: Evaluation Process for Goods, Works and Non-Consultancy Services

requirements in a timely manner to the PMU to enable them consolidate and come up with organizational rather than departmental requirements of goods and services.

Another major challenge is the quality of the prepared tender documents. Non-completeness of the tender documents not only affects the procurement process, but also has a downstream effect in the implementation of contract leading to many variations which result in cost overruns and delay in the completion of the project.

The following is a Checklist of important issues to consider in the procurement process in order to ensure the process is efficient and that a contractor with capacity and capability to execute the contract is obtained:

- **Ensure that the user's requirements are clearly established and properly translated into tender documents – namely the Drawings, Specifications and Bills of Quantities (BOQ).** Omissions and mistakes can have serious consequences in the tender process as they invite many queries and requests for clarifications from tenderers and sometimes necessitate the extension of time for submission of tenders. If the omissions are not picked up by the tenderers during the tender process¹, they will result into variations and extension of time during contract execution.
- **Ensure that a proper estimate is prepared for the project.** This is very crucial as it will form a deciding factor on whether submitted tenders are very expensive or abnormally too low and therefore justify rejection of such tenders. An estimate is prepared by costing the prepared BOQ using current market rates for executing various activities as presented in the BOQ and allowing a reasonable margin of profit for the contractor.
- **Based on the prepared tender documents and the estimate, both of which gives the scope and cost of the project, determine eligibility and qualification requirements for the tenderer.** Remember that very stringent eligibility and qualification requirements will make the procurement process non-competitive as very few tenderers may qualify to participate. Less stringent requirements may lead into obtaining a contractor who lacks capacity and capability to execute the contract.
- **Fix reasonable time for the preparation and submission of tenders by tenderers to procurement.** PEs are expected to fix a realistic tender period depending on the size and complexity of procurement. They should make a realistic estimate of time required for tenderers to prepare and submit a competitive tender. Unrealistic tender period results into getting non-responsive tenders and therefore necessitating re-tendering, or the need to extend the tender period thus leading to delay the tender process.

¹ Some loop-hole seeking contractors use the mistakes and omissions in the tender documents to benefit during contract execution through claims.

- For example a tender period of 14 days specified in the PPR 2013 for submission of tenders by tenderers using National Competitive Tendering Method may not be enough for big tenders. The Ministry should consider setting tender period based on the magnitude of the tender, for example for Tenders between Tshs 200 to 500 million, a tender period of 14 days be provided, and this period could be increased by seven days whenever works increase by one billion i.e. 21 days for tenders between Tshs 500 to 1,500 mil, 28 days for tenders between 1,500 to 3,000 mil. PPRA may be requested to issue guidelines on how to fix tender period.
- **Provide all the information under your possession that may assist the tenderers to prepare responsive and competitive tenders.** Such information may include soil investigation reports, weather reports etc. Given the short time given to tenderers to prepare their tenders it would be impossible for them to get most of the information.
- **Ensure that the evaluation criteria are explicitly stated in the tender documents.** This enables tenderers understand how their tenders will be evaluated and may also enable them to make a decision on whether to or not to submit a tender.
- **Respond to all requests for clarification from the tenderers in a timely manner, and consider the time and effort required by the tenderer to accommodate the given clarification in their tender and its effect on the tender period.** Where it is determined that to accommodate a clarification requires more effort and time, the PE should consider extending the tender period subject to the approval of the TB.
- **Ensure that opening of tenders is done properly by ensuring that all the important information, particularly the discounts and those that can be used to disqualify a tenderer are read out during the opening.** Minutes should be prepared that reflect what transpired during the tender opening process as these may be useful in situation where there are complaints from the tenderers.
- **Ensure that the appointment of Evaluation Committee (EC) takes place in a timely manner, possibly before or on the date of tender opening, and that the appointed members have experience and qualifications fit for the evaluation of the tender in question.** The quality of the decision of the TB is dependent on the quality of the evaluation report which is in turn dependent on the quality of the EC.
- **Ensure that evaluation of tenders is done properly in conformity with the evaluation criteria contained in the tender documents.** It should be noted that the role of the EC is to evaluate tenders in accordance with the evaluation criteria contained in the tender document. Therefore, before commencing with evaluation of any submitted tender the EC will need to go

through the tender document issued to tenderers to familiarize themselves with the evaluation criteria. The actual evaluation process should start only when everybody in the EC has understood the evaluation criteria.

- **In case there are complaints from tenderers, whether submitted informally or formally as application for administrative review, they should be properly handled by the Accounting Officer (AO).** Depending on the complexity of the tender the AO may wish to appoint a review panel as allowed for in the PPA Act 2011. Failure to handle a tenderer's complaints internally may lead into referring them to the Public Procurement Appeals Authority or High Court and therefore lead to delays in the procurement process.
- **Ensure that proper and adequate Post-Qualification is carried out to the lowest evaluated tenderer.** Post-qualification is covered in detail in **Section 2.5.**
- **Finally, ensure that proper negotiation is made with the tenderer recommended for the award of the contract.** Areas of negotiation are required to be identified by the EC who had the opportunity to read thoroughly the tender submitted by recommended tenderer for award of the contract. All agreements reached out during the negotiations should be incorporated in the relevant contract documents.

The above list of issues/actions, if taken care of will enable the Ministry to overcome some of the potential problems encountered in the procurement process.

2.6 POST-QUALIFICATION AND ISSUANCE OF NOTICE OF POST-DISQUALIFICATION

2.6.1 Purpose of Post-Qualification

Post-qualification is a very important step of the procurement process. It aims to establish if the tenderer who has been determined to offer the lowest evaluated tender has the capacity and the capability to execute the contract. During post qualification the tenderer with the Lowest Evaluated Tender is directly and or indirectly visited by the PE to confirm, verify, validate and ascertain the worthiness of all the statements made and documents submitted by the tenderer. This process focuses at ensuring that the tenderer complies with legal, technical and financial requirements of the tendering document.

Legal requirements involves the verification, validation and ascertaining of the ownership of the company, credibility and integrity of shareholders and directors, incorporation of the company, compliance to tax obligations and whether the required licenses are in place and properly procured.

Box 2.2

Post-qualification is the verification of all qualification information and documents submitted by the contractor to establish their correctness and authenticity.

Technical requirements involve validation, verification and ascertaining the correctness of the documents submitted by a tenderer to prove the quality of the goods and services offered. This may involve:

- (a) Verification and validation of the tenderer's stated competence and experience;
- (b) Verification and/or inspection and testing of the products, after sales maintenance convenience and affordability and capabilities. In applicable cases physical inspection of plants, sites or places of business to determine production capacity is conducted as well; and
- (c) Ascertainment of the authenticity of the tender security and the tender validity period.

Financial requirements involve verification, validation and ascertaining the tender price proposal of the tenderer, its financial contracting capacity, and the required bank commitment to provide a credit line to the tenderer. This is to ensure that the tenderer can sustain the operating cash flow of the contract.

2.6.2 Forms of Post Qualification

Post qualification can take diverse ways to be accomplished provided that the end result is getting correct information confirming the criteria of the prospecting tenderer. Criteria for post qualification will be confined to those spelt out in the tendering documents supplied to tenderers. There are mainly two common forms of post qualification:

- **Visiting the Tenderer's Business:** This is the place where most resources of the tenderer, including the human resources, offices, and equipment are expected to be found. Visiting will establish whether the tenderer is a brief case company or an authentic company with offices. Also the resources will be seen and assessed. The visiting can also be made to tenderers sites or places of business.
- **Independent Reference:** This entails seeking comments, observations, reference from other organizations that also had similar transactions with the tenderer. This is done by the PE writing directly to those organizations inquiring for some particulars of the tenderer. In all these two forms, the main agenda is to let the tenderer demonstrate again and much more practically that he is worth the criteria set for the tender.

2.6.3 Guidance on Notification of Post-disqualified Tenderers

The following guidance is provided to assist in carrying out post-qualification:

- (a) The TB is required to verify, validate, and ascertain the genuineness, validity, and accuracy of the legal, technical, and financial documents submitted by the tenderer with the Lowest Evaluated Tender using a non-discretionary

- “pass/fail” criterion in order to ensure that such a tenderer has passed all the requirements and conditions specified in the Tendering Documents.
- (b) It is recommended that post-qualification be conducted for a tenderer whose tender has been approved by the TB to be the lowest evaluated. Members of the Post-qualification Team preferably need to be members of the EC.
 - (c) The post-qualification shall include, among others, the Items included in Table 2.1, whenever applicable. All enquiries should be made in writing or electronic forms that provide a record of the content of the communication made. All the communications made shall be annexed to the Post-Qualification report.
 - (d) If the TB determines that the tenderer with the Lowest Evaluated Tender fails to comply with the criteria for post-qualification, it shall immediately advise the AO who shall notify the tenderer in writing of its post-disqualification. The notice shall clearly state all the grounds for the post-disqualification pursuant to the requirements or conditions provided in the Tendering Documents that, the tenderer failed to comply with.

Table 2.1: Criteria for Post-Qualification of the Contractor

Ser. No.	Post-qualification Criteria	Ref in the FQI ²	Means of Verification
1	Verification of legal Status, registration/certificate of incorporation, registration with Contractors Registration Board, business license submitted by the tenderer	Item 1.1 of FQI	Obtain Originals from Tenderer, Check with BRELA, CRB and Relevant License Issuing Authority
2	Verification and validation of the tenderer's stated competence and experience	Item 1.2 of FQI	Check with Clients shown in Section 1.2 of the Contractor's submitted FQI. Visit some of the projects to ascertain quality of the executed works.
3	Verification of availability and commitment of equipment units that will be used by the tenderer in the contract.	Item 1.3 of FQI	Physical Inspection and testing for the required capacities and operating conditions.
4	Verification and validation of the tenderer's submitted list of key personnel assigned to the project	Item 1.4 of FQI	Request to be provided with Originals of the Qualification Certificates of the proposed staff and check with Clients mentioned in their CVs about their involvement in the mentioned projects.

² Form of Qualification Information based on PPRA's Standard Tender Document for Works. For other type of tender documents similar post-qualification matrix need to be developed.

Ser. No.	Post-qualification Criteria	Ref in the FQI ²	Means of Verification
5	Verification and Validation of the tenderer's recommended Subcontractors for the project	Item 1.5 of FQI	Obtain detailed information about the eligibility of the Subcontractors and their Work Experience from jobs which they executed previously
6	Verification and Validation of the tenderers submitted information on Annual Turnover	Item 1.6 of FQI	Request from the Contractor the Breakdown of the Given Figures of Annual Turnover and Verify from their books/records if they are true.
7	Verification and Validation of the tenderers submitted information on Financial Situation and Performance	Item 1.7 of FQI	Request to be provided with Original Copies of Financial Statements for verification
8	Verification and Validation of the tenderers submitted information on Financial Capability	Item 1.8 of FQI	Obtain confirmation from the given source of financing. And obtain references from the Contractor's Bankers
9	Verification and Validation of the tenderers submitted information on Litigation History	Item 1.9 of FQI	Apart from the given information make further enquiries from the Clients with whom the contractor has worked for.
10	Verification and Validation of the tenderers submitted information on Occupation Health and Safety Policy and Safety record	Item 1.10 of FQI	Apart from the given information make further enquiries from the Clients with whom the contractor has worked for
11	Ascertainment of the sufficiency of the tender security as to type, amount, form and wording, and validity period.		Obtain confirmation from the issuer of the Security
12	Verification of the tender price and its sufficiency to execute the contract.		Request rate breakdown from the contractor, source of materials and their prices

2.7 USE OF FORCE ACCOUNT FOR CONSTRUCTION OF WORKS

2.7.1 Rationale Behind the Use of Force Account

According to the Public Procurement Regulations (PPR) 2013, force account/direct labour is construction by the use of public or semi-public agencies or departments concerned, where the public or semi-public agency has its own personnel and equipment. The use of force account may be justified where the required works are small and scattered or in remote locations for which qualified construction firms are unlikely to tender at reasonable prices; work is required

to be carried out without disrupting ongoing operations; risks of unavoidable work interruption are better borne by a PE than by a contractor; or there are emergencies needing prompt attention. It should be realized that, Force Account is not a method of procurement but a method of executing works.

Under this method, the PE is required to purchase all the materials required for the project from the recognized suppliers and use local technical labour for implementation of the required activities both obtained through quotations. Construction activities are supervised by internal staff of the PE.

The benefits of using force account include (1) Efficiency gains- the PE is able to execute minor/small works much faster; (2) Enhancement of internal capacity of the PE since works are executed and supervised by the PEs staff; (3) Cost savings, in order to use force account, it must be ascertained that it is cheaper to execute the works in-house compared to contracting out. Therefore, the PE is able to deliver services at a cheaper cost; and (4) Works can still be executed even where no contractor is willing to undertake the assignment.

2.7.2 Important Considerations to Ensure Effective use of Force Account

Of late there has been an increase in the use of force account even for high value contracts³, and the reasons given include the cost savings achieved by many PEs using this approach. While that may be true, the actual cost of using Force Account should be thoroughly looked into by taking into account the time and the salary paid to the PEs staff, the use of PEs resources to supervise and monitor projects almost on a daily basis as well as the cost of failure to comply with country laws etc.

The following are important considerations by a PE planning to execute works using the Force Account Method:

- (a) The PE must have the equipment and personnel to supervise the works. This sometimes can be a challenge when a PE has many projects and only a limited number of staff with requisite qualifications, skills and experience;
- (b) The PE must carry out a cost-benefit analysis to determine that it is cheaper to use force account than to execute the works by contracting out. This is achieved by establishing:
 - Cost of the personnel to be used, using the applicable rates of the PE;
 - Cost of the indirect overheads; and
 - Cost of the equipment and supplies to be used, using market rates.

³ The method is commonly used in execution of construction projects in the health and education sector. In 2016 and 2017, the Government of Tanzania provided Tsh400 Million and Tsh1.5 Billion for construction of 1 health centre and 1 district hospital for 100 health centres and 67 district hospitals respectively and these projects were executed by using force account/direct labour procurement method.

- (c) The PE must appoint a Supervisor from within or from another PE who shall have the overall responsibility of ensuring that the works are implemented in time, to the required quality and within the budget. Specifically, he shall be responsible for:
- Approving the work plan prepared by staff on site,
 - Supervising the progress of the executed works,
 - Verifying the works undertaken for quality and the cost of the works,
 - Issuing Performance and Completion Certificates, and
 - Supervising the public officer appointed as the immediate supervisor for the works on a daily basis.

The Appointment Letter of such Supervising staff should elaborate all his responsibilities and any limits placed on his authority if any.

- (a) The PE must also appoint a public officer from within the PE or another PE who shall be stationed at the site and who shall manage all resources including personnel required to execute the works.
- (b) The PE should also ensure it follows procurement procedures stipulated in the PPR 2013 for procurement of materials and equipment to be used for construction works. According to PPRA's Annual Performance Evaluation Report of 2018/19 building materials are among common used items regulated by the Government Procurement Services Agency (GPSA) and therefore PEs are required to conduct mini-competitions on prices of the required building materials from at least three suppliers that have framework agreements with GPSA and seek TB's approval before issuing local purchase orders to the supplier with the lowest price within the prevailing market prices.
- (c) Ensure that shortcomings observed in PPRA's Audit on the use of force account method are taken care of.

Box 2.3

ABSTRACT FROM PPRA'S ANNUAL PERFORMANCE EVALUATION REPORT 2018/19 ON FORCE ACCOUNT

Contract management/ works supervision in works implemented through force account.

The audit conducted revealed a number of weaknesses on contract management/ works supervision which include: draft contracts not approved by TB, contracts not vetted by legal officers, contracts not signed properly, progress reports not prepared, payments to casual labourers (mafundi) done without the payments records indicating the justifications for the amount paid; contracts for construction which were entered between the PEs and local fundis did not contain all the necessary documentations that form part of the contracts; payment made without carrying out inspection of works done and preparation of measurement sheets to justify payments made to local fundis not done; advance payment paid while not stated in the contracts and without having any security from the local fundis.

Quality control for works done through force account method

The audit revealed weaknesses on quality control for works done through force account method among which include lack of inspection reports of works done and testing the quality of works done, and quality assurance plan was not prepared.



Chapter 3

CONTRACT MANAGEMENT

3.1 IMPORTANCE OF CONTRACT MANAGEMENT

Contract management involves activities performed by a PE after a contract has been awarded to determine how well the PE and the contractor performed to meet the requirements of the contract. It encompasses all dealings between the PE and the contractor from the time the contract is awarded until the work has been completed and accepted or the contract terminated, payment has been made, and disputes have been resolved. As such, contract management constitutes that primary part of the procurement process that assures the PE gets what it paid for. The basis of Contract management is the contract signed between the Client and the Contractor.

As a rule, PEs are required to use PPRA Conditions of Contract drawn from Standard Tender Documents for Small Works, Standard Documents for Medium and Large Works. In situations where PPRA documents are not suitable, the contract document could be drawn from various sources such as FIDIC, World Bank, European Union subject to approval of PPRA. For donor funded projects and where there is stipulation to use procurement rules of the funding agency, the documents approved by the funding agency shall be used and such approval from PPRA shall not apply.

There are three aspects to a contract that must be managed while the assignment is being carried out: time, cost and quality as shown in Figure 3.1.

Time and cost must be measured against the budget and projected time required to complete the contract to detect deviations from the plan. The performance of the contract must be checked to ensure that the targets are being met.

Good contract administration assures that the end users are satisfied with the product or service being obtained under the contract. It is absolutely essential that those entrusted with the duty to ensure that the PE gets all that it has bargained for must be competent in the practices of contract management and are aware of and faithful to the contents and limits of the delegation of authority from their Employers.

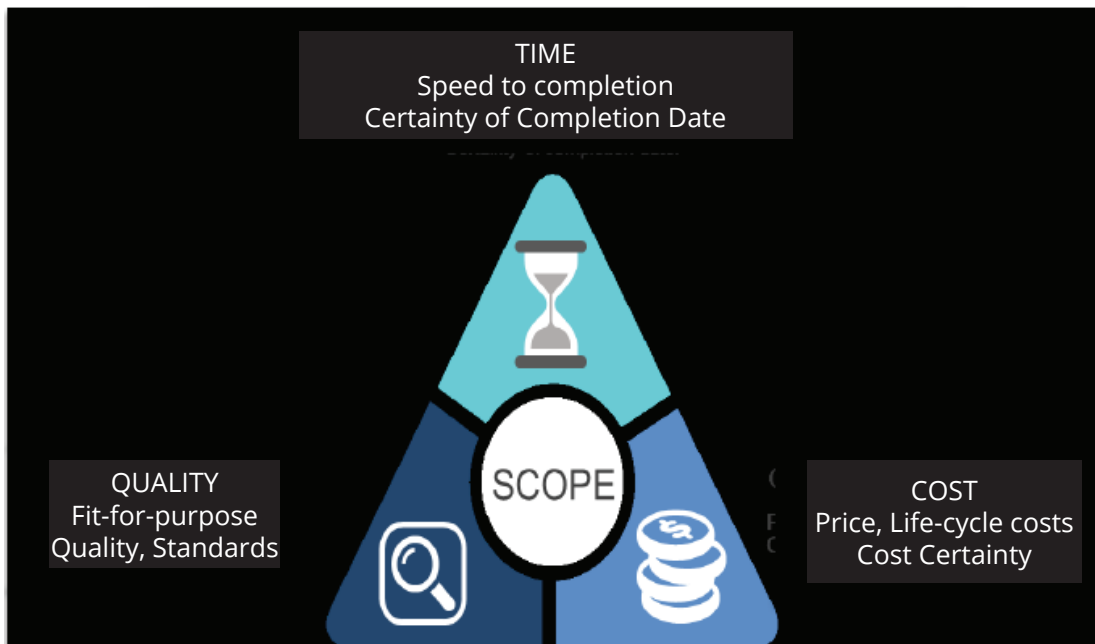


Figure 3.1: Time, Cost, Quality (TCQ) Interdependencies⁴

There are many post-contract issues that need to be dealt with, monitored and resolved before the contract reaches its conclusion and these include the following:

- | | |
|--|--|
| (a) Appointment of a PM and Supervising Engineer; | (h) Contract Close Out |
| (b) Contract Effectiveness; | (i) Stakeholder's Management; |
| (c) Contract Delivery Follow-up; | (j) Communication Management; |
| (d) Progress Monitoring and Control; | (k) Issues Management; |
| (e) Preparation of Interim and Final Certificates and managing payments to the Contractor; | (l) Relationship Management; |
| (f) Delays in Performance; | (m) Claims Management; |
| (g) Initial and Final Acceptance of the works; | (n) Disputes Management; |
| | (o) Managing Termination of Contract; |
| | (p) Evaluating of Contractors Performance. |

3.2 APPOINTMENT AND ROLES OF PROJECT MANAGER

3.2.1 Appointing a Project Manager (Supervisor)

Regulation 243 of the PPR 2013 emphasizes the need for each contract, a PE to monitor the performance of a contractor entrusted to implement a contract. It

⁴ Source CONTRACT-MANAGEMENT-GUIDANCE-September-19-2018-Final downloaded from <http://pubdocs.worldbank.org/en/277011537214902995/CONTRACT-MANAGEMENT-GUIDANCESeptember-19-2018-Final.pdf>

is usually advisable to appoint a person within the organisation to oversee the management of a contract.

Similarly Regulation 252 of PPR 2013 provides for Appointment of Works Supervisor – normally a public officer, a unit responsible for works in PE or a Consultant- Manages the work of the inspection committee. Also Condition of Contract including those contained in PPRA's Standard Tender Documents for Works makes it mandatory to appoint a PM. According to the documents:

The **PM** is the person named in the Special Conditions of Contract (**SCC**) (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the PM) who is responsible for supervising the execution of the Works and administering the Contract.

Contract management for works is often complex and time-consuming, as it involves supervision of the progress of the works, ordering variations where unforeseen conditions are encountered and measuring the works completed for payment purposes. For major contracts, a PE will normally use a full-time supervising engineer or PM, who will exercise control and supervision of the contract on its behalf. Where a PM is used, the PE must:

- ensure that the role of the PM is clearly defined, in particular his powers to issue contract variations, which result in changes to the overall cost, completion date, quality and design of the works and to settle disputes;
- establish arrangements for keeping the PE informed of contract progress, variations issued and any disputes; and
- Designate a contract administrator within the PE, who will be the contact point for the PM.

Box 3.1

The Project Manager must obtain approval of Tender Board before ordering variations to the contract and granting extension of time

3.2.2 Responsibilities of the PM

As discussed above once a PM is appointed, the PE must ensure that his roles are clearly defined. The following are some of the responsibilities of the PM:

- (a) Monitoring the performance of the contractor, to ensure that all delivery or performance obligations are met or appropriate action taken by the PE in the event of obligations not being met;
- (b) Ensuring that the contractor submits all required documentation as specified in the tendering documents, the contract and as required by law;
- (c) Ensuring that the PE meets all its payment and other obligations in time and in accordance with the contract.
- (d) Ensuring that there is adequate cost, quality and time control, as required;
- (e) Preparing any required contract variations or change orders and obtaining all required approvals before their issue. Such variations or change orders must be clearly justified in writing backed by supporting evidence;

- (f) Managing any handover or acceptance procedures;
- (g) Making recommendations for contract termination, where appropriate, obtaining all required approvals and managing the termination process;
- (h) Ensuring that the contract is complete, prior to closing the contract file including all handover procedures, transfers of title if need be and that the final retention payment has been made;
- (i) Ensuring that all contract administration records are complete, up to date, filed and archived as required,
- (j) Ensuring that the contractor and the PE act in accordance with the Provisions of the Contract, and
- (k) Discharging of performance guarantee where required.

3.2.3 Requisite Skills Set of Project/Contract Manager

Good practice requires that a PM is appointed for every contract. For small, routine contracts, this may be one person, who has a portfolio of contracts to manage. For large, complex, high-value contracts this is normally an entity (Engineer, PM Etc.) The PM needs to have the appropriate range of qualifications, skills mix and experience. A project will have a good head start if it has a qualified and experienced PM.

The PM, both acting on behalf of, and representing the Ministry, has the duty of 'providing a cost-effective and independent service, selecting, correlating, integrating and managing different disciplines and expertise, to satisfy the objectives and provisions of the project brief from inception to completion. The service provided must be to the Ministry's satisfaction, safeguarding its interests at all times.

The key role of the PM is to motivate, manage, coordinate and maintain the morale of the whole project team. This leadership function is essentially about managing people and its importance cannot be overstated. A PM needs to multi-task, as for example, shown in Figure 3.2.

Hard skills - technical skills

Typical technical skills, knowledge and experience required include:

- (a) Procurement;
- (b) Project management;
- (c) Legal knowledge (at the very least an ability to understand the legal aspects of the contract, including remedies);
- (d) Financial management;
- (e) Analytics and reporting;
- (f) Administrative, record keeping.

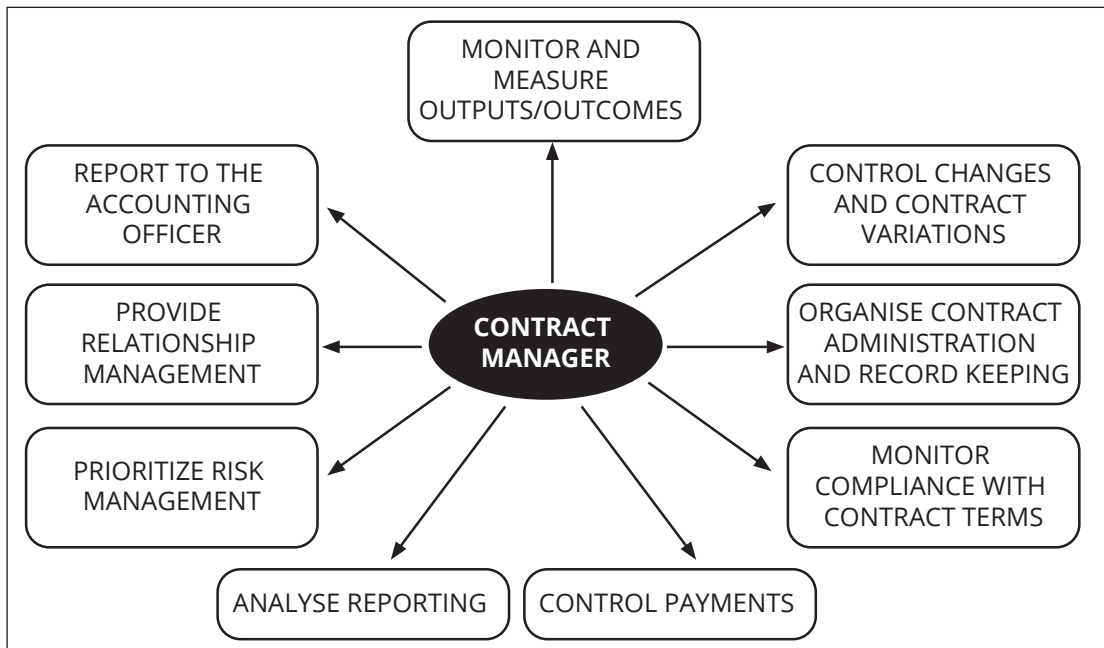


Figure 3.2: Project Manager’s Responsibilities

Additional skills may be required because of the subject matter or complexity of the contract. It is essential to have access to sufficient skills and experience as and when required. For example: civil engineering, water engineering; environmental and/or social knowledge and skills; and safety expertise.

Soft skills – interpersonal skills

In addition to technical (“hard skills”), a range of “soft skills” are required to build a successful relationship with relevant stakeholders, and to build successful contract management teams. Examples of relevant soft skills include: leadership, motivation and team building; decision making; interpersonal, communication and relationship management; mentoring and knowledge transfer; negotiation and conflict resolution; time management; and goal orientated, outcome focused.

Some of the key skills that a PM may normally possess are listed in Table 3.1.

Table 3.1: Desirable Competencies of a PM

Feature	Relevance
<p>Technical competence: Thorough knowledge and understanding of the subject matter and all aspects of the contract (e.g. technical specifications, terms of reference, conditions of contract, remedies etc.) and full understanding of their interdependencies (e.g. how to read the bills of quantities in conjunction with the technical specifications, the method of measurement and the drawings etc.).</p>	<p>Critical</p>

Feature	Relevance
Leadership skills: Self-motivated, focused, confident, thrives under pressure, calm, decision making, cooperative, politically savvy, personal integrity, diligent, honest, team management.	Critical
Implementation skills: Organized, efficient, pro-active, can think outside the box, devoted to the success of the project/contract, resourceful, results focused, risk management, problem solving, conflict resolution.	Important
Interpersonal skills: Articulate, approachable, persuasive, good verbal and non-verbal communication, listening skills; emotional intelligence, courteous.	Important

3.3 CONTRACT EFFECTIVENESS

Although the contract may have been signed by both parties, the legal effectiveness of the contract may be dependent on one or more of the following conditions: (1) Receipt by the PE of the Performance Security; (2) Receipt by the PE of an Advance Payment Security; (3) Payment to the Contractor an Advance Payment; and/or (4) Mobilization and Site possession by the Contractor.

PPRA's General Conditions of Contract for works provides conditions for contract effectiveness, reproduced below, which must be observed by the PEs.

Conditions Precedent	3.1 Having signed the Contract, it shall come into effect on the date on which the following conditions have been satisfied:- a) Submission of performance Security in the form specified in the SCC ; and b) Furnishing of Unconditional Advance Payment Guarantee.
	3.2 If the Conditions precedent stipulated on GCC 3.1 is not met by the date specified in the SCC this contract shall not come into effect;
	3.3 If the Employer is satisfied that each of the conditions precedent in this contract has been satisfied (except to the extent waved by him, but subject to such conditions as he shall impose in respect of such waiver) he shall promptly issue to the contractor a certificate of Contract commencement, which shall confirm the start date.

Therefore a person responsible for Contract Management i.e. the PM needs to ensure that:

- Any Performance Security specified in the contract is received by the PE , failure of which means that there is no contract;
- Any Advance Payment specified in the contract is paid immediately when the Advance Payment Security is received from the Contractor;
- Both the Performance Security and Advance Payment Security submitted by the Contractor are verified with the issuer of the same, to avoid possibility of

forgery. This should be done through official correspondences which shall be filed in the Contract File.

- Once issued with a certificate of Contract Performance, the Contractor meets the agreed dates for mobilization and possession of the site.

3.4 CONTRACT MANAGEMENT PLAN (CMP)

The Contract Management Plan is an input/output document that outlines the method in which a specific contract will be administered and executed. The CMP document will traditionally include a number of items such as requirements of documentation delivery and requirements of performance. A CMP can come in many forms. They can be formally written documents, in which nearly every detail is touched upon, or they can be written very informally, containing only top level information which can be filled in with more specificity at a later time. CMPs, as with most elements of the effective management of projects, should in fact be implemented as early in the life cycle of a project as possible. In the event circumstances change, it may be possible to modify a CMP with the agreement of all parties.

Make sure every contract management is tailored to the individual contract - the content and amount of detail will depend on the nature of the services, the clients and the contract. The plan should set out:

- (a) who will be responsible for managing the delivery of the contract,
- (b) the nature and extent of engagement with the supplier or provider,
- (c) how issues and disputes will be resolved,
- (d) potential risks, how they'll be mitigated and managed and by whom,
- (e) a methodology and plan for evaluating the quality of delivery and the benefits achieved,
- (f) key stakeholders (internal and external) and how these relationships will be managed,
- (g) an exit strategy to be applied at the end of the contract.

The PM shall prepare a CMP which shall give a background of the contract and capture the key focus areas of the contract, and this may as well be a subject of discussion in the Project Kick-Off Meeting discussed in Section 3.6.2.2.

It shall contain the following.

- (a) Background Information,
- (b) Contract management team,
- (c) Contractor details,
- (d) Scope of contract management,
- (e) Key provisions of the contract,
- (f) Duties and responsibilities,
- (g) Communication channels,
- (h) Review and reporting requirements,
- (i) Activities and timescales,

- (j) Any other information which will assist the contract management team in its task.

A Template for typical Contract Management Plan is attached as Appendix 1.

3.5 CONTRACT DELIVERY FOLLOW-UP

3.5.1 Definition of Contract Delivery Follow-up

One important aspect of contract management is to follow up on the state of what has been bought after it has been delivered, to ensure that the PE is satisfied. The extent of the follow-up may vary, depending on the contract value. Responsible PE staff should establish any expected delivery follow-up requirements at the time the contract is being set up. In many cases, problems arise during implementation because mitigating measures were not taken into account during the preparation of the contract.

It is normally required to deal with reports of unsatisfactory performance immediately. Decision must be made on a contractor who is not executing works to the expected quality standards or who has delayed the works on whether it should be considered as a contract default and what steps should be taken.

Contract delivery follow-up is also responsible for dealing with a contractor whose works during the execution or during the defects liability period have become defective or fail to meet contract requirements as a result of faulty construction, materials or workmanship.

3.5.2 Contract File

In order to allow for effective contract delivery follow-up, the PM is required to open and keep a contract file after the contract is signed. The *Contract File* supersedes the *Procurement File* which is used for the purpose of keeping all important records of the procurement process until a formal contract is entered.

It is important to appreciate that proper record keeping is fundamental to contract administration. Therefore, a contract file is used for recording all information regarding the actual performance of the requirements of the contract. The file should contain the following:

- (a) Signed original procurement contract
- (b) Any signed modifications to the contract
- (c) Contract correspondence between the parties
- (d) Information on performance
- (e) Correspondence relating to the contract
- (f) Management progress reports
- (g) Minutes of meetings of project team
- (h) Payment records and close up documents
- (i) Copy of performance security (where required)
- (j) Any other relevant information.

PPRA has prepared a guide of records to be maintained in the procurement and contract file as shown in Appendix 2.

3.5.3 Contract Delivery Follow up for Works

In works contract delivery follow-up encompasses the following:

- (a) ensuring that the actual mobilisation and completion dates are agreed with the contractor, based on the date of contract effectiveness;
- (b) monitoring the overall progress of the works and the performance of the PM;
- (c) reporting any contractual problems or requests for contract amendments to the PMU;
- (d) checking and ensuring that invoices and supporting documentation for payment are correct and arranging payment;
- (e) managing any securities, such as performance or payment securities, by ensuring that they are kept securely, ensuring that extensions to their validity are obtained in good time, when required, reducing their value when required, and releasing them promptly, when all obligations have been fulfilled;
- (f) ensuring all final acceptance and hand-over arrangements are completed and documented satisfactorily; and
- (g) ensuring all final drawings, manuals etc. are received and kept in an appropriate place.

One of the serious problems in project implementation is the lack of a dedicated person at the Head Office who has the responsibility of following up and overseeing that decisions required at the Head Office relating to a particular project are made in time. This leads to a situation where a project's progress is affected because of lack of timely decisions/approvals which are required to enable smooth execution on the part of the contractor. It is therefore important for a PE to appoint a dedicated person in its headquarters who shall be responsible to oversee the affairs of the project. This person is sometimes known as a *Project Coordinator* to distinguish him from the *Project Manager*.

3.6 PROGRESS MONITORING & CONTROL

3.6.1 Site Recording and Control Tools

3.6.1.1 Site Records

The keeping of continuous and comprehensive site records provides an effective means of controlling and monitoring all activities of a project on the site. Records have a vital role to play in the assessment and settlement of disputes. They can take a wide variety of different forms and the following list embraces most of the more common records kept by the contractor's representative.

- (a) All correspondence between a contractor and PM, including PM's instructions, variation orders and approval forms,

- (b) All correspondence between the Contractor and the Employer and third parties,
- (c) The minutes or notes of formal meetings,
- (d) Daily, weekly and monthly reports submitted by the Contractor's staff,
- (e) Plant and labourers' returns,
- (f) Work records such as dimension books, timesheets and delivery notes,
- (g) Day work records,
- (h) Interim statements as submitted including any corrections, with copies of all supporting particulars and interim certificates,
- (i) Level and survey books, containing checks on setting out and completed work,
- (j) Progress drawings and charts and revised drawings,
- (k) Site diaries, laboratory reports and other test data,
- (l) Weather records,
- (m) Progress photographs and
- (n) Administrative records, such as leave and sickness returns, and accident reports.

3.6.1.2 Site Correspondence

All letters, faxes, e-mails, drawings and other documents should be recorded as they are received or dispatched, and all incoming documents should be date stamped. Verbal instructions from the PM and telephone conversation where they convey instructions or important information should always be confirmed in writing. Copies of all correspondence, whether in the form of formal letters or handwritten notes, should be carefully retained, along with old diaries, notebooks, field books and similar data.

The originals of every incoming letter and clear copy of every outgoing correspondence, with any enclosure, should be placed in a file containing a suitable reference title. Additional but rather time consuming and costly measures that are sometimes taken include the keeping of a register of all correspondences and making extra copies of each outgoing letter which is kept in a file.

3.6.1.3 Site Reports

A report is primarily a summary of information and the principal method of conveying information on site matters to the head office, the employer and other parties.

Daily reports by Supervisors on site, form an important part of site communications. These reports contain details of the work carried out, weather conditions, the number of employees engaged on the work number and types of plant in use and hours worked, and details of any delays and their causes. Starts and completions of activities should be noted. After having been processed, the reports should be filed and stored neatly and chronologically for ease of reference. Technical

reports may be prepared on laboratory tests and special reports on specific problem areas.

3.6.1.4 Labour and Plant Return

The contractor's labour and plant returns constitute another commonly employed form of written record, the contractor will normally be required by the PM to submit at prescribed intervals, such as monthly, the number and categories of labour and plant engaged on the site. Apart from this requirement from the PM, such records assist the contractor to establish how efficiently he is utilizing his labour force, especially when such records are accompanied with the amount of work done on a daily basis for various categories of labour.

3.6.1.5 Laboratory Tests

Laboratory reports and other test results are normally entered on standard forms and files on a subject basis. Common tests include concrete cube strengths, earthworks density, compaction and moisture content, and analysis of bituminous products. On occasions, the information is more effectively presented diagrammatically as in the form of graphs for matters such as standard sieve analyses. Statistical analysis of data can encompass the determination of such parameters as range, standard deviation and coefficient of variation. The laboratory may also undertake the recording of rainfall, temperatures, wind speeds and tides.

3.6.1.6 Photographs

It is good practice to take photographs of the main features of the project from the same position at regular intervals, often monthly, to provide an excellent record of progress throughout the project. These photographs are often supplemented by photographs of particular features such as rejected section of honeycombed concrete, irregular brickwork, bank slippage and extent of flooding resulting from exceptionally heavy rainfall. The photographs should be taken with a good quality camera and they should have details of the date, subject, position and direction from which it was taken recorded.

3.6.1.7 Diaries

Diaries are indispensable as they provide a complete narrative of the progress of the works and the activities of the Contractors. The diary entries collectively supply comprehensive information on all aspects of the works and also permit cross checking to elucidate disputed statements.

A diary provides a factual record of events on site, discussions with the PM's staff and other personnel, instructions issued and weather conditions. All entries must be accompanied by details of the time, location and personnel involved.

3.6.2 Project Meetings

3.6.2.1 Purpose of Meetings

During the course of a contract, a variety of meetings will take place in site offices, on specific parts of the works and in the suppliers' premises. Some may be called at short notice to resolve a problem on the site, while others will be formally arranged at regular intervals and are generally concerned with co-ordination and progress. The main objective of all meetings is to come to a decision, although supplementary aspects like generation of ideas and discussion of problems may also be important. Meetings can, however, fail to achieve these objectives through over-formality, ineffective chairmanship, failure to concentrate on key issues or an antagonistic attitude by one of the parties.

Information meetings are generally concerned with the removal of unacceptable work or materials or the continuance or discontinuance of a particular method of operation. A note in the participant's diary may be sufficient to record the incident and the action taken. Where, however there is a dispute over facts or liability, then the PM may call a meeting with a Contractor's representative by notifying him, of the proposed daytime and place of the meetings, the names of those invited and the substance of their discussion.

From time to time, it may be necessary to convene a formal meeting to discuss a specific matter which has become important to the progress of the project. Three important categories of meetings can be identified:

- (a) Discussion between senior members of the site organization, often involving the contractor's representative and the PM
- (b) Meetings with the sub-contractor and suppliers, and
- (c) Meetings involving a third party, such as a statutory undertaker

3.6.2.2 Project Kick-off Meetings

Projects do not always go through an organized sequence of planning, approval and execution. Sometimes one can be executing a project and finds that team members and stakeholders have varying levels of understanding about the purpose and status of the project. Just as a project should have a formal end-of-project meeting to signify that it is complete, it also makes sense to hold a formal kickoff meeting to start a project.

The purpose of the kick-off meeting is to formally notify all stakeholders that the project has begun and make sure everyone has a common understanding of the project and their roles. The kickoff meeting is a time to get all the team members, clients and stakeholders together and formally set the stage for the start of the project.

Box 3.2

The kick-off meeting is an opportunity to present and discuss a Contract Management Plan with all project stakeholders.

The project kick-off meetings offers an opportunity for the PM to present his prepared CMP to all team members for discussion and obtain consensus and agreement.

Items of agenda for the Meeting

Regardless of who is in attendance at the kickoff meeting, there are a host of topics that should be covered or at the very least be touched on. These can be grouped into: project plans, ongoing concerns, and closeout.

The Project Plans

This includes the actual drawings and specs for the project. But it is also important to discuss things like the schedule, what permits need to be pulled, proposed start and finish dates for specific trades, and it is important to identify key milestones for the life of the project. Finally, when everyone leaves a kickoff meeting, they should have a concrete understanding of where their scope of work begins and ends.

Ongoing Concerns

It is a good idea to agree on meetings to be set- weekly or monthly meeting schedules during the kickoff meetings. Other topics to be covered should include: payment schedules, processes for implementation of change orders, the submittal and approvals process, and how much retainage will be withheld from progress payments. How and when material deliveries should take place might also be discussed. Not to be overlooked is safety – safety protocols and procedures should be discussed from the get-go, and it is probably a topic that should come up often at weekly meetings, too.

Closeout

It may seem a little early, but it is a good idea to discuss closeout procedures as early as possible. Information like when retainage will be released, punch list procedures, and cleanup requirements should be relayed early. That way, when the end of the job comes around, no one will be surprised when they are confronted with punch work, waiver requests and clean up.

Agenda for Kick-off Meetings

To achieve desired outcomes, it is essential to prepare a detailed agenda. Items that should be covered include:

- (a) Introduction,
- (b) A review of the meeting objectives,
- (c) Defining responsibilities of team members,

- (d) Defining communication protocols for processes of sending and approving messages,
- (e) Deliverables, including ensuring client understanding of deliverables, identifying which deliverables are required prior to construction release, discussing scope of changes and related issues such as safety and quality control, bonding and insurance, and updating implementation schedules,
- (f) Reviewing contract clauses,
- (g) Discussing site-specific facility access and security requirements, if any,
- (h) Detailing design and construction schedules,
- (i) Environmental health and safety planning,
- (j) Outages and permits,
- (k) Planned agenda structures for plan of the day/plan of the week/ plan of the month meetings.

3.6.2.3 Project Progress Meetings

The other most important meetings on a project are the regular project meetings, sometimes termed site meetings or progress meetings. They are normally held at monthly intervals and they provide the opportunity for a regular, comprehensive re-appraisal of the project. These meetings are usually chaired by the PM. They permit a full and frank discussion of the contract, the giving of early notice of disputes which may not be capable of resolution at site Level and the receipt of any legitimate complaints against the performance of the contractor.

The main functions of project meetings are as follows:

- (a) To ensure that the contractor and other team members understand the project requirements and have the opportunity to check contractual, design and production details and to request clarification or information,
- (b) To ensure that proper records are kept and contractual obligations met,
- (c) To compare progress with targets and agree on any corrective action,
- (d) To discuss problems, such as delays or sub-standard work which may affect quality, cost or timing of the prophecy,
- (e) To ensure that sub-contractors agree on the action necessary to meet their obligation and
- (f) To check that variations are confirmed in writing and that work is recorded and agreed.

Box 3.3

Progress meetings are an opportunity to discuss issues which impact project implementation. Where they cannot be resolved they must be escalated to a level where an appropriate solution can be found – Issues of Management is discussed in Section 3.15 of this guideline.

Agenda

A formal agenda should be prepared for each project meeting to provide a sound basis for discussion at the meeting. Table 3.2 Shows a Typical Agenda for a Monthly Progress Meeting.

Table 3.2: Typical Draft Agenda for a Progress Meeting

1. Project:
2. Contract No:
3. Contractor:
4. Meeting:
5. Venue:
6. Date:

Box 3.4

Prior to the meeting, a site visit must be made to inspect the works and assess the actual progress achieved. In case of large sites, the site visits can be made a day before the meeting. Ensure all important team members attend the visit

15th Progress Meeting Agenda and Schedule		
Item	Presenter	Time -allocation ⁵
1.0 Opening of the Meeting		09:00 to 09:15
2.0 Site inspection and matters arising		
3.0 Adoption of the Agenda		09:15 to 09:20
4.0 Confirmation of Minutes for 14th progress meeting		09:20 to 09:25
5.0 Matters arising from the Previous Progress Meeting		09:25 to 09:50
6.0 Previous Technical Meeting ⁶ brief summary/ report		09:50 to 10:00
7.0 Contractor's Progress Report and Construction progress		10:00 to 10:15
8.0 Status of Design works		10:15 to 10:25
8.1 Detailed Construction Architectural Drawings		
8.2 Engineering and Mechanical Design		
9.0 Approvals and Status of Fit-out Works		10:25 – 10:30
10.0 Contractual Submissions		10:30 to 10:40
10.1 Project BOQ		
10.2 Status of procurement of long lead items		
11.0 Environmental, Social, Health and Safety		
12.0 Contractor's Claims and Payment		10:40 to 10:45
13.0 Sub-Contractor's matters		10:45 to 10:50

⁵ Allotting Time for each speaker enables them to prepare for their presentation to fit the time allotted and thereby making meetings more efficient

⁶ Technical Meetings are those held at Site involving mainly the PM and Contractor's Project Supervising Staff – these are supposed to be held regularly to find solutions to problems occurring on site.

15th Progress Meeting Agenda and Schedule	
14.0 Proposal for next Progress Meeting	10:50 to 10:55
15.0 AOB	10:55 to 11:00
16.0 Adjournment	11:00

3.6.2.4 Conduct of Meetings

The chairman of the meeting, in consultation with the secretary, should ensure that dates for meetings are fixed, venues reserved and all participants are notified. The chairman will approve the agenda and usually give members the opportunity to suggest additional items for inclusion. He will also ensure that they arrive adequately prepared. A chairman should desirably be impartial, reasonable and responsive. Formal minutes or notes will be taken of the main points discussed and decision made.

The chairman should plan the discussion around the agenda to enable members to make a positive contribution and to ensure the smooth and rapid progress of the meeting. The main objective should be to reach unanimous decision in a minimum time. An efficient chairman will at the outset of a meeting determine the purpose of the meetings its direction, the limits of discussion and the timescale.

The Box 3.5 gives some tips on how to hold and manage project progress meetings. The same tips are applicable to any important meetings.

Box 3.5- Tips on How to Manage Meetings

How to manage a project progress meeting
<p>Have you ever attended a meeting that had just a rough outline of an agenda, or no agenda at all?</p> <p>Whatever type of project meeting you are holding there should always be an agenda distributed beforehand to the participants.</p> <p>Never just ask someone for information in the meeting – everyone needs time to prepare the right data to ensure an accurate update of project progress is delivered. But as the PM you need to remember that a progress meeting is what it says and you need to remind the attendees of this fact, if necessary. A progress meeting is not a time to air grievances, raise change requests or listen to the technical minutiae of an ongoing problem.</p> <p>A progress meeting should be brief (so book the meeting room for a limited amount of time – probably no longer than an hour) and everyone should understand it's objective, which is simply an update on where the project stands with respect to its schedule and any issues affecting progress.</p> <p>Any issues requiring detailed discussion should be deferred to another meeting where you can discuss the specifics with only those people affected.</p> <p>So here are some tips to help you manage and control your next project progress meeting:</p>
<p>1. Write an agenda and distribute it beforehand</p> <p>Even if this is one of many such meetings an agenda is a reminder to the participants just what the meeting is intended to cover and what is expected of them. It gives everyone time to gather the progress information they need to provide at the meeting.</p>

How to manage a project progress meeting

2. Repeat the objective

The agenda should be a reminder of the aim of the meeting but state the aims again at the beginning of the meeting and during the meeting if discussions are veering off topic.

3. Review progress and future actions

Review the progress from the last meeting and actions for the next period. On a large and mature project it might be possible to do this by exception.

4. Stay focused

Stay focused on discussing progress updates, assigning actions or revising the schedule where necessary. Do not deal with any unrelated issues – defer them instead to another meeting.

3.6.2.5 Implementation of Decisions

At the meetings views are exchanged, proposals generated and decisions made. It still remains for the decision to be implemented. The chairman of the meeting, possibly assisted by the secretary, will be responsible for ensuring implementation. The minutes will record who is to take the appropriate action and all participants will receive copies of the minutes. The action taken will be monitored at the next meeting under matters arising.

3.7 PREPARATION OF INTERIM AND FINAL PAYMENT CERTIFICATES AND MANAGING PAYMENTS TO THE CONTRACTOR

3.7.1 Advance Payment

An advance payment, sometimes referred to as a down payment, is sometimes payable when part of a contractual sum is paid in advance of the exchange, i.e. before any work has been done or goods supplied. On a construction project, a contractor may request an advance payment to help them meet significant start up or procurement costs that may have to be incurred before construction begins. For example, where they have had to purchase high-value plant, equipment or materials specifically for the project.

For the purpose of receiving the Advance Payment, the Contractor is required to make an estimate of, and include in its Tender, the expenses that will be incurred in order to commence work. These expenses will relate to the purchase of equipment, machinery, materials, and on the engagement of labour during the first month beginning with the date of the PE's "Notice to Commence" the works as specified in the Special Condition of Contract (SCC).

In a situation where there are problems of delayed payments, it is particularly recommended that advance payment be paid to the contractors to enable smooth contract start up. However, advance payment would only be paid upon

submission of advance payment security in the form of Bank Guarantee.⁷ The submitted Bank Guarantee should be checked of its “wording” to conform to the format provided in the Tender Document and its authenticity by formal communication with the issuer of the said guarantee. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee can be progressively reduced by the amounts repaid by the contractor.

It should be noted that submission of unconditional advance payment guarantee is a condition precedent to contract effectiveness. This provision in the contract needs to be treated carefully. Sometimes a contractor may face difficulties to process and submit an advance payment guarantee- under such circumstances wisdom should prevail. The PM may suggest amendment of the contract subject to the approval of the TB to disable payment of advance payment clause in the Contract so as to allow the contract to be effective without there being a need for the contractor to submit an advance payment guarantee.⁸ Once the advance payment clause is disabled, obviously the contractor will not be paid advance payment.

Also, important to note is that delay in payment of advance payment is a compensation event which may entitle the contractor to an extension of time. Therefore, immediately after the contractor has furnished acceptable advance payment guarantee, payments of the same should be effected within the date specified in the SCC.

It is also important to note that the Contractor is required to use the advance payment only to pay for equipment, plant, materials, and mobilization expenses required specifically for execution of the Contract. It is therefore the duty of the PM to obtain evidence from the Contractor that advance payment has been used in this way by supplying to him copies of invoices or other documents as may be appropriate.

3.7.2 Interim Payment Certificates

Interim Payment Certificates (IPC) provide a mechanism for the client to make payments to the contractor before the works are completed. Interim payments can be agreed in advance and paid at particular milestones, but they are more commonly, regular payments, the value of which is based on the value of work that has been completed (this is the actual value of the work completed, taking into account variations, etc.).

⁷ Unlike Performance Securities where the PPRA's Conditions of Contract provide alternatives of Bank Guarantee or Performance Bonds, for Advance Payment Guarantee only a Bank Guarantee is acceptable.

⁸ However this should be taken as red flag on the financial situation of the contractor. A contractor who fails to obtain a guarantee from his Banker signals that he is experiencing financial difficulties and lacks trust of his Bankers. Close follow-up is therefore required on his performance.

The amount of these payments is entered onto an interim certificate and the client must honour the certificate within the period stipulated in the contract.

The value of an interim certificates is the value of the work completed, less any amounts already paid, less retention. Half of this retention will be released on certification of practical completion and the other half upon issue of the certificate of making good defects. Normally the value of work executed is required to comprise the value of completed work items in the Bill of Quantities (BOQ). In addition, it should include valuation of Variations and Compensation Events. The PM may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

Interim certificates should make clear the amount of retention and a statement should also be prepared showing retention for nominated sub-contractors if there are any.

There may be particular provision to include the value of particularly costly materials that the contractor has delivered to the site. This allows the contractor to order items in good time, without incurring unnecessary long-term expenses, but does put the client at some risk if the contractor becomes insolvent.

PPRA's Conditions of Contract provide that the PM must issue an interim certificate within 28 days after the contractor has issued an interim payment application. The PM will also need to ensure that the amount of IPC exceeds the minimum amount of IPC provided in the SCC. Figure 3.3 shows a typical sequence of payments as envisaged in a typical construction contract.

3.7.3 Final Payment Certificate

The Final Payment Certificate (FPC) is certification by the PM that a construction contract has been fully completed. It is issued at the end of the defects liability period and has the effect of releasing all remaining money due to the contractor, including any remaining retention. The value of the final certificate will be based on the final account agreed by the PE and the contractor. This means that all patent defects must have been remedied, all adjustments to the contract sum must have been agreed and all claims settled.

Where proceedings have been commenced in relation to a dispute, the conclusiveness of the final certificate is a subject of the findings of those proceedings. In addition, the final certificate itself can be disputed. Adjudication, arbitration or other proceedings may then be necessary to resolve the dispute. The final certificate is then only conclusive in relation to matters that are not disputed.

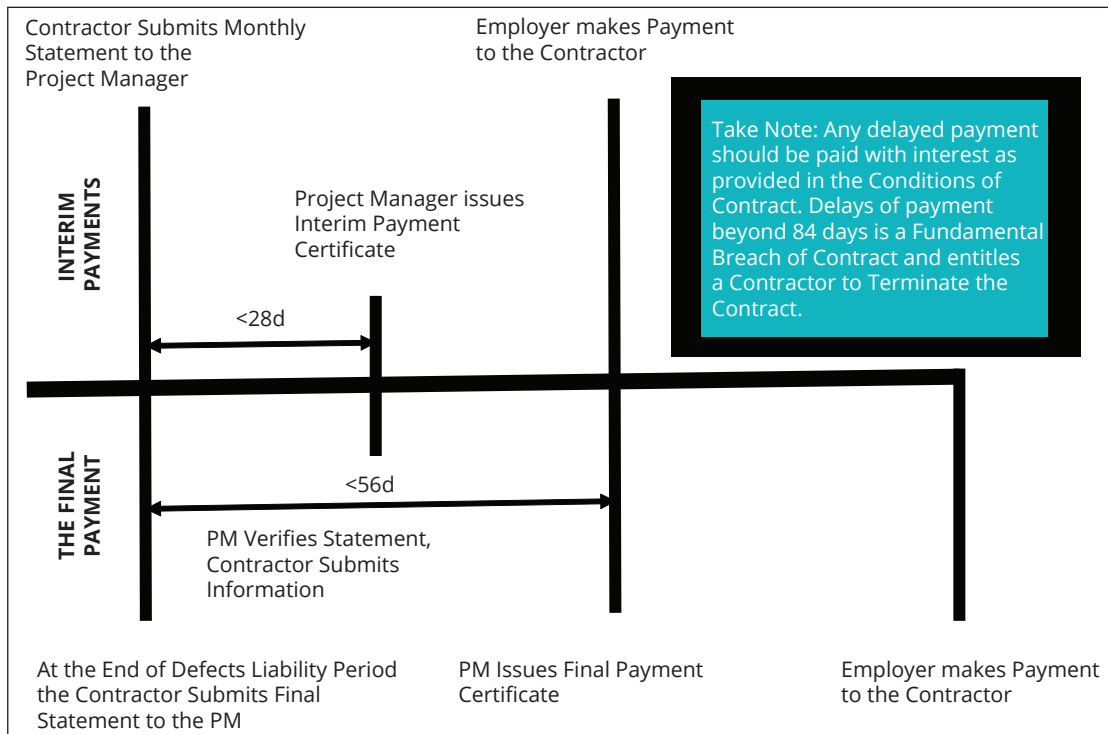


Figure 3.3: Typical Sequence of Payment Events for a Construction Contract

3.7.4 Managing Payments to the Contractor

Delay in paying construction contractors has impacted negatively on the effectiveness of contractors and as such affect the project delivery schedule. Failure to pay contractors in time for work executed might lead to the contracting firm being insolvent. Delayed payments of work done on construction projects in the construction industry are considered to be a factor of significant concern. It causes severe cash-flow problems to contractors and this can have a devastating effect down the contractual payment chain. It is not uncommon to find a contractor or sub-contractor who has not been paid what is due to him threatening to suspend work under the contract until the balance due to him is paid in full. The Ministry of Water (MoW) will ensure computerization of a payment tracking system supported by a transparent queued system accessible online to all the key stakeholders

PPRA's General Conditions of Contracts require the Employer to pay the Contractor the amounts certified by the PM within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date when the payment should have been made up to the date when the late payment is made at the prevailing rate of interest issued by the Bank of Tanzania on the date of Contract signature for each of the currencies in which payments are made.

Further delays of payments by the Employer up to 84 days becomes a fundamental breach of contract which entitles a contractor to terminate a contract.

It is however unfortunate that, some PEs disable the requirement to pay interest on delayed payments through the SCC. This is not allowed as it is among the fundamental rights of the contractor to be paid on time and any delayed payment attracts interest. Contractors on the other hand are afraid to claim interests for fear of being unofficially blacklisted by the PEs. It should be emphasized

here that one of the most fundamental obligation of the Client is to ensure timely payment for all works completed to the required quality. Failure to meet this obligation forces the other party to fail to meet its contractual obligations which depends on staged payments as provided in the contract.

The key considerations for effective management of payments to the Contractors:

- (a) Ensure that a proper estimate is prepared for the project, and based on the prepared estimate a budget is set aside for implementing the project;
- (b) Ensure that advance payment is made in a timely manner after the contractor has presented an acceptable and verified advance payment guarantee. As mentioned before, delaying payment of the advance is a compensation event which entitles a contractor to an extension of time, but more importantly it hurts the smooth start of the project and can have far reaching consequences as to the ability of the contractor to produce quality work in a timely manner.
- (c) Ensure that certification for work done is done properly and in a timely manner and that payments due to the contractor are made as per Conditions of Contract. In a situation of delayed payments, it is a contractual right to pay the contractor interest for delayed payments as provided in the contract.
- (d) Ensure that retention money as provided in the contract is deducted from payments due to the contractor up to the maximum amount provided in the contract. Also ensure that half of the retention money is paid to the contractor after issuance of Certificate of Practical Completion of the works.
- (e) Since the management of half of the retention money which is required to be paid at the expiry of defects liability period can be a challenge to the Ministry, consider the option of paying the contractors this amount after issuance a Certificate of Practical Completion of Works subject to submission of acceptable unconditional retention money bank guarantee.
- (f) Ensure that any variations to the Contract which result into an increase to the contract sum and/or construction period are approved by the TB before payment

Box 3.6

Delays of payment to contractors can seriously affect the progress of the works. Construction business is based on stage payments which must be made to contractors on time to enable them maintain steady progress with the works.

The practice of efficient and timely payment in construction projects is a major factor that can contribute to the success of a project

- (g) Ensure that any claims submitted by the contractor are determined fairly and in a timely manner. No variation to a contract price or construction period should be communicated to the contractor until approval of the TB is obtained.

3.8 DELAYS IN PERFORMANCE

Performance of works should be completed by the Contractor in accordance with the time schedule prescribed in the Schedule of Requirements. Where this is not the case:

- (a) The PM should demand from the Contractor, in writing, the conditions delaying performance, including full details of the delay, the likely duration and the cause(s).
- (b) The PM will immediately assess the situation in consultation with the PE, and may at his discretion extend the Contractor's time for performance, with or without liquidated damages as specified in the Contract.
- (c) If the time for performance is extended, both parties shall ratify such extension by a formal addendum to the Contract subject to approval by the TB.
- (d) A delay by the Contractor in the performance of his obligations may render him liable to liquidated damages if specified in the contract document, except where:
 - (i) the delay is as a result of Force Majeure;
 - (ii) there is no provision for liquidated damages in the contract;
 - (iii) an extension of time is agreed between the two parties without the application of liquidated damages.

PMs are required to refer to the relevant clauses in the Conditions of Contract for the procedure to be followed to calculate and claim liquidated damages. They are also required to update the contract file to reflect any delays in the Contractor's performance, and ensure that the user department (UD) is notified immediately of all such delays if they are not already aware.

Waivers to liquidated damages need to be handled carefully as they are likely to attract audit queries. Any waiver should be accompanied by an extension of time which is only justifiable when there is a compensation event as described in the contract which entitles the contractor to an extension of time.

3.9 INITIAL AND FINAL ACCEPTANCE OF THE WORKS

3.9.1 Initial Acceptance of Works

Initial acceptance of the works also known as Provisional Acceptance is a conditional acceptance which means that the client has accepted the project but performance needs to be verified or confirmed under operational conditions within an agreed period. The client issues a Provisional Acceptance Certificate to evidence this step. This is when the defects liability period starts. Initial acceptance follows practical completion of the works by the contractor.

Practical Completion doesn't mean the Contractor has finished the Works in every detail. It means the Works are sufficiently complete to be safely used by the PE for the purpose he intended. The Contractor may still complete minor items and fix defects after Practical Completion, as long as the Employer isn't inconvenienced. Practical Completion is important because if it is not achieved by the due completion date, the Ministry can impose penalties on the Contractor.

The PM must issue a Certificate of Practical Completion to the Contractor when he has achieved Practical Completion. Once the Certificate has been issued, the Ministry may occupy and use the Works, provided he gives reasonable access to the Contractor to finish the minor items still outstanding and to fix any defects. Although the Ministry may occupy and use the Works, the Contractor still has possession of the Works. This means the Contractor is still responsible for loss or damage to the Works, unless the loss or damage is caused by the Employer. Figure 3.4 summarizes typical sequences of events from award until completion of the contract.

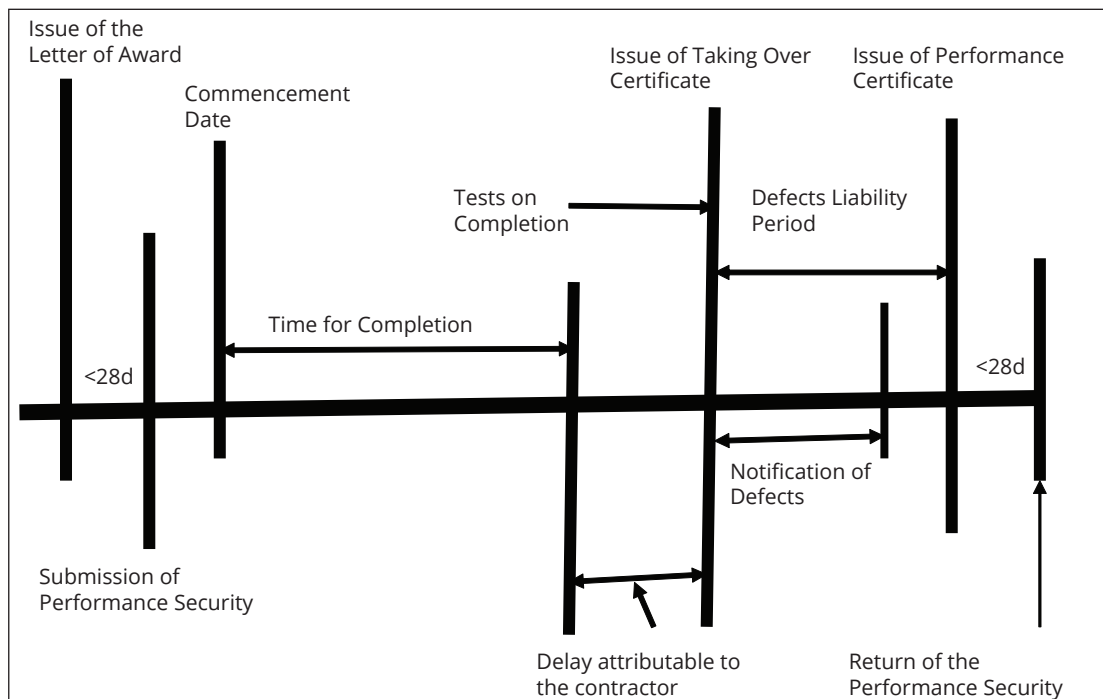


Figure 3.4: Typical Sequences of Events from Award until Completion of the Contract

3.9.2 Final Acceptance

Upon completion of a construction project, the owner will “accept” the works and thereafter release final payment to the contractor. Typically, a contract sets procedures for the administrative closeout of the project, including clauses covering substantial completion, reduction and release of retention, final inspection of the works, final acceptance, and final payment.

As can be expected, contractors usually focus most heavily on what is necessary to receive final payment. However, “final acceptance” by the owner is the most important closeout event as far as the contractual and legal relationship of the parties. Under the common law of contracts, upon final acceptance, the owner takes control and ownership of the project and the risk of loss passes from the contractor to the owner. Final acceptance generally means acceptance of the works as completed, including any deficiencies known to exist. At that point, the owner’s contract rights against the contractor becomes far more limited. Therefore, final acceptance of the works should be considered the most significant contract event after contract award.

3.10 CONTRACT CLOSE OUT

3.10.1 Contract Closeout Defined

A completed contract is one that is both physically and administratively complete. A contract is *physically complete* only after all deliverable items and services called for under the contract have been delivered and accepted by the grantee.

These deliverable items include such things as reports, spare parts, warranty documents, and proof of insurance (where required by the contract terms). These deliverable items may or may not have been priced as discrete pay items in the contract, but they are required deliverables, and the contract is not physically complete until all deliverables are made.

A contract is *administratively complete* when all payments have been made and all administrative actions accomplished. The steps that must be completed to close out a contract will depend upon the type and/or nature of the contract.

Contract close out is a part of contract management and therefore has the same purpose: to “ensure that contractors perform in accordance with the terms, conditions, and specifications of their contracts or purchase orders.” The extent of the effort involved in contract close out varies widely with contract type and the type of product or service procured. Therefore, there is no single procedure that can be used for the full range of contract types and products procured. Essentially it is a review and documentation of the fulfillment of all contract requirements.

Contract close out is quite simple with respect to a firm-fixed-price, off-the-shelf supply contract where the file contains documentation that the end product has been received, inspected and accepted and that full payment has been made. The process is more complex when large contracts containing progress

Box 3.7

Contract Close Out arrangements need to be considered during the design stage of the project. For example one aspect of contract close out is how to handover the contractor’s camps after completion. If a contract close out was considered during the design stage, it could have been decided on the type of camps to be built which could later be transferred to the local communities for use of hospitals or schools depending on the needs of that community.

payments, partial deliveries and many change orders are involved. However, the end objective is the same; to determine if the contractor fulfilled all requirements of the contract and if the PE has fulfilled its obligations.

3.10.2 Contract Completion Checklist

Before closing a contract file, the PM should check that:

- (a) all goods have been delivered, works completed and handed-over, services performed and contract deliverables received;
- (b) there are no outstanding claims for missing or damaged items against either the supplier or an insurance company;
- (c) all necessary payments have been made;
- (d) the total payment is correct, taking into account any contract amendments, variations, price variations and the amortisation of any advance payment;
- (e) all guarantees and securities have been returned and
- (f) all necessary documentation is in place and correct.

Box 3.8

Contract Close out arrangements need to be included in the Contract Management Plan and be discussed during the kick-off meeting.

3.11 STAKEHOLDERS MANAGEMENT PLAN

3.11.1 The Need for Stakeholders' Management Plan

Managing stakeholders is an important task that must be performed by a PM in order to achieve the project outcomes. Some of the challenges found in project implementation is the stakeholder's indifference. A stakeholder indifference can kill projects, and the lack of stakeholder participation is a common challenge in construction project management. When stakeholders are indifferent to the activity at a site, it can result in work and delays.

The stakeholder management plan is used in project management in understanding the stakeholder communication requirements. It is also used to determine the level of stakeholder engagement to assess and adapt to their participation in the project activities.

Box 3.9

Stakeholders' Management Plan need to be included in the Contract Management Plan and be discussed during the kick-off meeting.

This process is also involved in developing management strategies to engage them throughout the life cycle of the project. PMs need to make a stakeholder management plan based on the stakeholders' interests, needs and impact on the success of the project. The benefit of this project management process is that it provides a concise plan to interact with the stakeholders to support the project's interest.

It also identifies how stakeholders will be affected by the project. This will allow PMs to strategize and develop ways on how to engage them effectively in order

to manage their expectations in the event that will lead to the achievement of the objectives of the project. This often involves the improvement of communication channels to create a harmonious relationship between the stakeholders and the project team while, at the same time, satisfying the needs and requirements of everyone within the project boundaries.

3.11.2 Stakeholders Mapping

Stakeholder Mapping is a process of finding out the key stakeholders relating to a project. The process involves identifying all individuals who have an interest in the project outcome. A project stakeholder can be one individual or multiple individuals as in the case of a large public infrastructure project.

Once all the project stakeholders are identified, the PM must map, or categorize them, according to the different levels of engagement. Mapping of the stakeholders is done according to the following two levels – the level of interest and the level of influence

By influence, it means stakeholders have power in setting and modifying project requirements. On the other hand, interest means that stakeholders are affected by the project outcome but they do not have any power to influence project requirements.

A PM should focus on satisfying expectations of the stakeholders who have a high level of influence relating to the project. On the other hand, stakeholders having a high level of interest need to be merely kept informed of the project status.

Mapping of shareholders is a visual exercise. One can manually map the stakeholders. Once a PM has fully mapped the stakeholders. One may need to create an action plan on how to engage with them.

The 4 steps of stakeholder mapping

- Identify top-level stakeholders, e.g. Project Team Members, staff, civil servants, politicians, associated organisations,
- Segment the top-level to make the information more meaningful, e.g. levels of membership, engaged/non-engaged members, permanent / contract staff, senior / junior roles, MPs / local councilors, specific constituencies/wards, other membership organizations, charities, NGOs, community groups, specific interest groups,
- Establish their levels of interest and influence,
- Engage – prioritize the stakeholders to determine their level of engagement- Stakeholder Map template



Figure 3.5: Stakeholder Mapping

To determine how one should best engage each stakeholder group, it is recommended to apply the thinking below to the groups in each quadrant:

- High Influence / Low Interest – communicate and engage enough so they are satisfied their voices are being heard on key issues. Avoid low value contact so they do not lose interest in what the organization is doing (*KEEP SATISFIED* – include in meetings/presentations)
- High Influence / High Interest – these need to be fully engaged and lots of effort made to satisfy their concerns and requirements for information. These will be valuable advocates. (*KEEP ENGAGED* – provide personal briefings/ workshops)
- Low Influence / Low Interest – monitor these stakeholders closely and keep them informed, with minimal effort. Do not overload them with excessive communications or needless information (*KEEP INFORMED* – no specific communication, incidental via third parties)
- Low Influence / High Interest – keep these stakeholders regularly informed to maintain their interest. Monitor any issues or concerns that may arise and respond (*KEEP INTERESTED* – newsletters, posters flyers, etc.)

3.12 COMMUNICATION MANAGEMENT PLAN

3.12.1 The Need for Communication Management Plan

A lack of communication or poor communication can lead to the death of a project. PMs need to have updates on project status and feedback for updating their teams and to meet the requirements of stakeholders and upper management. The PM must foster open communication or risk falling a victim to the communication challenges in construction project management.

Box 3.10

Project Communication Plan needs to be included in the Contract Management Plan and be discussed during the kick-off meeting.

A project communication plan is a simple tool that enables the PM to communicate effectively on a project with the client, team, and other stakeholders. It sets clear guidelines on how information should be shared, as well as who's responsible for and needs to be looped in on each project communication.

A communication plan plays an important role in every project by:

- (a) Creating written documentation everyone can turn to.
- (b) Setting clear expectations relating to how and when updates will be shared.
- (c) Increasing visibility of the project and its status.
- (d) Providing opportunities for feedback to be shared.
- (e) Boosting the productivity of team meetings.
- (f) Ensuring that the project continues to align with goals.

3.12.2 Project Team Communication Methods

There is no single right way to communicate on a project. In fact, a communication plan can and should include a variety of communication methods. Here are a few to consider: Email, Meetings (in-person, phone, or video chat), Discussion boards, Status, reports, to-do lists and Surveys.

So how do you know what is right for the project? The PM should review past projects to see what worked well—and what didn't. He/she should talk to the team, client, and other stakeholders to ensure that everyone takes their communication styles into account. After all, a weekly email is no good if no one reads it!

3.12.3 How to write a Project Management Communication Plan

Writing a project management communication plan follows these 5 steps:

- (a) **List the project's communication needs.** Every project is different. Take the size of the project, the nature of work being done, and even the client's unique preferences into account as one determines which types of communication this project needs in order to succeed.
- (b) **Define the purpose.** Bombarding people with too many e-mails or unnecessary meetings can interfere with their ability to get work done and cause them to overlook important updates. Be purposeful in the implementation of the plan, and ensure every communication included has a reason. If one is feeling really ambitious, he should go ahead and outline a basic agenda for the topics that will be covered in each meeting or report.
- (c) **Choose a communication method.** Does one really need a meeting to share weekly updates, or is your project discussion board enough? Think through how the team works best, so they can stay in the loop while still

being productive. If the client prefers the personal touch of a phone call, build that into the plan too.

- (d) **Set a cadence for communication.** Establishing a regular frequency of communication streamlines the process by setting clear expectations from the time go. This not only frees one from fielding random requests for status updates. It also enables project members to carve out space for important meetings and reports ahead of time.
- (e) **Identify the owner and stakeholders.** Assigning ownership creates accountability so a carefully crafted plan can reach its full potential. The PM will be responsible for most communications, but there may be some who want to delegate the communication function to others. While one is naming names, it is necessary to list the audience or stakeholders for each communication type too. That way key players come to meetings prepared to provide updates when needed.

3.12.4 Project communication plan: Examples and Template

Know your team and stakeholders well. So how do you organize the details is up to you. Just be sure it is easy to understand. Table 3.2 shows an example of an effective communication management plan.

Table 3.3: Example of a Simple Matrix Communication Plan

Communication	Method	Frequency	Goal	Owner	Audience
Project Status Report	Email	Weekly	Review Project Status and discuss potential issues or delays	PM	Project Team+ Project Sponsor
Team Standup	Meeting	Daily	Discuss what each team member did yesterday, what they will do today, and any blockers	PM	Project Team
Project Review	Meetings	At Milestones	Present Project Deliverables, gather feedback, and discuss next steps	PM	Project Team+ Project Sponsor
Post-mortem meeting	Meetings	At End of Project	Assess what worked and what did not work and discuss actionable takeaways	PM	Project Team
Task Progress Updates	Gant Charts	Daily	Share daily progress made on Project Tasks	PM	Project Team

3.13 DOCUMENT CONTROL AND MANAGEMENT OF RECORDS

All documents used throughout the project phases need to be controlled to ensure the availability of approved documents when and where needed, that obsolete documents are withdrawn to prevent inadvertent use, and that documents are identified, tracked and stored to permit efficient retrieval.

Document control procedures should achieve the following objectives:

- (a) All documents are reviewed and approved by the designated personnel prior to issue for use and shall be accompanied with an approval letter signed by responsible personnel;
- (b) Document changes are approved by designated personnel; where possible, the reason for changes to documents that have previously been issued shall be indicated in the document or attachments;
- (c) Documents are available at locations where the use of the document is vital;
- (d) The distribution of project documents is recorded and, in designated cases, controlled.
- (e) A master list of all documents, indicating current authorized versions, is maintained;
- (f) A historical record of project documents is maintained to record implemented changes, the proper release by authorized personnel, and distribution to the location where the prescribed activity is performed;
- (g) To ensure that current information is available as required throughout the project and that obsolete information is withdrawn from use. Obsolete documents kept for historical record are identified as obsolete; and
- (h) Quality records are maintained and retained in accordance with project procedures.

The Document Control (DC) system shall have both a paper (hard copy) component and an electronic component. If stored as soft copy, then users shall be able to search for any document on a variety of search criteria, to open and view a scanned image of the document, and to print it out if desired.

Box 3.11

Document Control System needs to be included in the Contract Management Plan and be discussed during the kick-off meeting.

This electronic approach reduces the frequency with which project staff needs to remove hard copies from the project files, which in turn increases the level of control and security on the documents. However, if the hard-copy/original version of the document is needed for some reason, the user can easily determine where it is located in the project files through the coordination with the user and archives department.

3.14 MANAGING RELATIONSHIPS

3.14.1 Importance of Managing Relationships

Relationship management underpins successful contract management. A good relationship should have been established in the earlier stages of the project procurement lifecycle. Relationship management main goal is to keep the relationship between the parties to the contract open and constructive to resolve and identify problems early. There are two approaches to relationship management:

Box 3.12

Procedures on how to manage relationships should be included in the Contract Management Plan and discussed during the project kick-off meeting.

1. **Reactive Approach** – Where the organization starts managing the contractor relationships only when unpleasant situations with contractor occur, try to figure out how to improve the performance of unreliable contractors. This approach consumes quite a lot of time and resources, which could have been better spent on more important business processes.
2. **Strategic approach** – This applies where a contractor relationship management starts even before an agreement with the contractor is signed, in order to ensure the competitive advantage of the company in the long run. This is a forward-focused approach, which can lead to a successful relationship even in the early stages.

The strategic approach to contractor relationship management has always been key to successful businesses that rely on third-party contractors, regardless of industry.

Table 3.3 Shows a sample of an approach of managing relationships in a construction project. The procedure to manage relationships may need to be discussed and agreed during the project kick-off meeting discussed in Section 3.6.2.2 of this manual. By agreeing beforehand on how to manage relationships, one is creating a strategic approach to handling problems on site and prevents being reactive to things when they do not go well on site.

3.14.2 Partnering as a Way of Managing Relationships

Partnering is a project approach designed to enable a construction process to run within an environment of mutual trust, commitment to shared goals, and open communication among the client, architect/engineer, construction manager, general contractor (if applicable), and subcontractors. Partnering establishes a working relationship among all of the team members based on a mutually agreeable plan of co-operation and teamwork. Parties to the design and construction process, in agreeing to work under a partnering approach, work to create an atmosphere in which all parties are working in harmony toward mutual goals to avoid claims and litigation. The partnering approach is comprehensively covered in Appendix 3.

Table 3.4: Sample Approach to Managing Relationships

Overall Responsibility	Each Party to the contract nominates one person with the appropriate skills and experience as representative to be responsible for the co-ordination and management between the parties over the life of the contract.
Weekly/monthly performance review meetings	The nominated representatives, including the Contractor's representative meet formally to review performance aimed at discussing and resolving any minor issues relating to the performance of the contract.
Contract Management Senior Level Meeting	At least quarterly, or otherwise agreed, a formal meeting is held. The meeting comprises senior representatives from the Ministry and the contractor. The purpose is to formally monitor performance of the contract, consider any ways in which performance may be improved, resolved and where necessary any issues that remain unresolved from the weekly/monthly performance review meetings.

3.15 ISSUES MANAGEMENT

3.15.1 Definition of an Issue

An issue is a current problem that was previously a risk to a project (whether identified or not), that will negatively impact the successful delivery of the project. In other words, each issue is a significant problem arising from a **realized risk**. Issues should not be confused with:

- **Potential problems;** these are not issues; they are risks (an uncertain event or condition that may affect the project) and should be managed through the 'risk register'.
- **Required decisions;** while the resolution of a problem may give rise to an issue, the latter will require decisions to be made, the vast majority of decisions are not issues. Provided a decision can be made by the appropriate people in an appropriate time frame, it is just another decision.
- **Action items;** while in many respects action items are similar to issues, they should not be confused. Action items simply require someone to take the appropriate action.

Box 3.13

An issue is defined as any functional, technical or business-related event that arises during the course of a project that requires a satisfactory resolution for the project to proceed as planned. Such an issue is usually outside the ability or scope of the project team to resolve. Generally issues require decisions to be made that are outside of the scope of day-to-day project tasks and their management.

The Issue Management Process is used to document and resolve major issues and/or problems that may occur during a project.

Issues are identified problems that will have a detrimental impact on the project if left unresolved and, by definition, the solution is not known until the issue is

resolved. Some issues will have an immediate impact on the project; others will be a future event that will impact the project if not resolved. However, not all 'problems' are issues. An issue is a formally defined problem that will impede the progress of the project and cannot be resolved within the routine project management process. Generally issues either require some 'special effort' by the project team, outside help, or both to resolve. To facilitate this management effort, issues are recorded in the **issues log**.

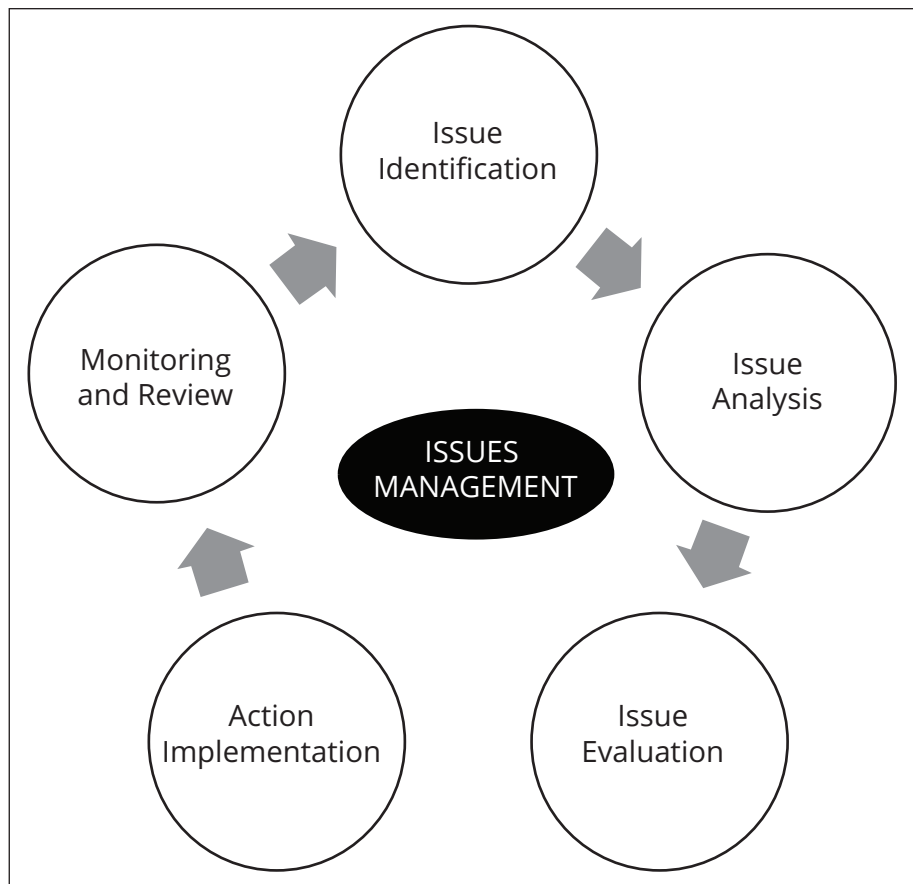


Figure 3.6: Issues Management

Fortunately, not every issue requires immediate action. Certainly, by the time it is identified many issues will have a fully developed impact that has to be dealt with quickly. Other issues will be emerging, their impact yet to be felt by the project, meaning there is time to address the problem. This allows some level of prioritization.

The analysis and prioritization of issues allows for effective management:

- Issues should have the same consequence (or impact) rating as the risk from which it was realized. This allows prioritization of action based on severity and cross links to the risk register.

- The time window for action is also important. Issues with less significant impact ratings that are impacting the project may need prioritizing over issues with more significant impact ratings that will not impact the project for some time.

The use of an issue matrix, similar to the traditional risk matrix, allows an overall issue rating that takes into account the timing of the realized impacts. The matrix retains the consequence or impact ratings from the risk assessment. However, instead of probability, the rows now relate to ranges of time in which an issue needs to be resolved before the impact negatively affects the success of the project.

As a default position, the following definitions may be appropriate for the different time ranges:

- **Immediate:** Resolution needed within the next five (5) working days or project success will be impacted
- **Urgent:** Resolution needed within the next ten (10) working days or project success will be impacted
- **Important:** Resolution needed within the next month or project success will be impacted
- **Timely:** Resolution needed within the next month or the uncertainty over resolution will disrupt other activities or decisions
- **Convenient:** Decision not needed for more than one month.

Table 3.5: The Use of an Issue Matrix

	Insignificant	Minor	Moderate	Major	Severe
Immediate	Medium	Medium	High	High	Extreme
Urgent	Medium	Medium	Medium	High	Extreme
Important	Low	Medium	Medium	High	High
Timely	Low	Low	Medium	Medium	High
Convenient	Low	Low	Low	Medium	High

The above matrix and definitions ensure that minor and moderate impact issues requiring immediate resolution will receive the same issue rating, and hence the same level of attention, as major or severe impact issues that do not need to be resolved for a month or more. If an issue is left unresolved it would automatically advance up the rows, from convenient to immediate, as the date on which resolution is required approaches, ensuring that issues that were initially assessed as having a low ranking due to their lack of proximity to the current date are not forgotten.

3.15.2 Managing an Issue

The processes used to manage issues can be simpler or more rigorous depending on the size of the project. The following process is appropriate for large projects.

- (a) **Identify the issue and document it:** Actively seek potential issues from any project stakeholders, including the project team, clients, sponsors, etc. The issue can be communicated through verbal or written means, but it must be documented.
- (b) **Determine if the 'problem' is really an issue.** Many items may be risks (potential problems that should be managed as a risk) or just action items that must be 'actioned' and followed-up. Issues involve a degree of uncertainty either in relation to the action (or non-action) of a stakeholder or in determining the best solution to the problem. The PM should determine whether a problem can be resolved immediately or whether it should be classified as an issue. If a large issue looks too difficult to be resolved in a timely manner, break it down into logical sub-issues.
- (c) **Avoid conflict!** The issue is a problem to resolve; adding additional layers of complexity by introducing conflict, blame or other emotions will not help the resolution of the issue. If a level of conflict is already occurring between some of the involved parties, work quickly to resolve the conflict and focus everyone on solving the problem.
- (d) **Enter the issue into the Issues Log.** If the problem is an issue, the PM should enter the issue into the Issues Log.
- (e) **Allocate an owner - the issue manager.** You can't manage everything, so it is important to be able to delegate tasks. Choose someone who has the skills to help resolve the problem and ask them to be the issue manager. This means that they will have to follow up progress on resolving the issue, track the actions and provide you with status updates.
- (f) **Determine the impact.** Using the same scale defined for the risk register (if the issue was an identified risk, transfer the relevant information from the risk register), carry out an impact analysis to assess the scale of the problem. Think about the areas of the project and the stakeholders that are affected and how long the problem will take to resolve. It is a good practice to encourage people to help identify solutions along with the issues. When a team member identifies a potential issue, ask the person to also suggest one or more possible solutions.

Determine the solution date. A 'resolve by date' should be defined and recorded for every issue.

- (g) **Priorities the issue.** Use the matrix above.
- (h) **Determine who needs to be involved in resolving the issue.** The issue manager determines who needs to be involved in resolving the issue. It is important to understand up-front who needs to be involved in, or can contribute to developing the final issue resolution. Provide guidelines for when team members can make decisions and when more senior people need to be involved. Team members should be encouraged to make the decision themselves if:

- (i) Apply problem solving techniques to develop a solution. The PM should assign the issue to a project team member for investigation (the PM could assign it to himself or herself but in most cases, delegation is essential). The team member will investigate options that are available to resolve the issue, and for each option, the team member should also estimate the impact to the project in terms of budget, schedule, scope, risk and other pertinent factors such as identifying any environmental impacts.
 - (i) There is no significant impact to effort, duration or cost,
 - (ii) The decision will not cause the project to go out of scope or deviate from previously agreed upon specifications,
 - (iii) The decision is not politically sensitive,
 - (iv) The decision will not cause one to miss a previously agreed upon commitment,
 - (v) The decision will not open the project to future risk.
- (j) **Gain agreement on resolution.** The various alternatives and impact on schedule and budget are documented on the Issues Form or Issues Register. The PM should then take the issue, alternatives and project impact to the appropriate stakeholders for discussion and resolution. The PM should make a recommendation and may have the authority to select from the alternatives. Each resolution should involve a set of agreed actions, and if the agreed solution involves changes to the project, the agreed solution is formalized through the change control process.
- (k) **Add the action plan to the project management plan.** Once a resolution is agreed upon, the appropriate corrective activities are added to the schedule and other documents to ensure the agreed resolution to the issue is actually implemented (particularly if the change control processes are not required).
- (l) **Monitor progress.** Use the action plan and project schedule to monitor progress towards resolving the issue. Follow up with the issue owner on a regular basis. When each action has been completed successfully, you can mark the task as complete on the task list and update the issue log with the latest progress.
- (m) **Review and Close the Issue in the Log.** The PM should document the resolution or course of action in the Issues Log, reviews the overall effectiveness of the solution and where appropriate records the lessons learned.
- (n) **Communicate through the Status Report.** The PM should communicate issue status and resolutions to project team members and other appropriate stakeholders through the methods established in the Communication Management Plan, including the project Status Report. Smaller projects may not need all of these discreet steps. For instance, the issue can be documented and rated directly in the Issues Log without the need for the separate Issues Form but all well managed projects should develop a process that manages issues from identification through to completion and closure.

3.15.3 Issues Log

The format and contents of an issues register needs to be adapted to the project and should be based on an organizational standard (organizational process asset). Most issues logs contain the following information:

- (a) The issue name (unique and short).
- (b) Classification or type (usually based on what aspect of the project's work is affected; safety/quality/etc.).
- (c) Status:
 - (i) Pending (the issue is not fully defined yet).
 - (ii) Open (it is being worked on).
 - (iii) Closed (it has been resolved).
- (d) Who raised the issue (normally this person needs to know when and how it is resolved).
- (e) Date the issue was raised or logged.
- (f) A concise description of the issue and references to other relevant documents.
- (g) Priority (see matrix above). The issue owner or manager (the person tasked with resolving the issue).
- (h) Resources assigned to work on the issue.
- (i) Target resolution date.
- (j) Final solution (this should be distributed and actioned).

The log can be set up in a database, spreadsheet or 'Word' document. An Example of Issues Management Log is attached as Table 3.5.

3.16 CLAIMS MANAGEMENT

3.16.1 Definition and Objective of Claims

A claim arises when one party, mainly to a contract, believes he has suffered a detriment for which the other party should compensate him. A claim can be defined as a demand, or request, for cost or time compensation, over and above that which has been granted or contemplated, from one contractual party to the other. The objective of all claims is to put a party back in the position he would have been in but for the delay or disruption; the original profit (or loss) should remain as included in the tender.

It is a misconception to believe that claims are a substitute for a well prepared tender and will compensate a contract for the deficiencies on his tender. Neither will a claims approach put a contractor back into a position of positive cash flow where he has deliberately pitched his price at a sub-economic level in order to keep his resources occupied. All too frequently contractors, see claims as being methods of compensation for situations where it is the contractor who has placed himself in a position of uneconomic contracting. A claim is most definitely not the difference between what one thought the job would cost and what it actually cost. Many experienced contractors still seem to believe in this definition.

Neither should employers expect to finish the contract for the price of the contractor's tender, more particularly where the conditions of contract provides a mechanism for variations to be instructed by the PM and for extensions of time to be granted for a variety of different circumstances.

If employers want the lump sum price without the possibility of changes affecting the contract price then far more care needs to be taken in the period leading up to the tender, and the extent to which the design is complete will have a fundamental bearing on the ultimate price outcome.

It is not unusual for an employer's professional team to spend months preparing the documentation for tender and then giving the tenderers unreasonable time periods within which to respond. Alternatively, significant areas of the work are unspecified at the time of tender and a provisional sum or, worse still, no allowances at all are made and the employer is ultimately taken by surprise when the final price significantly exceeds the tender sum.

Contracting is not, and never will be, a claims free environment. Claims must be seen to be what they are – fair compensation within the terms of the contract for a situation which is contemplated within the contract alternatively, where not contemplated and where the risk lies other than with the contractor, compensation as the law provides.

3.16.2 Types of Claims

Contractors' claims fall into three categories; that is contractual, extra-contractual and ex-gratia claims.

Contractual claims: These are claims which can be demonstrated to be due under the contract. The contract will normally require the contractor to serve a written notice with details and substantiation of the claim. The architect/engineer must be satisfied beyond reasonable doubt that the claim is admissible under the actual terms of the relevant clause or clauses of the contract before any payment can be made or extension of time awarded.

Extra-contractual claims: These are the claims which although not admissible under the contract, appear to be an obligation to the employer which the courts might uphold in common law. Such an obligation will usually be attributable to the employer's action or inaction. Common law damages claims should be agreed between the employer and contractor failing which the matter would be referred to arbitration or litigation.

Ex gratia claims: Even though there may be no entitlement to damages for a breach of contract or a tortious act by the employer, contractors sometimes submit claims requesting *ex gratia* payment. The usual basis of such an application is that the contractor has suffered a substantial loss on the project which cannot be recovered elsewhere; such claims are rarely entertained by employers.

ISSUE MANAGEMENT LOG

Project Name: <optional>

National Center: <required>

PM Name: <required>

Project Description: <required>

ID	Current Status	Priority	Issue Description	Assigned To Owner	Expected Resolution Date	Escalation Required (Y/N)?	Impact Summary	Action Steps
	Open	Critical	EXAMPLE: Issues raised by board members about the financial viability of the project are preventing the project from moving forward as planned.			Yes	EXAMPLE: Potential project stoppage	EXAMPLE: Meet with board members to clarify the project finances
	Work In Progress	High	EXAMPLE: The project is short on a specific skill set.			No	EXAMPLE: Possibility of project work not completed on time	EXAMPLE: Add staff to fill the skills gap.
	Closed	Medium	EXAMPLE: Negotiations with functional managers in an organization competing for scarce human resources are forecasted to delay project completion.			Yes	EXAMPLE: Possibility of project work not completed on time	EXAMPLE: Additional negotiation
		Low						

Table 3.6: Issues Management Log

Current Status	Priority	Issue Description	Issue Type	Date Identified	Assoc ID	Entered By	Actual Resolution Date	Final Resolution & Rationale
Open	Critical	EXAMPLE: Issues raised by board members about the financial viability of the project are preventing the project from moving forward as planned.	Informational	01/01/06		John Doe		EXAMPLE: The project team met with board members to clarify the project finances, allowing the project to move forward as planned.
Work In Progress	High	EXAMPLE: The project is short on a specific skill set.	Procedural	01/01/06		Jane Doe		EXAMPLE: Staff was added to the project to fill the skills gap.
Closed	Medium	EXAMPLE: Negotiations with functional managers in an organization competing for scarce human resources are forecasted to delay project completion.	System	01/01/06		Tom Doe		EXAMPLE: Negotiations ended satisfactorily before they caused project delays.
	Low		Other					

3.16.3 Mitigation of Construction Claims

It is almost now a truism that whatever is done to avoid risks and subsequently claims during the course of project execution they always arise. If and when claims are inevitable then a concern should be their magnitude and degree of occurrence. Management strategies are needed that could mitigate the occurrence of inevitable claims. Therefore the following are proposed as some of the possible mitigating factors:

(a) **Tender and contract documentation:**

Contract documentation should be fair and adequate to effectively save the particular contract strategy adopted. It is worth emphasising the importance of avoiding ambiguous, over worded and contradictory documents. Furthermore, what is put on paper in the contract documents must be workable in practice with room for flexibility and adaptability to match difficult situations that may eventuate. Lastly but not least, documentation should be completed in time for unimpeded performance.

Box 3.14

Many Claims emanate from errors, omissions and mistakes in the Tender and Contract Document. Accuracy and Completeness of the tender and contract documents is therefore very crucial in mitigating potential Claims that may occur during the course of project implementation. Tender and Contract Documents should therefore be thoroughly checked by Experienced staff to ensure their accuracy and completeness.

Thus, there should be proper examination and review of the specifications and drawings, ensuring the documents are understandable, unambiguous and consistent. Field personnel should become familiar with the drawings and specifications and the purposes they are intended to serve, since they may be the first to notice any discrepancies.

- (b) **Tender Award:** The choice of a good contractor with an economic and realistic price requires no emphasis.
- (c) **Adequate Information:** With tendering goes the provision of sufficient data and information on which tenders can be based. The aim being to look for a fair price, which shall take care of substantial foreseeable risks and allow tenderers to plan their operations with sufficient flexibility.
- (d) **Realistic Estimates:** Preparation of realistic estimates should be aimed at as no amount of good project management could overcome estimating deficiency. Unreasonable reduction of tender prices before award should be avoided.
- (e) **Ensure Prompt Action:** When a claim situation is discovered it is important for the parties to move quickly. Contractors should notify and make inquiries as soon as possible for instructions, delays, variations, unforeseeable conditions etc. Responsive negotiation to resolve a claim should be entered into before additional costs accrue. Impartial analysis by the parties and

contractual reviews are preferable to permitting valuable time to be lost as the supervising officer and contractor argue the merits.

- (f) **Establish good working relationship:** From the very onset it is important to establish good communication and to ensure a sound working relationship. Some of the new standard procedures now encourage a less adversarial approach. Under these contracts an early warning system stimulates early joint consideration of problems with the estimated total cost being agreed before the commencement of the work.

3.16.4 Claims Procedure and Presentation

3.16.4.1 Notification

Good practice in connection with the submission and consideration of contractual claims suggests that the contractor should give to the PM, within the time prescribed in the contract or as soon as possible, his 'notice of claim' which should:

- Explain the circumstances giving rise to the claim;
- Explain why the contractor considers the employer to be liable;
- State the clause(s) under which the claim is made.

3.16.4.2 Entitlement

The contractor should, within the time prescribed in the contract or as soon as possible, follow up this 'notice of claim' with a detailed 'submission of claim' which should contain the following:

- A statement of the contractor's contractual reasons for believing that the employer is liable for the extra costs with reference to the clauses under which the claim is made.
- A statement of the event giving rise to the claim, including the circumstance (or changes thereof) he could not reasonably have foreseen.
- Copies of all relevant documentation, such as:
 - contemporary records substantiating the additional costs as detailed.
 - details of his original plans in relation to use of plant, mass haul diagrams involved.
 - relevant extracts from tender programme and make-up of major BOQ rates.
 - information demonstrating the individual or cumulative effect of site instructions, variation orders and on-costs relating to the claim.

3.16.4.3 Quantification

Once the entitlement to a claim is established, quantification should follow. The quantification should be adequate and accurate. Many claims fail due to there being exaggerated demands for reimbursement.

3.16.4.4 Clarity

A contractor's claim should be self-explanatory, comprehensive and readily understood by someone not connected with the contract. It should contain a title page, an index, recitals of the contract particulars, relevant clauses and reasons for the claim and an evaluation.

These guidance notes would seem to reflect good practice no matter what the project or the conditions of contract.

3.16.5 Evaluation of Contractor's Claims

As soon as the PM receives notification of claims he should consider the matter, notwithstanding that it may be deficient in factual, contractual or financial substantiation and certify accordingly. Good practice encourages the PM to certify payments on account up to the level that payments have been substantiated to his satisfaction.

The PM requires the permission of the employer before certifying additional monies against claims. As soon as the PM receives the contractor's 'notice of claim' and prior to any certification it is essential that the PM marshals the facts of the case into a claim report, either for his own records or to send to the employer with his recommendation.

Box 3.15

One of the biggest challenge experienced in the Tanzanian Construction Industry is the PM's ability to evaluate contractor's claims. Many public institutions do not give attention to contractor's submitted claims and often look down on the contractors who submitted claims as trouble makers. Remember that any undetermined claim can result into a dispute, and if the contractor is entitled the PE will still end up paying him through adjudication or or arbitration award, having lost a lot of time and resources.

The PM's claim report, should be set out in the following format:

- (a) Introduction
- (b) Summary of claim
- (c) Contractor's contention of principles (and value when stated)
- (d) Analysis of principles of claim
 - (i) circumstances giving rise to claim
 - (ii) principles on which the claim is considered (including relevant clauses in the conditions of contract)
 - (iii) description and justification of claim
 - (iv) recommendation on principles of claim
- (e) Analysis of quantum of claim
 - (i) analysis of contractor's justification
 - (ii) apparent discrepancies
 - (iii) recommendation for quantifying claim
- (f) Appendices
 - (i) index and copies of correspondence

- (ii) tables
- (iii) drawings

If insufficient details accompany a contractor's brief notification of claim, the initial report will have to be restricted to items (a) to (c) and maybe (d) above.

3.16.6 Records

A party to a dispute, particularly one proceeding to arbitration or litigation, is likely to learn one major lesson – the importance of records; (often too late). On large projects the contractor and the PM should agree upon a system which enables contemporary records to be kept from the commencement of the project and not piecemeal when a dispute occurs.

In addition to the contract documents the following information can be of use in resolving a dispute:

- (a) Programme including any revisions
- (b) Method statement and contractor's proposals
- (c) Tender reports including any additional reports
- (d) Test results, trials and samples
- (e) Working drawings, sketches and bending schedules
- (f) Variations, site instructions and confirmation of instructions
- (g) Correspondence, minutes of meetings agreed as correct by both parties
- (h) Weather records – both pre-contract and during the contract
- (i) Labour and plant allocations and returns (daily and/or weekly)
- (j) Contractor's wages sheets
- (k) Invoices from suppliers/subcontractors
- (l) Site diaries – both of agent and section engineers
- (m) Progress photographs – preferably dated and coinciding with date of interim valuation
- (n) Tender build-up
- (o) Contractor's internal bonus and cost records
- (p) Site surveys and levels
- (q) Re-measurement records
- (r) Interim valuations and certificates, etc.
- (s) Graphs, charts, tables, schedules, calculations
- (t) Notices issued in accordance with the conditions of contract
- (u) Cause and effect' programme(s)

The importance of records, particularly those made at the time of the event and agreed by the parties, cannot be overemphasised.

Box 3.16

Proper and adequate records are pre-requisites for proper determination of any Claim and/or dispute. A lot of records are generated in the course of execution of the project. It is therefore important to have a proper Records/Documents Management System as described in Section 6.13 which will ensure that records are available, and can be assessed efficiently as and when required.

Generally the site and office records should be impeccable. The site diary, allocation sheets for labour and plant, confirmation of instructions and even verbal comments should all be kept up to date. Programmes and drawing registers should be monitored on a daily basis. The same should also be required of subcontractors.

3.17 MANAGING CONTRACTUAL DISPUTES

3.17.1 Wastefulness Nature of Disputes

Contractual disputes are time consuming, expensive and unpleasant. They can destroy client / supplier relationships painstakingly built up over a period of time and can impact the supply chain. They can add substantially to the cost of the contract, as well as nullifying some or all of its benefits or advantages. They can also impact on the achievement of value for money. It is in everyone's interest to work at avoiding disputes in the first place and this should be mirrored in emphasis on improving relationships between the client and the contractor through teamwork and partnering. Inevitably, however, disputes do occur and when they do the importance of a fast, efficient and cost effective dispute resolution procedure cannot be overstated.

Most minor disputes may be resolved through discussion and agreement between the PM and the Contractor to rectify the cause of the complaint. Any formal written complaint received from a Contractor should be fully investigated and referred to the AO to authorize correspondence or formal negotiations with the Contractor.

Where an adjudicator is appointed under the contract, such adjudication may result in an unfavorable decision in favour of the Contractor, and should therefore be treated as a last resort once all other possibilities for agreement are exhausted.

As a general rule one needs to ensure that relationships between the client and the contractor are non-adversarial, and that contracts should contain provision for the resolution of disputes which are appropriate having regard to their nature and substance of the contract.

3.17.2 Dispute Avoidance

Given the expense and disruption caused to any contract when a dispute arises and the damage to client/contractor relationships, the importance of following dispute avoidance techniques cannot be over-emphasized. However, notwithstanding the emphasis on the desire to avoid dispute, officers should not act in a way which compromises PE's rights.

Box 3.17

Partnering approach discussed in Section 3.14.2 of this Manual can be very useful in avoidance or dispute resolution through negotiations.

The first important step is to have clear wording in the contract that reflects the intentions of the parties. That wording should include provision for the appropriate dispute resolution techniques to be applied in the event of a dispute arising, with suitable arrangements for escalation. Bear in mind however that overly prescriptive provision may reduce the options available to parties if there is a dispute.

Once the contract is in place good contract management is key. Contract management techniques should include monitoring for the early detection of any problems. In any contract both parties should be required to give the earliest possible warning of any potential dispute and regular discussions between the client and supplier should include reviews of possible areas of conflict.

When a contract is initially established the importance of bearing in mind how the expiry of the contract is to be managed (especially if there is a need for ongoing service delivery, not necessarily by the contractor) should be borne in mind and reflected in the contract.

3.17.3 Dispute Management

If a dispute arises, it is important to manage it actively and positively and at the right level in order to encourage early and effective settlement. Unnecessary delays and inefficiency can lead to rapid escalation of costs and further damage the client/supplier relationship.

The following actions need to be taken where a dispute has arisen:

- (a) Examine the Contract carefully to be aware of all contract conditions relating to the Resolution of Disputes.
- (b) Determine if the PE is at fault or partly at fault, and if so, take appropriate action to rectify the problem.
- (c) Invite the Contractor to a formal meeting, possibly within 7 days of the complaint, to discuss the issues and try to agree a compromise acceptable to both parties. Ensure that accurate written Minutes are kept of any such meeting. If an agreement is reached which changes any of the conditions of the Contract, approval of the TB is required before the agreement can be implemented.
- (d) If no initial agreement is reached and negotiations conducted by the AO or Senior Officers appointed by him also fail, consider the use of any adjudication or arbitration services as specified in the contract.

3.18 TERMINATION OF CONTRACT

3.18.1 Right to Terminate a Contract

Generally it is not desirable to terminate an on-going contract and it should normally be a last resort to a PE when things are not working as well as planned. The grounds for termination of a contract will depend on the terms and conditions of the individual contract concerned. The following notes provide guidance on

typical grounds for termination of a contract, but it is essential that a PE should be guided by the contract document itself:

- (a) **Termination for convenience:** most contracts include a condition which enables the PE to terminate the contract for its own convenience, without there having been any default by the contractor. Where the PE terminates for its own convenience, it must make payment for all goods, works or services satisfactorily completed prior to termination and any other expenses incurred by the contractor.
- (b) **Termination for default:** most contracts include a condition which enables the PE to terminate the contract, where the contractor has failed to perform his obligations under the contract or to comply with an agreement reached through arbitration or other dispute resolution mechanism. The contract will often specify a procedure by which the PE must formally notify the contractor of the default and give them time to correct the default, before actually terminating the contract. Where the PE terminates a contract because of the contractor defaulting, it is normally permitted to procure the goods, works or services from another source and charge the original contractor for any additional costs incurred.
- (c) **Termination for corrupt practices:** most contracts include a condition which enables the PE to terminate the contract, where the supplier has engaged in corrupt or fraudulent practices in competing for or implementing the contract. As with termination for default, the PE is normally permitted to procure the goods, works or services from another source and charge the original contractor for any additional costs incurred.
- (d) **Termination for insolvency:** most contracts include a condition which enables the PE to terminate the contract, where the supplier has become bankrupt or insolvent. In such cases, there is normally no compensation to the supplier.
- (e) **Termination for force majeure:** most contracts include a condition which enables the PE to terminate the contract, where the supplier has been unable to perform the contract for a specified period of time, due to an event of force majeure. In such cases, the PE must normally make payment for all goods, works or services satisfactorily completed prior to termination and any other expenses incurred by the supplier.
- (f) The PE should note that a contract will also give the contractor grounds for termination, which normally include failure by the PE to make payments which are overdue by a specified period of time, force majeure or failure of the PE to comply with an agreement reached through arbitration or other dispute resolution mechanism.

3.18.2 Managing the Contract Termination Process

Contract termination can have serious legal consequences to the PE. The parties to the contract normally have the right to terminate the contract, but to protect

the PE, advice of the Legal Department/Attorney General should be sought. Contracts should not be terminated without examining all possible alternatives or resolving the issues leading to the termination of the contract.

When faced with a situation where termination of the contract is evident, the PE Should:

- (a) Examine the Contract carefully to be aware of all contract conditions and penalties relating to the Termination of Contract- in particular determine whether the circumstances/event leading to the termination is among the defined fundamental breaches of contract or can be determined by the PM to be a fundamental breach.
- (b) Compile and assemble all the information that is available to establish the breach of contract and which therefore justify the termination. Critically analyze the information and ask a fundamental question – is it sufficient to establish breach?
- (c) Seek and follow the advice of the Legal Department/Attorney General in the preparation of any correspondence and settlement of any contractual penalties. Normally they will require to be supplied sufficient information to establish if indeed there was a breach of contract.
- (d) Sometimes it is a political leader who orders such termination of a contract. There is nothing wrong with who orders the termination if justifiable. What is important is that once a political leader orders a termination, those responsible for managing the contract- the PM should follow the procedures provided in the contract to bring the contract to an end. Failure to do so may give the contractor or service provider a right to resist a termination which did not follow procedures.
- (e) Normally one is required to have security on site and ensure that the movement of materials in and out of the site is restricted, and particularly the movement of construction materials and equipment out of the site should be authorized by the PM. In a situation where termination is eminent the PM will need to ensure that security of the site is stepped up to prevent the contractor from moving the materials and equipment out of the site contrary to the requirement that all Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the contract is terminated for fundamental breach by the Contractor.
- (f) Make arrangements to call for the Performance Security from the issuer of the said security. In case the Performance Security is in the form of Performance Bond care should be taken to reach an agreement with the issuer of the bond before engaging any other contractor to complete the

Box 3.18

Do not Rush to Implement Termination Orders given by Leaders. **Ensure that you implement those directives by following the procedures provided in the contract.**

As a Professional you should be bold enough to advise otherwise if there is no justifiable reason for termination.

works for the wording of the bond provides an option for the Insurer to either arrange to complete the works or seek quotations from contractors and select a contractor to do the work- payment is the last option under a surety.

- (g) Measurement and valuation of work done up to the date of termination should be done and witnessed by the parties to the contract. Also a list of all materials and equipment on site should be prepared and witnessed also.

As said before a contract termination is a painful process and sometimes the time and effort used to conclude the termination process could be more useful in trying to find solutions to the problems that pertain to the project instead of processing the termination.

3.19 CONTRACTOR'S PERFORMANCE EVALUATION

Having a system for evaluation of Contractors and their performance is a key process and important to support an effective procurement & contracting function of an organization. Performance of all participating Contractors need to be closely monitored to ensure timely receipt of supplies from a supplier, completion of an assignment by a Consultant or complete execution of order by a contractor within scheduled completion period. For timely execution of projects, it is necessary to monitor the execution of contracts right from the award stage to completion stage and take corrective measures in time.

The objective of Evaluation of Performance of Contractors aims to recognize, and develop reliable Contractors so that they consistently meet or exceed expectations and requirements. The purpose of this procedure is to put in place a system to monitor performance of Contractors associated with the Ministry so as to ensure timely completion of various projects, timely receipt of supplies including completion of works & services for operation and maintenance of operating plants and quality standards in all respects.

Having a Contractor's Performance Evaluation System will enable the Ministry to:

- (a) Pro-actively manage the performance of contractors during the term of awarded Contracts; and
- (b) Create a record of past performance for use by the PMU and UDs, in determining the award for future tenders and contracts.

A typical Contractor's Performance Evaluation System is attached as Appendix 5.

Box 3.19

A Contractor's Performance Evaluation System enables you to track and obtain feedback of the contractor's performance for ongoing and completed projects. This feedback is important for future award of contracts in the Organisation. It is a mistake to award a contract to a contractor who may not perform. It is even a **grave mistake** to award a contract to a contractor who is known by the Organisation to have not performed in a previous contract.



Chapter 4

CONTRACT SUPERVISION AND ADMINISTRATION

4.1 GENERAL REQUIREMENTS FOR CONTRACT SUPERVISION AND ADMINISTRATION

Contract supervision and administration is undertaken by the PM in consultation with the UD. Supervision and administration of works contracts is often a complex task relying heavily on the experience and qualifications of the PM. The basic actions to be undertaken under Contract Administration and Supervision are listed below, namely to:

- (a) Maintain close supervision of the Contractor's performance, work done, materials used, and labour force on the site to ensure that potential problems are identified and solved as early as possible.
- (b) Notify the Contractor, in writing, requesting rectification of any deficiencies in workmanship, materials used, safety or environmental standards, or other required performance standards
- (c) Hold regular site meetings with the Contractor to identify the causes of any slippage in the schedule of works.
- (d) Receive regular progress reports from the Contractor and ensure that written records of any disputes or contract variation orders issued are maintained.
- (e) Ensure that any significant problems, variation orders, day work claims, compensation events, cost overruns, or slippage in the timetable are brought to the attention of the PE.
- (f) Initiate and supervise any process for claims against insurance or the Contractor.
- (g) Conduct detailed checks on the Contractors claims for work performed, re-measure as appropriate, and prepare Interim Payment Certificates, deducting any retention percentage specified in the Contract.
- (h) Participate in inspections for Interim and Final Handover of the Works and prepare the Final Payment Certificate releasing retention money to the Contractor.

Contract Administration and Supervision involves six (6) main activity levels and these include: Time Control; Quality Control; Cost Control; Managing Variations; Ensuring compliance with the laws of the country; and Managing project closure.

4.2 TIME CONTROL

4.2.1 Importance of Time Control for the Construction Projects

Time control involves implementation and completion of a project within the agreed works programme. Effective time management is essential to successfully and efficiently meet budget and programme targets. Projects can risk incurring unnecessary costs and delays as a result of ineffective time management, either by failing to allow for the full complexity of a project, or by failing to effectively manage scheduled work or unexpected events.

Effective project time management starts with the preparation of a realistic time for completion of the assignment by the PE. Unfortunately, in many situations this is not the case. Many projects are let out with unrealistic completion time thus making it nearly impossible to complete the project in time. Sometimes the so called extensions of time actually reflect the realistic time that should have been allowed for the completion of a project.

A realistic time for completion of a project needs to be supported by a well prepared works programme showing the method(s), arrangements, order and timing for all the activities of the Works. It is a requirement that such a programme be prepared by the Contractor for the approval of the PM.

However experience shows that PMs do not take enough time and effort to scrutinize the so prepared programme to establish its realism. Most often than not Contractors prepare programmes to fit within the provided time for completion without critically considering a realistic time that they will require to carry out various activities and the entire project. As a starting point, the PM should request justification for the proposed programme by the Contractor having due regard to the projected productivity of people and equipment.

From a well prepared works programme, the PM is required to ensure that the contractor adheres to the programme, and raises queries any time there is slippage by the contractor to follow the approved programme of works. The PM should also check that the revised programme of works which is submitted by the contractor on a monthly basis has included how the contractor is going to recover any lost time.

4.2.2 Checklist of Actions by PM to Ensure that a Project is Completed on Time

The checklist below provides actions that need to be taken by the PM to ensure that the Project is completed in Time or well ahead of time:

- (a) Ensure that a realistic time for completion of the project is fixed – One should not take just for granted that the time provided in the tender/contract documents is sufficient. Once a PM is appointed for a project he/she first

revisit the contract documents to establish their accuracy and realism. Once he/she discovers errors or mistakes he/she has to make request for amendments which have to be approved by TB or if the errors or mistakes are not so serious this will serve as an eye opener of the potential problems likely to occur and therefore the PM can advise ways of overcoming them.

- (b) Critically scrutinize the programme of works submitted by the contractor together with its subsequent revisions to ensure that it is realistic and presents a logical sequencing and timing for the execution of the activities.
- (c) Ensure that the amount stated in the SCC is deducted for failure of the Contractor to submit a revised programme of works within the time stated in the SCC. This assumes that PE is paying the contractor on time. This amount will be released once an acceptable revised programme of work is submitted by the contractor.
- (d) Ensure timely handing over of the site or parts of the site to the contractor. Remember if possession is not given by the date stated in the **SCC**, the Employer will be deemed to have delayed the start of the relevant activities, and this will be a Compensation Event.
- (e) Ensure timely issuance of Drawings, Specifications, or instructions required for execution of the Works.
- (f) Ensure timely approval and inspection of works carried out by the contractor, particularly those that require inspection and approval before the IPC is released.
- (g) Ensure that any instruction to the Contractor to uncover or to carry out additional tests upon work is backed up with a proof of unsatisfactory work for if the work ordered to be tested is found to have no defects that may amount to a compensation event.
- (h) Ensure timely approval of subcontracts proposed by the contractor. If there are reasons for refusal these must be communicated in a timely manner to the contractor as well.
- (i) Ensure proper co-ordination of the works of other contractors, public authorities, and utilities companies on the site.
- (j) Ensure timely payment to the contractor, of the advance payment including applicable and all monthly or interim payments.
- (k) Handle all contractors' applications for extension of time fairly and expeditiously.
- (l) Take time and effort to analyze all early warnings submitted by the contractor and establish their possible impact on completion time for the project and find ways in collaboration with the contractor that will mitigate their adverse effects.

As a matter of fact, there are many causes of projects delay that are within the Client's/ PM Control. It should be ensured that delays caused by Clients action or inaction are kept to a minimum, and allow those that are the result of unforeseen conditions.

4.3 QUALITY CONTROL

4.3.1 The Need for Quality Control for the Construction Projects

In order to enhance Client satisfaction during a construction project, the project must meet the expected quality. This expected quality can be ensured through quality assurance and quality control activities. The quality control process confirms that the project outcome meets the client's standards. The quality assurance process checks the quality plan (which includes method of construction and quality of materials) and quality control process to confirm that quality standards are implemented on the project site.

To improve the quality of construction, understanding the project requirements and standards is essential. The project quality plan should be part of the project construction management plan. The quality control plan defines how quality should be handled throughout the duration of the project.

The common way of controlling quality is the inspection of the finished parts of the work. The main purpose of quality control through inspections is to minimize the chance of defects before the project is delivered to the owner. Supervision of a construction project is not just as simple as coming up with a construction punch list. Controlling quality means monitoring if the work practice is going as planned or not, examining the quality of the current construction tasks, and providing reports daily for any unsatisfactory work output.

In the water supply and sanitation projects quality assurance is to ensure value for money, reasonable time for project implementation, sustainability of water and sanitation services and reduction of O&M costs.

4.3.2 Differentiating Quality Assurance from Quality Control

Quality Assurance makes sure that one is doing the right things in the appropriate way while Quality Control is making sure that the results of what is done meets the set standards. Quality assurance is connected to a working interaction between each contractor on site while quality control deals with the inspection of the outcome of work. The two operations are closely linked because monitoring quality levels through the project guarantees high-quality results at the end.

Quality control function aims at checking the output (in this case completed work) and comparing it to the standards regardless of the process of constructing output. However, a quality assurance function entails monitoring the project steps and ensuring safety with the required methods for each one of them.

The main goal of quality control is to ensure that the construction meets standards they specified at the start of the project.

Figure 4.1 shows the difference between quality control and quality assurance.

The PM role of ensuring that quality requirements of the contract as specified in the drawings and specifications are met, but for better assurance he may request the Contractor to present to him his Quality Assurance Plan so as to give him confidence that indeed a contractor has clear intentions of making sure that quality requirements of the project are being met.

Box 4.1

Quality Assurance is about a *plan*. It is carried out *before* the construction project starts. Quality Assurance is a process that *manages* for quality. QA lists *the processes, standards and policies* that need to be carried out and ensures they are known to the people who are responsible to manage quality in a project.

The key elements of Quality Control are *observation* and *activity*. Even when you have the best plan and system in place (that's what Quality Assurance does), you still need to *monitor* the work as it occurs to make sure the *results* are what you expect them to be. In plain-speak, QC is the inspection of the craftsmanship on a construction project. Quality Control verifies the expected standards of the *output*.

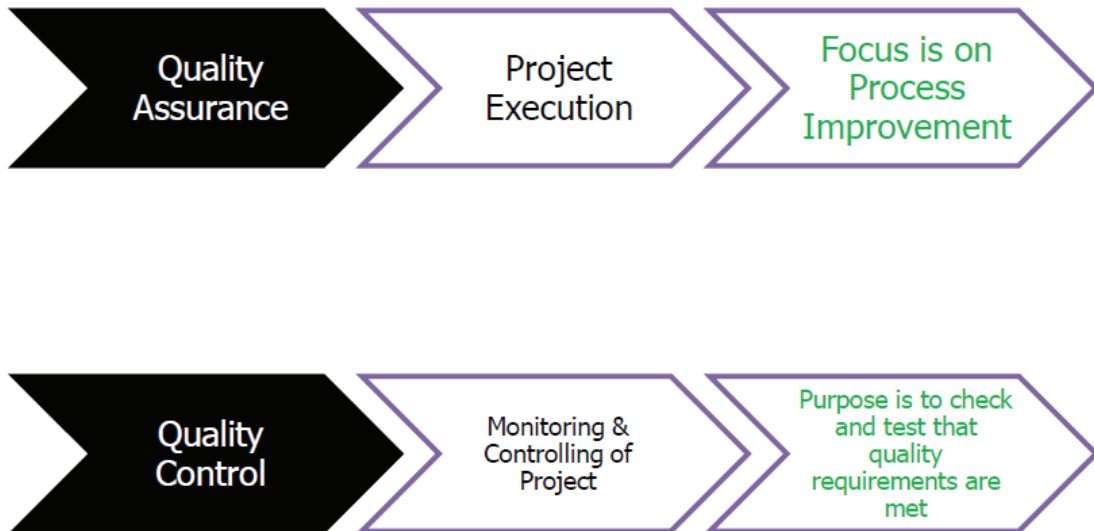


Figure 4.1: Differentiating Between Quality Assurance and Quality Control

4.3.3 Checklist of Actions by PM to Ensure that the Project Meets Quality Requirements

As discussed before it is the duty of the PM to ensure that the work produced by the contractor is in conformance with the drawings and the specifications provided for the project. The following is a checklist of actions to be taken by the PM in ensuring that the project is executed and completed to the required quality standards:

- (a) Before starting the work, critically scrutinize the drawings and specifications to confirm that they are correct and do not contain any omissions, errors or

- mistakes. If omissions, mistakes or errors are discovered make an urgent request for amendments which have to be approved by TB.
- (b) Work together with the Contractor to prepare a Quality Assurance Plan which shall narrate the scope of the works and the expected quality requirements for the project, as well as the role of the participants in ensuring quality requirements, and daily reporting and documentation required to ensure that indeed the executed works conform to the standards and the specifications. A typical Quality Assurance Plan is attached as Appendix 5.
 - (c) Regularly and on a daily basis, check the work of the contractor to ascertain that it meets the quality requirements as stipulated in the drawings and specifications.
 - (d) Promptly issue a notice to the Contractor to correct any defects found in the works within a set time. If the contractor fails to correct the defect within the time specified in the Notice, the PM should arrange to have the defect corrected and charge the contractor for the same as provided for in the contract, or decide to treat the failure to correct the defect as a fundamental breach of contract as provided for in the contract, and institute measures required towards the termination of the contract.
 - (e) Request the Contractor, on a monthly basis to provide a programme of the activities, which require his specific approval before the contractor is allowed to proceed to execute the ensuing activities. A good example is the prior inspections before casting of concrete. Most work specifications would require the PM to (i) inspect and approve the formwork as well as the reinforcement before casting, and (ii) the physical presence of the PM or his representative during the pouring of concrete. In order for the contractor to proceed with these works at a certain date, it is important that the PM is notified well in advance so that he can make necessary arrangements enabling him to be present at the time and date the activity is planned for execution by the contractor.
 - (f) Where there is proof of or reasons to believe that part of the executed work falls short of the required quality, the PM should instruct the contractor to search for the defect and to uncover and test any works suspected to have a defect.
 - (g) Before the issuance of the Certificate of Practical Completion, the PM must inspect the works to ensure that they have been executed in conformity with the drawings and specifications. For such inspection a comprehensive check-list of items to be inspected should be prepared well in advance as part of the contract closeout checklist.

The quality of projects is one of the traditional and global measures of project performance. For construction projects, the goal and desire of clients, contractors and consultants is to ensure that projects are delivered according to the acceptable and agreed standards. It is the role of the PM to ensure the project meets specified quality standards.

4.4 COST CONTROL

4.4.1 Importance of Cost Control

Successful projects are those that are delivered safely to the required quality standards, on time, and within the approved budget. The effective management of costs is a vital element in achieving these objectives. Clients rightly expect that the final cost of their projects should not exceed the approved budget, and indeed for some, cost certainty may be their main priority.

The underlying challenge in controlling costs stems from the fact that many clients have limited funds, and budgets are often set at the limit of what is affordable. Cost overruns during the construction phase may seriously over-extend the client financially, to the point where the project may not be finished to the expected standards, or may even have to be abandoned. Clients who have to pay more than they expected are likely to be (very) disappointed; this is a poor outcome. Cost control must be focused on preventing this from happening.

Box 4.2

The primary aim of cost control is to prevent cost overruns.

Many projects in Tanzania and the world over have suffered from cost and time overruns due to factors stemming from poor cost control during the design and project implementation stages. Most PMs and contractors find difficulty in controlling project costs due to problems which include delays by clients to release money, delays to make decision, lack of materials and equipment, bad weather, overlapping of activities, unclear and incomplete drawings, making good defective works, and generally failure to control the productivity of resources. Others are due to theft and vandalism, interference by clients, high labour turnover, and insufficient knowledge on cost control techniques.

4.4.2 Project Manager's Role in Controlling Costs of the Project

The PM is mandated to control costs for the project i.e. to ensure that the project costs do not exceed the approved budget which would normally be the contractor's contract figure and a contingency amount provided to cover for unforeseen works or events that could not be reasonably foreseen at the time of award of the contract.

The PM's responsibility with respect to project cost control include the following:

- (a) Ensuring that payments effected to the contractor reflect the actual work done on site valued at the rates quoted by the contractor in the BOQ.
- (b) Initiating and managing the variation process in a situation where extra works are ordered or where work is taken out of the original scope. That involves valuation of the variation and obtaining the approval of the TB.

- (c) Adjusting the rates as appropriate if the final quantity of work executed is different from the quantity in the BOQ by a percentage provided in the contract document. This will entail negotiations with the contractor. Where agreement on adjustment for rates cannot be reached, this matter can be referred to the dispute resolution mechanism applicable.
- (d) Ensuring that before ordering variations for items for which no contractor's rate is included in the BOQ, he must obtain a quotation from the contractor, check its reasonableness, and fix a rate if it is determined to be unreasonable. The fixed rate by the PM may be a subject of a Claim if the contractor is not satisfied with the fixed rate.
- (e) Ordering the contractor to prepare a cash flow forecast for the project which shall be updated every time the contractor updates the programme of works. This cash flow forecast shall assist the Client to plan and set aside funds for payment to the contractor for the executed works based on PMs Certification.
- (f) Ensuring that Contractor's submitted monthly statements of the work executed are properly scrutinized to establish the correctness of the executed works. He shall ensure that the certification process is completed within 28 days.
- (g) Keeping all documents and records that were used in the valuation of the works executed by the contractor in the process of certifying amounts to be paid to the contractor.

Box 4.3

It is a cardinal rule that all variations to the project cost must get approval of the TB. And where they exceed more than 15% an approval of Budget Approving Authority must be sought – in the case of the Ministry, this is for the Paymaster General to decide

4.4.3 Checklist for PM to Ensure Proper Cost Control for the Project

- (a) As discussed above, it is the PM's responsibility to monitor and control costs of the project. The following is a checklist of actions to be taken by the PM to ensure that the project is executed and completed within the approved budget.
- (b) Before starting the work, critically review the allocated budget (estimate) for the works to determine its sufficiency to implement the contract. Cost control starts with a well prepared estimates of the cost for the project.
- (c) Obtain a cash flow forecast from the contractor, and make the Client aware of his payment obligations based on the forecast. This will enable necessary arrangements to be put in place to enable timely payment to the contractor upon presentation of payment certificates.
- (d) Keep a close track of all contractors approved claims and adjust the contract prices to reflect increases or decreases in the contract price.
- (e) Ensure that the TB approval is obtained for any variations and amendments to the contract price.

- (f) Ensure deduction of retention money as provided for in the contract, and recovery of advance payments (if paid) in the approved payment certificates.
- (g) Ensure that liquidated damages are deducted from payments due to the contractor for any delay which could not be compensated by the Client.
- (h) Follow-up with the Client to ensure timely payment of all certified payments to the Contractor. This will prevent payment of interest which ends up increasing the project costs.
- (i) Cost control is at the heart of successful project implementation. It is therefore critical that the PM implements the action described above to ensure that cost objectives of the project are achieved.

4.5 MANAGING VARIATION ORDERS AND CONTRACT AMENDMENTS

4.5.1 Variations Defined

A variation (sometimes referred to as Variation Order (VO) or Change Order), is an alteration to the scope of works in a construction contract in the form of an addition, substitution or omission from the original scope of works. Almost all construction projects vary from the original design, scope and definition. Whether small or large, construction projects will inevitably depart from the original design, specifications and drawings prepared by the design team. This can be because of technological advancement, statutory changes or enforcement, change in conditions, geological anomalies, impact of climate change, non-availability of specified materials, or simply because of the continued development of the design after the contract has been awarded. In large civil engineering projects, variations can be very significant, whereas on small building contracts they may be relatively minor.

Standard forms of contract generally make express provisions for the PM to instruct variations. Such provisions enable the continued, smooth administration of the works without the need for another contract. Variation instructions must be clear as to know what is and is not included and at times may propose the method of valuation.

Box 4.4

Variations may include: Alterations to the design; quantities; quality; working conditions and to the sequence of work. Variations may also be deemed to occur if the contract documents do not properly describe the works actually required.

4.5.2 Valuation of Variations

Variations may give rise to additions or deductions from the contract sum. The valuation of variations may include not just the work which the variation instruction describes, but other expenses that may result from the variation, such as the impact on other aspects of the works. Variations may also (but not necessarily) require adjustment of the completion date.

Valuations of variations are often based on the rates and prices provided by the contractor in their tender, provided the work is of a similar nature and carried out

in similar conditions. If similar types of works to those instructed by a variation cannot be found in the drawings, specifications or bills of quantities, then fair valuation of the contractor's direct costs, overheads and profit is necessary to be made by the PM.

4.5.3 Source of Conflict on Variations

Conflict can arise when work is not mentioned in the BOQ, drawings or specifications. In common law this silence does not mean the contractor has an automatic right to claim for extra payment. The client is not bound to pay for things that a reasonable contractor must have understood were to be done but which happen to be omitted from the BOQs.

Where there are items that, whilst they are not expressly mentioned, are nonetheless required in order to complete the works, then the contractor should have included them in their price. For example a conflict can arise when a contractor qualifies that the, 'Supply & Fixing of Door is included' but 'Supply & Fixing of Ironmongery is excluded'. A reasonable contractor should foresee that a door cannot be fixed without hinges – which is a part of the ironmongery. So even if ironmongery is excluded, the contractor cannot expect a variation for any of the items required to fix the doors.

Variations are often sources of dispute, either in valuing the variation, or agreeing whether part of the works constitute a variation at all, and can cost a lot of time and money during the course of a contract. Whilst some variations are unavoidable, it is wise to minimize potential variations and subsequent claims by ensuring that uncertainties are eliminated before awarding the contract. This can be done by:

- (a) Undertaking thorough site investigations and condition surveys,
- (b) Ensuring that the project brief is comprehensive and is supported by stakeholders,
- (c) Ensuring that legislative requirements are properly integrated into the project,
- (d) Ensuring that risks are properly identified,
- (e) Ensuring that designs are properly coordinated before tendering,
- (f) Ensuring the contract is unambiguous and explicit,
- (g) Ensuring the contractor's rates are clear,
- (h) Preparing concise drawings, bills of quantities and specifications, providing for all situations which are reasonably foreseeable.

4.6 MONITORING COMPLIANCE WITH COUNTRY'S LAWS

Construction process in Tanzania is governed by many laws. Some are expressly stated in the contract document and others are not. It is the duty of the PM to ensure that the execution of the contract is in accordance with country's laws. The notable laws include:

- (a) The Contractors Registration Act of 1997 as amended in 2008 (The Contractors Registration Amendment Act, 2008), – with regard to Contractor’s registration, construction site boards and registration of projects. In particular the PM must ensure that the eligibility of the contractor is maintained throughout the period of execution of contract by making sure that the contractor is still registered by the CRB.
- (b) Relevant Labour Laws – with regard to workers’ employment and working conditions, social security, working hours, welfare and immigration.
- (c) Laws relating to taxes and duties.
- (d) The Environmental Management Act 2004, together with the Environmental Impact Assessment Audit Regulations, 2005 as amended in 2018. In particular the PM must ensure that contractor’s work methods and the handling of effluents from the construction sites do not have any negative impact on the environment.
- (e) To ensure the contractor has an insurance cover for Indemnity against Professional liability and the Occupational Health and Safety Act, 2003 together with the Occupational Safety and Health (Building and Construction Industry) Rules of 2015. The latter is a very important Law which must be observed to ensure health and safety of workers and public. The implementation of this piece of legislation goes with considerable costs on the part of the contract, and there is a tendency of contractors to try to save costs by skipping some of its requirements. It is critical that the PM ensures that the requirements of this law are properly observed and implemented at site.

4.7 MANAGING PROJECT CLOSURE (FINISHING OF THE PROJECT)

4.7.1 Project Closure Defined

When it comes to project management, closing out a project is not just a matter of executing deliverables. Though the process may seem tedious or overly administrative, a formal closure phase ensures all loose ends are tied up, documentation is signed and approved, contractors are paid, and everyone is on the same page.

The closing phase also gives you the opportunity to review and evaluate the project’s success (or failure), which is crucial for planning and more successfully executing projects in the future.

The closing phase of project management is the final phase of the project lifecycle. This is the stage where all deliverables are finalized and formally transferred, and all documentation is signed off, approved, and archived. The project closure process ensures that:

- (a) All work has been completed according to the project plan and scope.
- (b) All project management processes have been executed.
- (c) One has received final sign-off and approval from all parties.

The project management closure process also gives the team the opportunity to review and evaluate the project's performance to ensure greater success in future projects.

4.7.2 Importance of Closing a Project

Without a formal project closing process, one risks letting crucial details fall through the cracks, which can result in confusion, a never-ending project, dissatisfied clients, and even liability issues. Project closure helps to avoid:

- (a) Repeating mistakes in future projects and pertinent objectives;
- (b) Having final products or deliverables without dedicated support and resources;
- (c) Failing to identify the team or individuals who will own and maintain the solution following final delivery; and
- (d) Creating liability issues resulting from incomplete payments, contracts, or deliverables

Following a clear project closure plan helps to properly transition the solution to the client or end-user. This process ensures that the final stakeholders have the information, resources, and training to successfully manage and use the end product. The project closure process also ensures that the project is formally completed and is no longer considered a project, allowing one to hand the reins over to the correct team in charge of managing and maintaining the project's outputs.

By officially closing a project, one minimizes risks, increases client satisfaction, and ensures all parties are on the same page. In other words, a project closure is a process one cannot afford to skip.

4.7.3 Steps to Closing a Project

The closing phase of a project involves several steps. Work through the following checklist to ensure the project is successfully completed.

- (a) **Formally transfer all deliverables:** The first step to "closing out" a project is to finalize and transfer the project deliverables to the client. The PM should together with the Contractor go through the project plan to identify all deliverables and make sure they have been fully completed and handed over.
- (b) **Confirm project completion:** Based on Contract "Close Out" checklist, the PM together with the Contractor will need to go through the Checklist to ensure that everything contained in the list has been accomplished. Only then they can declare the project to be completed.
- (c) **Review all contracts and documentation:** Once the project handing over has been completed and approvals have been obtained from the client, then the closing of the contract can commence. The PM should review all

the project documentation to ensure all parties have been paid for the works and there are no outstanding invoices.

(d) **Release resources:** Formally release resources from the project, including contractors, team members, and any other partners. Notify them of the end of the project, confirm any final payments or obligations, and officially release them so they are free to work on other projects.

(e) **Conduct a post-mortem:** A post-mortem or project review is one of the most valuable steps of the project closure process. This is the time to review the successes, failures, and challenges of the project and to identify opportunities for improvement in going forward⁹.

As one begins the post-mortem, there is a need to conduct a performance review of the project. In other words, it is necessary to calculate the project's performance in terms of cost, schedule, and quality.

Next, conduct a survey or hold a meeting with the project management team to get feedback on how the project went. These individual answers will help paint a more comprehensive picture of the project's performance. The team should consider the following questions:

- What went well?
- What were the challenges or failures?
- How well did the team communicate?
- Did the team follow the outlined processes and plan?
- Was the client satisfied with the results?
- What would one change or improve for future projects?

With the project performance and feedback in mind, one can then identify lessons learned and opportunities for the future. One needs to keep in mind that the goal of a post-mortem is not to assign blame for any mistakes. Instead, it is a learning opportunity for everyone to improve in future projects. It is good to document the project review with the performance measurement, feedback, and improvement plan.

- **Archive documentation:** Once a project post-mortem is completed proceed to finalize all documentation (contracts, project plans, scope outline, costs,

Box 4.5

Key Questions for Post-Mortem

1. Was the Project Completed within the agreed budget?
2. Was the Project Completed in Time?
3. Were any issues of quality resolved?
4. Were there any compromises along the way?

⁹ PPRA's Contract Completion Information Disclosure Form shown in Appendix 6, if properly filled with the information required, can be a very useful tool for conducting the post-mortem. The Form is Statutory and it must be prepared for every contract executed and completed by the PE. However, a more comprehensive Form is proposed to track quarterly progress of the works and as well as at completion of the works. It is shown as Appendix 7.

schedule, **as built drawings** etc.) and index them in the Organization archives for later reference. Keep clear notes on the project's performance and improvement opportunities so that can be easily referenced and implemented in similar projects in the future.

- **Celebrate:** Finally, do not forget to celebrate! The end of a project is a big accomplishment and represents the culmination of many hours of hard work and dedication from a team of contributors. An end-of-project party is a great way to acknowledge your team's hard work and increase morale to perform better in future projects

Chapter 5

ESSENTIAL BASIC FIELD CONSTRUCTION SKILLS

In this chapter, a number of select and essential field construction skills needs have been summarized for adherence in the implementation of Water Supply and Sanitation Projects regarding Dam construction, Boreholes, Intakes, Storage tanks, Transmission mains, Water points and Sanitation works.

5.1 DAM CONSTRUCTION

During the construction of the embankment earth fill or rock fill dams, the following are the key issues to be taken into account at each stage of the project implementation. The construction works should be conducted as per design specifications.

(a) Construction Supervision Guidelines

Supervision of the embankment dam is very critical due to the fact that weather is the major constraint which needs care during construction planning stage. The following are the key issues to be observed in order to achieve the intended output of the project:

- (i) The supervisor should make sure that the project has been designed according to the defined standards. Therefore, in case of a separate supervisor from the designer of the project, thorough review of the project should be done and feedback submitted to the client at the agreed time.
- (ii) The supervisor and the contractor should be familiar with the project at the initial stages of project implementation to avoid setbacks which may be caused by differences in project understanding.
- (iii) The project cost and work plan should be well communicated to the client to make sure there is sufficient fund to run the project smoothly. Delay of fund release may result in project delay and damages may result from weather impact (probable seasonal rains).
- (iv) Mobilization of equipment should be well communicated to the contractor so as to facilitate timely commencement of the project.
- (v) In the construction contract, the delay caused by any irresponsibility of either party should be penalized so as to minimize the possibility of large

liquidated damages caused by weather factors and sometime abandonment of the project.

- (vi) The supervisor should define all resources related to the project and keep updating the client on time basis so as to avoid any delays related to miscommunication between the parties.
- (vii) The client (of the project) should set a reasonable number of technical personnel to be involved in the project implementation team as counterpart staff so as to activate ownership of the project, hence reduce Operation and Maintenance costs of the project.
- (viii) In the contract it should be explicitly stated that the contractor does not require to remove any equipment or plant from the site without prior notification to the supervisor and approval writing in communication with the client.
- (ix) All technical specifications of the project should be approved by the supervisor of the project.

(b) Site Clearing and Preparation

Base of the dam

All trees and roots, grass, grass roots and top soils must be removed. Once the trees have been removed (usually by hand) the dam bulldozer and excavator can be used to remove about 300 mm of the top soil which can then be left in a position from which it can be later retrieved to dress the completed embankment or other disturbed areas.

Borrow pit areas

Borrow pit areas should have been demarcated and maintained to be used on some projects. The borrow pit areas sampled during soil test analysis should be used for construction of the project. The passed borrow pits should be well documented and their GPS coordinates should be used for identification during construction.

Excavated soils (from the borrow pits) must be frequently monitored to check that its quality and moisture content has not changed and that it is still suitable for emplacement in the embankment. The core and cut-off trench requires good quality clay, the downstream shoulder needs poorer and coarser materials (drainage is important) and the upstream shoulder needs a clay soil of some permeability.

(c) Setting out of the embankment core trench

The Centre-line pegs should be installed at the ends of the embankment and at every change in ground level. For each change in ground level, a 'mating' peg should be established by level machine, Differential GPS or theodolite on the opposite side of the valley, but still on the Centre line.

At each peg, on the Centre line of the embankment, the distances of the toe pegs upstream and downstream are calculated and set out at right angles.

For large dam project the consolidation test results should be used to determine the freeboard due to settlement. Using rule of thumb extra 10% of dam height is added to cover the loss in dam height due to settlement.

The toe peg offset distances from the centre-line are calculated using the formula:

$$\text{Offset distance (m)} = S \cdot H + 0.5 Cw \dots\dots\dots (5.1)$$

Where:

S is the slope value

H is the height of the embankment (m)

including 10% allowance or calculate settlement in dam design software such as Geostudio software (Sigma/W)

Cw is crest width (m)

(d) Constructing the Embankment

The core/cut-off trench

Excavation of the core trench

Excavation of the core trench should be conducted by using an excavator. Due to the size of an excavator arm, the operator should follow the setting out established in the design report. Due to stability reasons of the trench and seepage management reasons, the core trench is excavated in trapezoidal shape. Trimming of the trapezoidal shape is conducted when the excavator is on the side of the trench. The depth of the core trench depends on the design specifications given in the design report and detailed drawings.

Filling of the core trench

As per engineering specifications, the materials obtained from the tested borrow pits are hauled, transported and spread in the core trench at layers not more than 0.3 m thick and compacted at an optimum moisture content to attain maximum dry density of the compacted soil. The degree of compaction is a ratio of compaction carried out at site and that achieved in the soil test laboratory. The degree of compaction is obtained by using different methods and namely sand replacement methods and the nuclear method.

Raising of the Embankment

The embankment is compacted in the same way as that of the core trench and the only difference is to maintain a clay core in case of a zoned embankment where the clay core may be vertical or inclined depending on the design choice made. The designer may select to use a certain alignment of the clay core or concrete cut-off wall depending on the site-specific conditions.

As this is the most important part of any embankment, great care is necessary in the excavation, filling and use of materials.

The minimum depth necessary will depend on the site conditions but in all excavations the cut-off trench must be taken from good quality impermeable materials such as clay or solid rock or to a minimum of three-quarters of the dam's crest height. If a suitable rock is located and is generally good, it is permissible to fill any cracks or fissures with compacted clay or mortar, provided they can be fully cleaned and traced to ensure seepage paths will not develop later. If an impermeable layer of sufficient thickness has not been reached and the trench depth has attained the required height of $0.75H$, the cut-off trench excavation can stop only if the material encountered is not of a coarse or gravels nature (as it often occurs in streambeds). If permeable material is found it is vital that the cut-off is taken through it to a depth sufficient to find more impermeable materials.

Before backfilling, the excavation should be checked to ensure that the conditions above have been complied with. Short cuts taken at this stage can prove costly later and seepage through the embankment can become excessive if the correct depth into the correct material is not achieved. A little extra time and care in the excavation of the core is usually worthwhile.

Other requirements such as construction of a coffer dam, special compaction, dewatering equipment and safety provisions in the trench should be considered before excavation starts, to allow the work to be carried out efficiently. For example, an assessment of the site condition, such as to ascertain groundwater levels, at the design stage would allow such special provisions to be included in the cost estimates. Water bowsers or other water sprinkling equipment may be useful in assisting compaction of the embankment.

Ant heap material or cracking clays are not recommended for core filling but if the former is used it should be chemically treated and in all cases kept as far as possible below the ground level sections of the core (which should remain wet throughout the year).

Embankment

Once the cut-off has been brought up to ground level, the embankment can be constructed. If necessary, and usually because of time limitations, it may prove prudent to construct the cut-off some time before the rest of the dam (i.e. during the previous dry season ensuring the works are protected from erosion).

The removal of the soil from the borrow pit areas can be assisted by ripping or irrigating the area involved (avoid over-watering which could lead to traction problems). The latter is especially desirable for core and upstream sections where the soil, if used wet, may be more readily compacted.

At stages determined by the designer/supervisor, the embankment as constructed should be surveyed to check that the slopes conform to the design specifications.

If there is any variation, remedial measures will be necessary. It is better therefore to avoid such problems by careful and frequent monitoring of the structure as it takes shape, especially at the beginning of the work when operators and other staff are more prone to making mistakes.

When the embankment is at the correct height it must be surveyed to check in particular that the crest has been built slightly convex with more soil laid in the centre where the most settlement will occur. The crest should have a slight slope (cross fall) towards the upstream side of the embankment to permit the safe drainage of rainwater to the reservoir rather than the downstream slope. A channel may be necessary to reduce the risk of erosion.

It is very important that good grass cover, preferably of creeping grass type, is established on both the embankment and the spillway before the likelihood of heavy rains. This could mean constructing most of the spillway before work on the embankment itself starts, ideally at the end of the previous rainy season when water for establishing grass is available.

Maintaining the geometry of the embankment

During raising of the embankment, the contractor should maintain the designed geometry of the embankment by trimming of the raised embankment wall slopes using the excavator. Based on the trapezoidal equation the upstream and downstream slopes of the embankment is maintained by proper trimming of the embankment at any reasonable dam height. Computation of the top width is done at each stage of the embankment raise. Note that in case of miscalculating the top width at any stage of embankment raise, will alter the final crest width or slope of the embankment or both.

(e) Spillways

For large dams spillways are very sensitive structures which need great care during construction. The engineering design of the spillway should be maintained during construction phase of the project. In all cases the movement of machinery over the spillway area should be minimized to avoid disturbing the topographical set up of the spillway proposed area due to erosion which may be caused by moving machine. Any large volume spillway cut should be done at a time when the excavated material (if suitable) can be included with the material being moved to construct the main embankment or reserved to fill in borrow pits.

(f) Settlement

As the dam settles, the crest should fall close to the horizontal. The monitoring benchmarks or beacons should be used to monitor the horizontal and vertical movement of the embankment.

(g) Plant and Equipment

Consideration of what plant and equipment is available, the conditions of operation and distances materials are to be moved, as well as size and type of dam to be built, are the most important factors in determining the plant and equipment to be used.

Bulldozers are not generally recommended as they make it difficult to achieve the levels of compaction and layering essential in any earth embankment. Very small dams made of impermeable materials, up to heights of 2m, can be successfully constructed with bulldozers (calling for settlement allowance of up to 20 percent). In context of the manual, large earth fill embankment dams are highly considered. Heavy earthmoving machines – such as elevating scrapers and push loading scrapers are really necessary for large dams construction.

(h) Compaction Equipment and Techniques

The compaction of soils is essential to increase the shear strength of the materials to achieve high levels of embankment stability. A high degree of compaction will increase soil density by packing together soil particles with the expulsion of air voids. Comparing the shear strength with the moisture content for a given degree of compaction, it is found that the greatest shear strength is generally attained at moisture contents lower than saturation.

If the soil is too wet, the materials becomes too soft and the shear stresses imposed on the soil during compaction are greater than the soil's shear strength, so that compaction energy is dissipated largely in shearing without any appreciable increase in density.

If the soil is too dry, materials compacted in this condition will have a higher percentage of air-spaces than a comparable soils compacted wet. It will take up moisture more easily and become more nearly saturated with consequent loss of strength and permeability. A damp soil, properly layered and compacted with a minimum of air voids also reduces the tendency for settlement under steady and repeated loading.

(i) Rollers

Sheep foot rollers can compact layers of soil up to 350 mm deep gross (i.e. about 300 mm after compaction) and satisfactory densities can normally be obtained with 8-12 passes at a roller speed of 3-6 km/h when the soil moisture content is right. It is important to keep these rollers clean as soil collecting between the feet will reduce compacting ability. Sheep foot rollers are more effective than other rollers in compacting drier clay (but will require more passes) and will churn and blend the soil which is useful in distributing water throughout the construction surface when borrow pit water spraying is not possible. Note the weight of the compaction and vibration energy are key issues to be considered when selecting compaction equipment.

Vibrating rollers are more suited to the compaction of sandy soils and where resulting very high densities are required. In dam construction their usefulness is usually limited to small-scale works such as narrow cut-off compactions and trench works.

Rammers and plates have much the same application and are used where space is a limitation and in specialized works such as trenches, behind concrete and around pipe works. Their suitable application of the equipment is on the outlet pipe.

On clay soils, smooth-wheeled rollers can form seepage paths between layers of soils laid on the embankment. If a sheep foot roller is not available to compact such soils, the layers of clay should be reduced in gross depth and final surfaces roughened (by harrowing or similar) to permit a good bonding between compacted layers.

5.2 BOREHOLE/WELLS

The method of construction of a borehole/well should depend upon the depth of the aquifer tapped, the diameter required, the nature of the geological formation to be penetrated and the amount of data backup available.

Factors to be considered during the construction of Boreholes/Wells

- (a) Borehole construction should be based on the recommendation of the Hydrogeological and Geophysical Survey Report,
- (b) Proximity to the planned service area,
- (c) The site should be easily accessible by drilling rigs and other equipment during the drilling, construction and maintenance phases,
- (d) It should not be within 100m of the cattle watering pools, latrines and other health hazards, and preferably be upstream of those. Any pit-waste (solid waste) should be placed downstream of the well to avoid the water well-being contaminated by leachate,
- (e) It should be safeguarded against flooding. Especially near rivers, the location has to be chosen so that the well is not threatened by any meandering action of the river. Furthermore, the danger of flooding of low-lying areas should be taken into account,
- (f) The sub-soil should not render the construction of a well impossible. It is difficult to make a hand dug wells in rocky materials, etc.
- (g) Proximity to existing electric power lines. Avoid sites close to existing High voltage electric power lines, otherwise exercise maximum safety precautions.

5.2.1 Drilling Methods

- (a) There are several different types of rigs available for drilling water boreholes. They vary in size, capacity and capability depending on the type of formation

expected and the depth required. There are rigs which do not perform well in hard rock formations and there are those that are multipurpose.

- (b) Percussion and rotary-percussion drilling methods are generally the most applicable techniques for drilling in consolidated formation (igneous and metamorphic rocks). If a significant thickness of granular or other overburden materials is present, a combination of methods can be effective, although not very practical.
- (c) Cable-tool, hydraulic-rotary percussion and air-rotary percussion (down-the-hole air hammer) and foam drilling modifications are the most common types of equipment in use today for igneous and metamorphic rocks. (Referred to Web: <https://www.resvol.design/manual>)
- (d) In unconsolidated loose, unstable, collapsing formations, rotary with appropriate drilling stabilizer should be used. In such a case the drilling diameters will be telescopic starting with diameter large enough to lower temporary casing in upper collapsing formations and continue drilling depend on the final minimum diameter. If other chemical fluids or solids are used to arrest collapsing of formations, the Contractor has to use proper borehole development and cleaning methods to make the use of borehole water safe for drinking purposes. The Contractor will use such fluids or solids with the agreement of the Client.

5.2.2 Borehole Depth

The depth of the borehole should be determined from the lithological log. A borehole should be completed to just below the bottom of the lowest aquifer to be exploited for the following reasons:

- (a) More of the aquifer can be utilized as the intake portion of the well, resulting in higher specific capacity,
- (b) Sufficient water is available to maintain the yield even during periods of severe drought or re-pumping,
- (c) To provide room at the borehole bottom for casing to keep away any loose materials between the casing and the borehole wall.

5.2.3 Casing Materials

The selection of casing materials should be based on the water quality, well depth, cost, borehole diameter, required yield and drilling procedure. The common types of casings used in borehole construction are steel, thermoplastic, fibre glass and concrete. The pipe quality should be approved by Tanzania Bureau standards (TBS).

5.2.4 Gravel Packing and Grouting

The annular space between the casing and borehole wall should be filled with filter packing materials in the screen intervals and materials. The gravel packing mixture to be used depends on the sieve analysis results and the slot size of

the screen. The contractor will do the sieve analysis and then determine the gravel pack materials. Gravel packing material will be stored so as to avoid contamination or rain-washing finer materials. Iron and Calcareous grains will not be included in the gravel pack materials. Where those occur in a formation it is best to use blank casing sections. The uppermost section of the annulus is normally sealed with bentonite clay and cement grout to ensure that no water or contamination can enter the annulus from the surface. Where gravel packs are considered necessary the D60/D10 particle size (size passing sieve 60% and 10% respectively) is a guide to selection.

- Sufficient gravel pack should be placed against the screens i.e. from below the lowermost screen to above the uppermost screen. The gravel pack should extend to approximately 2 - 3 m or more above the uppermost screen to allow for settling during well development.
- The gravel pack should be capped with a clay seal (*pure clay*) to prevent contamination via the annular space.

NB: The amount of gravel (*in 50 kg bags*) used on each borehole should be carefully recorded by the Supervisor.

5.2.4.1 Back-filling the Borehole

The annular space above the clay seal should be back-filled with inert drill cuttings. The top 3m of annular space should be left for sealing the borehole with cement slurry.

5.2.5 Well Development

The main objective of well development is to remove finer materials like native silts, clays, sand, drilling fluid residues deposited on the borehole walls during the drilling process from the borehole and immediate surroundings (*gravel pack and the aquifer*). The pack and the aquifer are cleaned and opened up so that water can flow into the well more easily. The well should be developed before the borehole is back-filled up to ground level. The reason for this operation is that the gravel pack around the screens will settle and become compact during development, and therefore more gravel has to be added up to the design level, before any other back-fill is put into the borehole.

Development can be done by either of the following methods:

- Continuous airlift until water is free from sediment.
- Intermittent airlift development. The cycles to be determined depending on the rate at which water is clearing. Typical cycles are 10 minutes airlifting followed by 5 minutes' recovery. Intermittent airlifting should be carried out until water runs clear to the satisfaction of the Supervisor.

The Supervisor should always accurately record date and duration, in hours, for well developing. After a well development, the plant can be rigged down.

5.2.6 Instructions at the end of Drilling

5.2.6.1 Sealing the Borehole

The upper 3 m of the borehole annulus should be grouted with cement slurry to provide an effective seal against entry of contaminants.

5.2.6.2 Capping the Borehole

The borehole should always be capped after well development. A borehole reference number should be marked on the borehole casing above the ground surface.

5.2.6.3 Clearing the Drilling Site

On completion of the construction of the borehole the site should be left clean and free from all debris, hydrocarbons and all sorts of waste. All dug pits should be filled with soil or murrum free of hydrocarbons.

5.2.7 Pumping Test Supervision

For every successfully drilled borehole it is important to carry out test pumping. Test pumping is performed to determine the optimum yield (quantity of water that can be drawn out of a borehole in a given time - Q) of a borehole and the depth at which the pump needs to be installed. An advice on the pump (hand pump or a certain type of motorised pump) to be installed can be given based on interpretation of the data, leading to an advised yield and an estimated dynamic water level (DWL).

The test pumping procedures and details about test pumping are in the guidelines for test pumping (Vol. I). During a Constant Discharge rate, a sample of water (1–2 litres) should be collected and taken to the laboratory for analysis of physico-chemical properties in order to determine portability and acceptability. It should be stressed that there are agreed water quality as well as quantity limits below which no installation of hand pumps is permitted. The water quality guidelines are found in the technical specifications for borehole drilling.

5.3 INTAKES

Stream or river intake is to be located at the eroding part of a river curvature rather than the side where silt is deposited. It is usual to site a weir on hard rocks that is often supported by some dowel bars that are drilled into the rocks. During construction, it is advised to temporarily divert the river until the intake weir construction is completed and the concrete has fully set.

5.4 TRANSMISSION MAINS

When constructing big pipelines with diameter of 300mm or more, ensure washout valves and air release valves are located on valleys and hills, respectively.

When connecting or welding pipe joints do not put soil cover to the joints before testing for leakages and do not use edible oil in fixing the rubbers. Upon testing the pipes remove air locks. Starting from the intake gradually move across the pipe length until water reaches the storage tanks or water point.

5.5 STORAGE TANKS

Reinforced block wall tanks can be either fully buried underground, partially buried, on the ground or on a raiser of between 6 m and 12 m. Soil investigations have to be done at any site for construction of the raiser in order to decide how to reinforce the foundation of raiser. Use Waterproofing additives to the cement used for construction of concrete elements of the tank including the plaster to the walls. It is useful to be aware that drawings of all standard capacities of storage tanks ranging from 10,000 litres to 500,000 litres are available in the Ministry of Water (MoW) Website. The drawings contain bills of quantities as well as the bar-bending schedules.

5.6 DISTRIBUTION MAINS

During construction for laying water pipes, the trenches have to be located on the edge of the road reserves and if there is enough space to be outside the road reserve. The depth of the trenches should not be less than 60cm and again the joints should be buried only after testing the pipes for leakage. Air entrainment has to be minimized through optimal opening of the valves when commissioning the pipe network for the first time. The smallest diameter of the these pipes is 12.7 mm (1/2").

5.7 WATER POINTS

Location of water points is often done in collaboration with Community or CBWSOs if this already exists. Regardless of the type of water point constructed, one tap or 2 taps, the water points have to be drained away from the water connection point into a soakaway pit filled with gravel or stones. Alternatively the spillage water can be led to a garden located in the neighbourhood. It is important to install a very good quality bib cork and often times these are the first to be damaged.

5.8 SANITATION WORKS

5.8.1 Site location for Sanitation Facilities

The site of faecal sludge/wastewater treatment systems need to be carefully selected not to cause too much nuisance to neighboring communities and for faecal sludge not to induce too high transportation costs of the sludge from the points of generation to the point of treatment. Good communication between Local Government Authorities (LGA), town planners and sanitation engineers/designers is important. The LGAs need to allocate land necessary for the faecal

sludge/wastewater treatment facilities involving the communities. Minutes of the agreements with communities must be properly documented for future references.

Once land has been allocated, the LGA must ensure that it is properly secured with title deed and fencing to avoid encroachment. The fencing should ensure the minimum distances from settlements. Distances of 550-5000 meters are suitable because smaller distance from these treatment installations from main settlements would lead to transmission of odor and pollution to city.

On the other hand, long distance involves huge costs for constructing infrastructure and transportation. Topography of the area should be determined. Whenever possible use gravitational flow to the treatment site in order to reduce operational costs. The layout of the site should also allow gravitational flow from stage to stage except where there is a need of pumping to elevated tanks or units. Use the head generated by the elevated unit to use gravitational flow to the next stages.

5.8.2 Conveyance Systems

Conveyance systems in sanitation may be open channels, sewerage lines and piping of treatment equipment and units. The open channels should be protected against throwing of trash by people and falling accidents. The laying of the sewer for wastewater transport to treatment plants should follow the same principles as any water pipe or open channel.

Sludge transfer stations are part of the conveyance system. Location of transfer stations must involve the communities. Here the LGA involvement is highly necessary and minutes of the meetings and agreement reached must be properly documented for future references. The transfer stations must be paced in a way that they do not cause nuisance to people. They must be hygienic and fenced. Mobile transfer stations may be considered. Faecal sludge from pit latrines in slum areas or unplanned areas may be collected and transported by manually operated transportation.

5.8.3 Treatment System

The site for the treatment facilities must be fenced and protected from unauthorized entry. If biogas is being released in enclosed areas intentionally or unintentionally fire hazard warnings should be clearly installed. Firefighting equipment must be provided including sand buckets. Construction of treatment plant should be accompanied with training of operators of the plant on operational issues and health and safety. Layout of the facilities must ensure smooth flow of wastewater from one unit to the other. In case of waste stabilization pond NEVER place inlet and outlet of a unit linearly aligned. These two must be placed on diagonally opposite sides of the unit to avoid short circuiting.

5.8.4 Storage and Distribution of Treated Wastewater for Re-use

Wastewater and faecal sludge treatment should necessarily aim at reuse. The concept of treatment for reuse must be encouraged at all levels. The LGAs and utility companies are responsible for encouraging and regulating the treatment approach. The key for this approach is to ensure that the faecal sludge or wastewater is adequately treated for the intended reuse. For sludge secondary treatment is very important. There may be a need of polishing stages and treated water storage. The storage may be a pond, an underground tank in combination with an overhead tank for distribution to the needed area. Distribution can be achieved in pipeline laid following principles of pipeline design and layout. Reuse guidelines for treated sludge and wastewater can be prepared.

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APPENDICES

APPENDIX 1: TEMPLATE FOR CONTRACT MANAGEMENT PLAN

INSTRUCTIONS FOR USING THIS TEMPLATE:

This template is provided as a guide only. The plan must be updated to reflect the specific contract.

Project Name/Description	
Reference Number	
Public Authority/Client	
User Department	
Prepared by	
Date	

SIGNING

Contract Manager/Supervisor Sign-off

I, as Contract Manager/Supervisor, will ensure that relevant legislation, policies and organizational requirements relating to contract management are adhered to.

Signature:

Name:

Position:.....

Address:

Telephone:

Email:

Date:

Plan Approval

Signature:

Name:

Position:

Date:

1. BACKGROUND

The *[Insert name of Client]* has awarded a contract for *[Insert contract description]* to *[Insert name of Contractor]*.

Provide brief background on:

- *the branch/directorate*
- *the tendering and contracting process*
- *the selection of the successful Contractor*

The following documents are either referenced or relate to this contract management plan:

- Signed Works Contract
- *[List Client contract management policies and other relevant documents]*

2. PURPOSE AND OBJECTIVES

The purpose of this contract management plan is to document the key activities and tasks required to manage this contract to ensure that the objectives of the contract are achieved.

The plan describes how the Client and the Contractor will work together over the life of the contract to ensure timely delivery of goods and services meeting the requirements specified in the contract.

This plan will be used by the Client to review the performance of the contract and monitor the achievement of the contract outcomes.

The objectives of this contract are to:

- *[Identify objectives – refer acquisition plan and/or tender documentation]*
- *e.g. to ensure cost effective and efficient delivery of contracted goods/services;*
- *e.g. to ensure the continuous and timely supply of quality goods*
- *etc.*

3. PROCUREMENT KEY DELIVERABLES

The key deliverables of this contract are:

- *[Identify key deliverables – refer contract documentation]*
- *etc.*

Contractual Milestones and Deliverables

Activity/ Milestone	Responsible	Contract Reference	Start Date	End Date	Remark
<i>Submit work schedule</i>	<i>Contractor</i>				
<i>Foundation work for Section ...</i>	<i>Contractor</i>				<i>Critical Path</i>
<i>Complete Structure for ...</i>	<i>Contractor</i>				
<i>Pilot testing for ...</i>					

4. CONTRACT SUMMARY

Contract Title	
Contract Number	
Contract Type	<input type="checkbox"/> <i>One off purchase</i> <input type="checkbox"/> <i>Period contract</i> <input type="checkbox"/> <i>Panel contract</i> <input type="checkbox"/> <i>Other</i>
Contract Scope and Coverage	<i>[Outline the scope and the specifications of goods and/or services to be provided, including geographic coverage.]</i>
Contractor	<i>[Insert name of Contractor]</i>
Contract Commencement Date	
Contract End Date	
Contract Extension Options	<i>[List any contract extension options provided for in the contract.]</i>
Base Contract Value	Tsh
Contract Contingencies Value (.....%)	Tsh
Total Contract Value (VAT inclusive)	Tsh

The following bank guarantees and other securities apply to this contract:

- *specify securities*

The following statutory and regulatory requirements are relevant to this contract:

- *detail these requirements including work, health and safety, environmental, human resources etc.*

The following warranties apply to this contract:

- *document warranty provisions of contract*
- *detail how warranty provisions are to be managed during the life of the contract*

Key contract conditions and clauses relevant to this contract include:

- *[Insert key details including intellectual property ownership etc.]*
- *[Insert details of any other requirements (eg industry participation policy) that parties are required to comply with]*

5. ROLES, RESPONSIBILITIES AND GOVERNANCE

5.1 GOVERNANCE STRUCTURE

[Describe the governance structure relevant to the contract. Where possible include a diagram showing the key parties, the hierarchy, lines of reporting etc.]

5.2 KEY CONTACTS, ROLES AND RESPONSIBILITIES

[Insert all key personnel for Contractor, Employer and the Consultant AND other important parties]

Organisation	Name and Title	Roles and Responsibilities	Contact Information (email, tel., address)
Contractor	<i>Contractor's Representative</i>		
Consultant	<i>Engineer</i>		
Employer	<i>Project Manager/ Contract Administrator</i>		

5.3 CONTRACT MANAGER

The contract manager/supervisor is responsible for:

- ensuring the contract outcomes are achieved;
- managing and addressing contract risks;
- identifying and addressing opportunities for improving the contract;
- maintaining good relationships with the Contractor
- scheduling regular contract management meetings;

- communicating with users, stakeholders and clients;
- ensuring that performance measures are met;
- providing performance reports to senior managers or the governance committee;
- addressing problems and conflicts that may arise; and
- assessing and (where required) seeking approval for any variations to the contract.

The contract manager/supervisor should regularly refer to the contract management plan and ensure it is amended or updated as required to reflect any changes in circumstances during the operation of the contract.

The Contractor’s contract manager is

Name:

Position:

Address:

Telephone:

Email:

5.4 OVERSIGHT COMMITTEE

If an oversight committee is required please complete the following; if not relevant, delete.

A Contract Management Committee comprising the following members will provide oversight of the contract:

- *insert names of committee members*
- *insert names of committee members*
- *etc*

The role of this committee is to:

- *list the committee responsibilities*
- *etc*

5.5 COMMUNICATION

The following communication strategies and protocols will be used to communicate with the Contractor, users and key stakeholders:

Stakeholder/Users	Role/Reason for Interest	Key Methods
<i>[Insert details, including end users, executive management, technical, others]</i>	<i>[Insert the reason for their interest in this contract]</i>	<i>[Insert methods to be used for liaising, reporting and communicating with them]</i>

The following documents relating to the contract will be stored and filed for reference and audit purposes:

- *[Insert the name of the document, the version number and where they are held, for example, transition plans, risk management plans. Include any relevant documents that have been referred to in this plan.]*

6. CONTRACT MANAGEMENT MEETINGS

Contract management meetings will be held every one/three months (update as appropriate).

Attendees at these meetings are:

- Contract manager/Supervisor
- Contractor contract manager
- *insert name of other attendees*
- *etc*

A standard agenda (refer Attachment One) is to be used.

The contract manager shall organise the meeting and prepare minutes after each meeting.

The following meetings shall also be held:

Name of Meeting	Details	Attendees
<i>[List name of meeting.]</i>	<i>[List the purpose of the meeting, the standard agenda items, meeting protocols and other relevant matters for each meeting.]</i>	<i>[List the attendees from all required parties.]</i>

7 IMPLEMENTATION APPROACH

Contract implementation is a critical period that can entail specific risks and challenges.

The following implementation approach will be adopted:

- *development of an implementation plan;*
- *a contract start-up meeting with the Contractor and key stakeholders will be held to discuss implementation;*
- *[Insert other details including, for example, establishment of governance committee, communication to users and stakeholders, briefings, timeframes, resources and strategies to address identified risks.]*

The following transition in tasks and responsibilities will be addressed for this contract:

- *[Where applicable, list details such as planning the kick-off Meeting, handover, etc.]*

8. RISK MANAGEMENT, INSURANCE, GUARANTEES AND SECURITIES

8.1 RISK MANAGEMENT

The contract manager/supervisor is responsible for identifying and managing risks during the contract.

The contract manager must ensure systems are in place to monitor emerging risks so that appropriate actions can be taken proactively.

The following key contractual risks have been identified and will be monitored, treated and mitigated:

- *[Insert details including risks that were identified earlier in the procurement process]*

8.2 INSURANCE

The following insurance certificates are current and will be monitored to ensure future currency through the life of the contract:

Type of Insurance	Description/Policy Number	Amount Insured	Expiry Date

8.3 GUARANTEES AND SECURITIES

No.	Type of Guarantee/ Security	Contract Ref.	Amount/ Limit of Liability	Required Date	Expiry Date	Information Required
1.	<i>Advance Payment Guarantee</i>					
2.	<i>Performance Security</i>					
3.	<i>ESHS Performance Security</i>					
4.	<i>Retention Guarantee</i>					

9. PERFORMANCE MANAGEMENT

9.1 REPORTS

The key milestones relating to the performance of this contract are:

- *[List details]*

The following key performance indicators will be used to measure the performance of the contract:

- *[List performance indicators]*

Key Performance Indicators (to measure performance and outcomes)

No.	Deliverable	KPI	Performance Target	Test	Verification	Remark
1.						
2.						
3.						

Underperformance/ default contractual actions

No.	Description of Underperformance	Responsible	Applicable Contractual Provision/s	Actions to be taken	Remark
1.					
2.					
3.					

The following reports will be provided by the Contractor:

- *[List details - refer specification or statement of requirements in the contract]*

What is to be Reported	Provided To	Frequency
<i>[List details]</i>	<i>[List details]</i>	<i>[List details]</i>

The following reports will be prepared by the Contract Manager/Supervisor

What is to be Reported	Provided To	Frequency
<i>[List details]</i>	<i>[List details]</i>	<i>[List details]</i>

9.2 RECORDS MANAGEMENT

No.	Type of Record	Owner	Responsible	Action Required	Remark
1.	Contract Documents and any Amendments				
2.	Insurance Details				
3.	Change Orders				
4.	Notices				
5.	Payment Documents, including documents on application of price adjustment if any)				
6.	Minutes of contract related meetings				
7.	Progress Reports				
8.	Immediate Reports on ESHS if applicable				
9.	Test Results				
10.	Guarantees, warranty/defect liability and Securities				
11.	Documents related to any suspension or termination				

9.3 ISSUES

Issues Escalation Procedure

Nature of Issue	Level of Review	Responsible Body	Response Time	Type of Issue
Low or Routine				
Medium				
High				
Critical				

9.4 INSPECTION CHECKLIST

9.4.1 Borehole Inspection Form Checklist

BOREHOLE INSPECTION CHECKLIST	
Name of Borehole:	Purpose of Borehole:
Owner of Borehole:	Hazard Classification:
Address:	Inspected By:
Village:	Date of Inspection:
District:	Estimated yield required:
Political or Legal Location:	Weather Conditions:

BOREHOLE INSPECTION CHECKLIST						
Coordinates:						
<i>Note: Coordinates should be measured using a GPS</i>						
	Item	Yes	No	N/A	(Condition)¹ <i>Good/ Acceptable/ Poor</i>	Remarks
Pre- contract						
1	Driller's equipment approved					
2	Driller's personnel approved					
3	Driller's field operation observed					
Pre-Mobilisation Meeting						
1	Contract checked					
2	Questions asked and clarifications made					
Mobilization						
1	Community has been mobilised					
2	Programme of work submitted and approved					
3	Materials checked and approved					
4	Driller has been shown the site					
5	Data collection forms approved					
6	Filing system set up					
Siting						
1	Geophysical equipment checked and approved					
2	Siting supervised					
3	Report submitted and approved					
Drilling						
1	Rig location approved					
2	Drilling method approved					
3	All safety measures taken					
4	Samples are collected and kept					
5	Drilling completed					
6	Borehole logged					
Borehole Design						
1	Casing and screen installation approved					

BOREHOLE INSPECTION CHECKLIST						
2	Gravel pack installation approved					
3	Sanitary seal approved					
Borehole Development						
1	Water sample checked for sand content					
2	Pumping test carried out					Estimated... m ³ /s
3	Borehole disinfected					
4	Water quality analysed					
5	Borehole successful or abortive					
Demobilization						
1	Site restored to its original state					
2	Circulation pits <i>backfilled</i>					
3	Abandoned borehole sealed					
4	All pieces of equipment removed from site					
5	Rubbish disposed of properly					
Complete documentation						
1	The Driller has carried out all tests and submitted the reports.					

Borehole design Criteria		Value
<input type="checkbox"/> 1.	Borehole Depth (metres):	
<input type="checkbox"/> 2.	<i>Aquifer/Rock Type</i>	Basement/Consolidated/Unconsolidated
<input type="checkbox"/> 3.	Yield (litres per second)	
<input type="checkbox"/> 4.	Drilled borehole diameter (mm)	
<input type="checkbox"/> 5.a	Type of borehole casing and screens:	PVC / Steel / Other:
<input type="checkbox"/> 5.b	Wall diameter and thickness (mm) check diameter and wall thickness with callipers	
<input type="checkbox"/> 5.c	Quantity of borehole casing & screens (m)	
<input type="checkbox"/> 6.	Screen length (m)	
<input type="checkbox"/> 7.	Percentage screen open area (>25%)	
<input type="checkbox"/> 8.	Installation of casing and screens	<input type="checkbox"/> Produce sketch of proposed assemblage of casing and screen.
		<input type="checkbox"/> Layout casing and screening on the ground, check against sketch and photograph
		<input type="checkbox"/> Check joints between casing pipes.

Borehole design Criteria	Value
<input type="checkbox"/> 9. Gravel Pack	<input type="checkbox"/> Ensure that gravel pack design is adhered to (formation stabiliser or filter pack). <input type="checkbox"/> Check that formation stabiliser does not contain mica, clay or laterite.
<input type="checkbox"/> 10. Sanitary Seal	<input type="checkbox"/> Check sanitary protection design, proper depth and material composition

Well Development and Pumping Test Summary	
Development: <input type="checkbox"/> Air-lift <input type="checkbox"/> Over-pumping <input type="checkbox"/> Surging <input type="checkbox"/> Backwashing <input type="checkbox"/> Jetting Duration _____ hr Comments: _____ _____ _____	Pumping Test: <input type="checkbox"/> Air-lift capacity evaluation <input type="checkbox"/> Constant Rate Test (CRT) <input type="checkbox"/> Step Drawdown Test Duration _____ hr Discharge _____ l/s Dynamic water level: _____ m Drawdown: _____ m Comments: _____ _____ _____

Borehole: Water Quality Summary	
Sample taken: <input type="checkbox"/> Yes <input type="checkbox"/> No Date _____ Field Parameters: <input type="checkbox"/> Clear <input type="checkbox"/> Turbid Colour _____ Taste _____ Odour _____ Turbidity _____ NTU Temp. _____ °C EC _____ μS-cm pH _____	Chemical Quality: pH: _____ Bacteriological Quality: Faecal coliform: _____ cfu per 100ml Laboratory: _____

Borehole: Water Quality Summary
Comments: _____

9.4.2 Dam Inspection Form Checklist (OWRB, 2011)

DAM INSPECTION CHECKLIST						
Name of Dam:			Purpose of Dam:			
Owner of Dam:			Hazard Classification:			
Address:			Inspected By:			
Village:			Date of Inspection:			
District:			Estimated Lake Level:			
Political or Legal Location:			Weather Conditions:			
Coordinates:						
<i>Note: Coordinates should be measured using a GPS and taken on the crest of the dam at the center.</i>						
	Item	Yes	No	N/A	(Condition) ¹ <i>Good/ Acceptable/ Deficient- Poor</i>	Remarks
General Conditions of Dam						
1	Alterations to the dam?					
2	Development in downstream floodplain?					
3	Grass cover adequate?					
4	Settlements, misalignments, or cracks?					
5	Recent high water marks? elevation					Elevation
Upstream Slope of Dam						
1	Erosion, slides, or depressions?					
2	Trees or excessive vegetation?					
3	Animal burrows or holes?					
4	Evidence of livestock on dam?					
5	Cracks, settlement, or bulges?					
6	Evidence of slides or scarps?					
7	Adequate and sound slope protection (rip-rap)?					

Crest of Dam						
1	Longitudinal or transverse cracking?					
2	Trees or excessive vegetation?					
3	Crest arching or bowing?					
4	Erosion or ruts?					
5	Low areas or depressions?					
6	Evidence of livestock on crest?					
7	Road on crest?					
Downstream Slope of Dam						
1	Erosion, slides, or depressions?					
2	Trees or excessive vegetation?					
3	Animal burrows or holes?					
4	Evidence of livestock on embankment?					
5	Cracks, settlement, or bulges?					
6	Drains or wells flowing?					Estimated..... m ³ /s; clear/ cloud?
7	Seepage or boils?					Estimated..... m ³ /s; clear/ cloud?
Abutment Contacts						
1	Erosion, cracks, or slides?					
2	Seepage or boils?					Estimated..... m ³ /s; clear/ cloud?
Inlet Structure						
1	Concrete? Metal?					
2	Spalling, cracking, or scaling?					
3	Exposed reinforcement?					
4	Corrosion present?					
5	Coating adequate?					
6	Leakage? Estimated gpm					Estimated..... m ³ /s
7	Trash rack adequate?					
8	Obstacles to inlet?					
9	Drawdown operative? Opened & closed					

Conduit & Outlet						
1	Concrete? Metal?					
2	Spalling, cracking, or scaling?					
3	Exposed reinforcement?					
4	Joints displaced or offset?					
5	Joint material lost?					
6	Leakage of valve or gates?					Estimated..... m ³ /s
7	Other leakage?					Estimated..... m ³ /s; clear/ cloud?
8	Conduit misaligned?					
9	Outlet or channel obstructed?					
10	Outlet channel eroding?					
Concrete Spillway						
1	Spalling, cracking, or scaling?					
2	Exposed reinforcement or deterioration?					
3	Joints displaced or offset?					
4	Joint material lost?					
5	Leakage (joints, cracks, other)?					Estimated..... m ³ /s; clear/ cloud?
6	Wall displaced?					
7	Dissipater deteriorating?					
8	Dissipaters clean of debris or vegetation?					
9	Erosion at toe of spillway?					
10	Spillway undercutting?					
Auxiliary (Emergency) Spillway						
1	Obstructions, debris, trees?					
2	Erosion or sinkholes?					
3	Animal burrows or holes?					
4	Evidence of livestock on spillway?					
Stilling Basin						
1	Spalling, cracking, or scaling?					
2	Exposed reinforcement?					
3	Joints displaced or offset?					
4	Joint material lost?					

5	Joints leak?					Estimated..... m ³ /s; clear/ cloud?
6	Rock adequate?					
7	Excessive vegetation or debris in basin?					
8	Dissipater deteriorating?					
9	Dissipaters clean of debris or vegetation?					
Gates						
1	Floodgates broken or bent?					
2	Floodgates eroded or rusted?					
3	Floodgates operational?					
4	Floodgates leaking? Estimated gpm					
Instruments						
1	Structure instrumented?					
2	Monitoring performed?					
3	Instruments operational?					
	Development Below Dam					
	(Low or Significant Hazard Dams)					
Are there homes, businesses, or habitable structures located down-stream of the dam						
1	Are there homes, businesses, or habitable structures located down-stream of the dam					
Emergency Action Plan (High Hazard Potential Dams Only)						
1	Emergency action plan?					
2	Emergency services contacts up-to-date?					
3	Dam breach inundation map?					

Legend:

(Condition)¹: Please rate the condition of Sections 1 – 11 on inspection form either: Good, Acceptable, Deficient, or Poor.

Good: No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading

Conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria or tolerable risk guidelines.

Acceptable: No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

Deficient: A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. Poor may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Further investigations and studies are necessary.

Poor: A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

9.4.3 General Form Checklist

GENERAL WATER PROJECT INSPECTION CHECKLIST						
Name of Project:						
Client:						
Contractor:		Inspected By:				
Village:		Date of Inspection:				
District:						
Political or Legal Location:						
Coordinates:						
<i>Note: Coordinates should be measured using a GPS and taken at the site of inspection</i>						
	Item	Yes	No	N/A	(Condition) ¹ Good/ Acceptable/ Deficient- Poor	Remarks
	GENERAL CONDITIONS					
	Site Supervisor and other Key Personnel Available?					
	Necessary tools and equipment available?					
	All related construction documents Material approval and shop drawings in place and approved.					
	Site clear from waste material?					
	Construction material available?					
	Are protective gears provided and used at the site?					
	Work programme prepared and followed?					

	Quality assurance plan prepared and followed?				
	Site Meetings Conducted?				
	Site Logbook available and activities recorded daily?				
	Materials properly arranged at site?				
	Is First Aid kit available at site?				
EXCAVATIONS					
1	Are the excavated areas provided with fence/barricades?				
2	Are excavated pits adequately shored/timbered?				
3	Is Depth and Width of trench as per dimensions in Drawing?				
4	Are the excavated material kept away from the edge of the pit/ trench by at least 1m?				
5	Are Warning signs placed near the excavated area?				
6	Means of access and exit from the work area provided?				
REINFORCEMENT					
1	Are the reinforcement tensile strength Test certificates available and as per design?				
2	Is reinforcement size as per design?				
3	Is curtailment of reinforcement satisfactory as per bending schedule?				
4	Are reinforcement hooks as per bending schedule?				
5	Does the placing of reinforcement, diameter, number and spacing match with the Construction Schedule?				
6	All reinforcement tied properly at all points where they cross each other using appropriate binding wires?				

7	Are Reinforcement covers placed as per design and spacer blocks properly placed?				
8	Is the weight of reinforcement (kg) provided as per in BoQ?				
9	Cleanliness of shuttering and bars OK?				
FORMWORK					
1	Is the formwork structure erected according to drawing and specifications?				
2	Are horizontal, diagonal bracings provided in both longitudinal & transverse directions?				
3	Are the shores properly seated top and bottom to prevent displacement?				
4	Are formwork structure shores of adequate size and spacing?				
5	Formwork corners and joints adequately tied to prevent leakage or bulging and spreading of concrete?				
6	Adequate lap between forms and previously cast concrete provided?				
7	Is the formwork level and alignment Ok?				
PRE-CONCRETING					
1	All necessary equipment available?				
2	Is mix design approved?				
3	Sand and aggregate test conducted and are as per design?				
4	Casting and curing method accepted?				
5	Formwork dimensions in accordance to drawing?				
6	Formwork clean, smooth, water tight and free from deleterious material?				
7	Formwork meets level and line requirement?				

8	Steel fixed and located according to drawing?				
9	Reinforcement clean, and free from deleterious material?				
10	Concrete cover placed as per drawing?				
CONCRETING					
1	Formwork clean, smooth, water tight and free from deleterious material?				
2	Water cement ratio as per design?				
3	Surface preparation before placing?				
4	Slump test performed?				
5	Adequate vibration provided?				
6	Does segregation of aggregates occur?				
7	Temporary spacers and ties removed?				
8	Shuttering prop displacement/settlement occurs?				
9	Concrete cube for testing prepared as per specification?				
POST -CONCRETING					
1	Honey combing, cracks and bubbles observed?				
2	Surface finishing, line and level as per drawing?				
3	Curing method and frequency done as per specification?				
4	Stripping/removal of formwork, supports done as per specified method and time?				
5	Repair of surface finish as per specified method?				
6	Structure cleared for next construction stage?				
BLOCKWORK					
1	Certificates of testing of blocks, sand and cement available?				

2	Setting out and Surface Preparation ok?				
3	Mortar mix ratio as per specification?				
4	Blocks dampened with water before installation?				
6	Number of course as specified and approved?				
8	Block work joints properly filled with mortar and raked to form key for plaster?				
9	Wall ties are fixed at junctions of concrete walls and columns and all required?				
10	Horizontal stack provided as per method statement				
11	All required mechanical, electrical and plumbing embedment / openings are in place?				
12	Horizontal and vertical alignment a checked				
13	Curing method and frequency done as per specification?				
PIPE LAYING					
1	Pipe size, type and schedule is according to drawing?				
2	Bottom of the trench is firm and free from loose material, thoroughly compacted prior to placing bedding material.				
3	Pipe length and ends are free from cracks or imperfections?				
4	The line and grade of the trench according to the cut sheet?				
5	Pipe has proper bearing and is fully placed into the pipe bedding material and is cantered in the trench?				
6	Pipe joints pushed and secured properly to mark?				
7	Correct pipe fittings (Air valves, washout,e.t.c) installed in proper direction and location as per drawing?				

8	Are specified backfill material used?					
9	Pipeline flushed upon completion of construction?					
10	Hydrostatic testing conducted?					

10. DISPUTE RESOLUTION AND TERMINATION

A formal contract must have dispute resolution clauses (refer clause – update clause no) which can be initiated by the contract manager when the informal process does not resolve a dispute.

The following dispute resolution process will be used for managing disputes:

- *[List details including any escalation process. Reference the relevant contract clauses.]*

If the Contractor breaches or repudiates the contract and fails to remedy the breach as required by the appropriate contractual clause (refer clause – update clause no), then the Client may initiate action to terminate the contract. Approval must be sought from appropriate senior management prior to actioning the termination process.

11. PAYMENT TERMS AND ARRANGEMENTS

Payment Plan/Procedures

No.	Type of Payment	When/ Frequency	Documents Required	Process Time	Verification Process	Approvals
1.	<i>Advance Payment</i>	<i>Once</i>	<i>Advance Payment Guarantee</i>			
2.	<i>Interim Payments</i>	<i>Every Month</i>	<i>Interim Payment Certificates, time sheets, proof of incurred expenditure, shipping documents etc</i>			
3.	<i>Interest Payments</i>	<i>Delayed Payments</i>				
4.	<i>Price Adjustment</i>	-				
5.	<i>Claims/ Compensation</i>	<i>As needed</i>				
6.	<i>Final Payment</i>	<i>Once</i>				

12. CONTRACT VARIATIONS AND EXTENSIONS

The following contract variation method and procedures will be used to consider and approve contract variations:

- *[List details]*

This contract has *[List details where applicable]* extension options.

The following review will be undertaken to determine whether the contract should be extended:

- *[List details]*

13. CONTRACT FINALISATION

The following contract finalization tasks and transition out requirements will be implemented at the conclusion of the contract to close the contract:

- *Completion of all outstanding contract actions;*
- *finalisation of all deliveries required by the contract;*
- *completion and reconciliation of all payments and financial obligations;*
- *finalisation of all required reports;*
- *[List other details including, for example, the Contractor may be required to handover government owned assets, materials, files.]*

A post contract review report will be undertaken at the conclusion of the contract period.

The report is to be forwarded to the Client procurement unit.

Contract Management Meeting Agenda

Agenda Items	
1.	Introduction
2.	Minutes from previous meetings outstanding issues
3.	Contract performance status key performance measures contract deliverables
4.	Contract administration insurances reporting requirements risk management
5.	Issues/challenges customer issues/feedback
6.	Improving the contract opportunities future trends/options
7.	Other business
8.	Next meeting

APPENDIX: 2 PROCUREMENT RECORDS KEEPING

Details of Records to be Included in the Procurement and Contract File.

Chronological Mapping of Procurement Records as per PPA and Regulations	
Ser. No.	Record
A: Records to be Maintained in the Procurement File.	
1.	Copy of Annual Procurement Plan
2.	Minutes of Management Meeting which approved the Procurement Plan
3.	Requisition of Procurement to initiate Process;
4.	Approval of Procurement Method
5.	Minutes of TB Meeting that approved tender advert, bidding documents (advert/ specifications/TOR/ Statement of Requirements);
6.	Copy of Adverts/Invitation for Tenders/Quotations where non- open method was employed
7.	Tender Document/ RFP issued to Bidders (if any);
8.	Clarifications received & Issued to Bidders (if any);
9.	Minutes of Pre-bid meeting (if any);
10.	Amendments/addendum to Bidding Document/RFP issued to bidders (if any) including Notice of Extension of time for submission of bids (if any);
11.	Minutes of Tender Opening;
12.	Tenders submitted
13.	Letter of appointment of evaluation committee;
14.	Evaluation report with all the necessary attachments, particularly all correspondences with bidders regarding notification of arithmetic errors and acceptance of the same
15.	Deficiencies noted by Procurement Unit while reviewing the evaluation report and correspondence with the evaluation committee on the same
16.	Any Declaration of Interest by members of Tender Committee before adjudicating on a particular tender;
17.	Deficiencies noted by the Tender Committee while adjudicating on the Tender and their directives to Procurement Unit on the same;
18.	Minutes of the Tender Committee that approved recommendations of award;
19.	Letter of appointment of negotiation team (if any);
20.	Approval of negotiation plan;
21.	Letter inviting firm to negotiate (letter of intent);
22.	Minutes of Negotiation
23.	Approval of contract award recommendation
24.	Letter of Intent to award
25.	Report on any complaints received from the bidders;
26.	Letter of award/Letter of Acceptance;

Chronological Mapping of Procurement Records as per PPA and Regulations

Ser. No.	Record
27.	Letter of Notification of Unsuccessful bidders;
B: Records to be Maintained in the Contract File	
28.	Contract documents
29.	Approval of Contract documents
30.	Approval of contract amendments (if any);
31.	Copy of performance guarantee where applicable;
32.	Copy of Signed Contract;
33.	Copy of advance payment guarantee, where applicable
34.	Records for site handover where applicable;
35.	Notice to commence works/services where applicable;
36.	Instructions or Formal Communications;
37.	Approval for variation orders/ contract amendments where applicable;
38.	Variation orders/change order;
39.	Progress reports, where applicable;
40.	Letter of appointment of Inspection and Acceptance Committees for Goods
41.	Inspection and Acceptance Committee report;
42.	Certificates/Delivery Reports/ Goods Receiving Notes;
43.	Payment Certificates (Buildings and Civil Works) to be accompanied by testing results & measurement sheets where applicable;
44.	Letter of Credit/Invoices/ Payment Vouchers (for goods);
45.	Claims submitted by the supplier, Contractor, consultant or service provider
46.	Claim Valuation Reports
47.	Disputes (if any) and how they were handled – Records of settlement proceedings
48.	Snag list (list of defect works to be corrected during defect liability period, if any)
49.	Final Inspection and Handover Report;
50.	Final Account and Contract Closure Report

APPENDIX 3: PARTNERING, A TEAMWORK APPROACH¹⁰

Partnering is a project approach designed to allow the design and construction process to be performed within an environment of mutual trust, commitment to shared goals, and open communication among the client, architect/engineer, construction manager, general contractor (if applicable), and subcontractors. Partnering establishes a working relationship among all of the team members based on a mutually agreeable plan of cooperation and teamwork. Parties to the design and construction process, in agreeing to work under a partnering approach, work to create an atmosphere in which all parties are working in harmony towards mutual goals to avoid claims and litigation.

Partnering as a concept has attracted a great deal of attention due to the tremendous amount of litigation which has occurred in recent years in the construction industry. Adversarial relationships and resulting claims and litigation have resulted in huge legal costs in many construction projects. Partnering has shown that it does not need to be that way. Through close communication and establishing mutually agreeable goals at the beginning of the project, outstanding results can be achieved with no necessity for outside lawyers. The objective is a “win-win” attitude between all parties due to the design and construction process. There are already numerous examples of completed projects which have proven that the partnering process works.

The essential elements of a partnering agreement are as follows:

Commitment to partnering by the top management of every organization involved in the project, Trust relationship between all parties through personal relationships and open communication with mutual sharing and understanding of each party's risks and goals.

A partnering charter developed jointly by all parties to the project which identifies specific mutual goals and objectives of the partnering participants for continuous evaluation and review against the agreed upon mutual goals. Timely resolution of any disputes at the lowest level possible during the project.

Partnering Advantages

Partnering can result in a significantly higher level of quality on a project and can significantly increase the probability of timely and on-budget completion of the project and can reduce the risk of claims and litigation.

Benefits to the employer

1. Greater control of schedule and cost through close communication and regular evaluation of project progress.
2. Higher quality through focusing on mutual goals by team members who are not side-tracked into adversarial relationships.

¹⁰ Downloaded from <https://www.nap.edu/read/9227/chapter/4> on 20th January 2020.

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3. The potential for a totally claim free project which can be achieved through partnering. Lower administration costs can be achieved by the avoidance of case building and use of outside counsel.
 4. Greater innovation through open communication and trust particularly in the area of value engineering and constructability reviews.
 5. Higher profit potential for all participants resulting in a more efficient project delivery process.

Benefits to the contractor

1. Reduced risk of delays and cost overruns by early and active involvement in issues resolution.
2. Increased productivity through elimination of adversarial relationships and case building. Reduced exposure to claims litigation through early low level project resolution of problem issues.
3. Greater profit potential.

Benefits to the architect/engineering consultants

1. Greatly reduced exposure to liability for document deficiencies through early review.
2. Co-operative effort to resolve problems early to reduce exposure to claims and litigation resulting in reduced administrative costs and increased profit potential.

Benefits to subcontractors and suppliers

1. Improved cash flow due to elimination of, or reduction in, disputes resulting in withheld payments. Greater involvement in the decision making process as an active team member in the project.
2. Reduced exposure to, or elimination of, claims and litigation through early project dispute resolution. And finally, increased profit potential through a "win-win" attitude.

There is considerable overlap in the benefits for all parties to the project. This highlights the similar interests that all parties have in agreeing to mutual goals and objectives in the partnering charter.

IMPLEMENTATION OF PARTNERING

Partnering requires considerable time, effort, and commitment at all stages of a project. The use of a partnering strategy is the voluntary decision to which all team members agreed at the beginning of the project. Implementation steps for partnering could proceed in the following manner:


1. All parties should express their desire to perform the project under a partnering agreement at the beginning of the project. The owner's intention of utilizing the concept should be mentioned in the bid solicitation and

- specifications. Any pre-bid conference should include a presentation on partnering.
2. There should be a meeting of top management of all firms involved in the project in the early design stage. However, the executives at the CEO level should meet to discuss the partnering approach to managing the project. A commitment from the top of each organization is essential for partnering to work.
 3. A partnering workshop/team building session should be held in the very early stages of the project. Each member team should designate a partnering leader who would intend to participate in the workshop. All of the participants of the partnering workshop would develop and agree to a partnering charter which is a written list of the goals and objectives for the project. The charter is a physical symbol of the project team members' commitment to partnering. It is considered to be a road map for regular evaluation of the project process.

Specific benchmarking measurement goals as well as general goals can be part of the partnering charter. The charter does not change the terms of the project participants' contracts and is not a contract in itself. The charter is a guide for co-operation. Each party to the project should sign the charter to show commitment to the partnering process. For periodic evaluation, a formal, regular evaluation of the progress of the project should occur normally as a formal monthly or bimonthly meeting. At this review meeting, there should be an open dialogue on any problem areas with the goal of maintaining all parties' commitment to the partnering process and to make sure that an adversarial relationship has not started to build.

4. The partnering charter should commit all of the team members to dispute resolution without claims or litigation. The goal is that any disagreement is resolved at the project level and that if a dispute is unable to be resolved at the project level, it should quickly move up to the next level of management for resolution. Resolutions should be sought in a "win-win" atmosphere of open communication and trust. The goal is to avoid claims and any involvement by outside lawyers that could result in litigation. Alternate Dispute Resolution (ADR) techniques can be an important part of the partnering process. If any dispute is unable to be resolved at the lower level, the parties should agree to mediation or some similar low cost dispute resolution approach. The goal is to avoid the time and expense of claims and litigation. Alternate dispute resolution techniques can help maintain team spirit and friendly working relationships at the project.

Construction projects where adversarial, confrontational attitudes have resulted in misdirected energies and high cost of claims and litigation. **The partnering process changes mindsets.** Partnering can help all the involved in the design and construction process to **redirect their energies and focus on the real issues associated with achieving optimum project goals.** Partnering is not a panacea. Partnering requires a major commitment to change by all project parties



to work in a team environment that results in a “win-win” relationship. Partnering can and is changing the industry one project at a time. It is an approach which can produce outstanding results for the construction industry.

APPENDIX 4: PROPOSED SERVICE PROVIDER PERFORMANCE EVALUATION

1. DEFINITION

“Contractor” means a contractor, supplier, consultant or service provider who has entered into a contract with the MINISTRY

“Performance Evaluation Form” means a form provided herein which shall be used to evaluate a contractor’s performance.

“Project Evaluator(s)” means one or more person(s) from the MINISTRY’s UD(s) and/or a consultant to MINISTRY, that will be evaluating the Contractor’s performance by completing Performance Evaluation Forms in accordance with this procedural document, as amended.

“Disqualification” means the action that results when a Contractor receives a rating of **“UNACCEPTABLE”** on a Final Performance Evaluation form, subject to the terms and conditions of this document.

2. PURPOSE

This procedure provides a framework for the MINISTRY to evaluate and improve the performance of all contractors that are sourced by the MINISTRY by;

- a) pro-actively managing the performance of Contractors during the term of awarded Contracts; and
- b) creating a record of past performance for use by the MINISTRY in determining the award for future solicitations and contracts.

Project Evaluator(s) may utilize this Contractor Performance Procedure for all contracts including but not limited to; invitational bids, single or sole source purchases, emergency purchases and wherever it is in the best interest of the MINISTRY.

3. WHEN TO CARRY OUT PERFORMANCE EVALUATIONS

3.1 Final Performance Evaluation shall be carried out within two (2) weeks of the following occurrences, depending on the type of good, service or construction:

- a) for Construction contracts; upon the issuance of a Certificate of Final Completion;
- b) for Consulting contracts; upon completion of the Contract;
- c) for Goods; upon delivery and inspection of goods and/or after the expiry of any applicable deficiency;
- d) for Services, upon completion of services and/or after the completion of deficiencies;
- e) for Vehicles and Equipment; upon delivery and inspection and/or after the expiration of the warranty period;
- f) upon termination of a Contract for any reason prior to the Contract end date.

3.2 Interim Performance Evaluation shall be carried out at least every twelve (12) months for all Contracts with a term longer than one (1) year.

4. PERFORMANCE EVALUATION SYSTEM

4.1 Contractors shall be assigned one of the following ratings to each category set out on the Performance Evaluation Form. A critical aspect of the assessment rating system described below is the **second sentence** of each rating that recognizes the Contractor’s resourcefulness in overcoming challenges that arise in the context of Contract performance.

Rating		Description of Rating
10	Exceptional	Performance significantly exceeds the Contract requirements to MINISTRY’s benefit, for example, the Contractor implemented innovative or business process re-engineering techniques, which resulted in added value to the MINISTRY. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the Contractor were highly effective.
8-9	Good	Performance meets contractual requirements and exceeds in some area(s) to the MINISTRY’s benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the Contractor were effective.
6-7	Satisfactory	Performance meets contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which proposed corrective actions taken by the Contractor appear satisfactory, or completed corrective actions were satisfactory.
5	Cautionary	Performance did not quite meet contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which proposed corrective actions taken by the Contractor appear to be a continued minor concern, or completed corrective actions were slightly below satisfactory.
3-4	Not Satisfactory	Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the Contractor has submitted minimal corrective actions, if any. The Contractor’s proposed actions appear only marginally effective or were not fully implemented.
0-2	Unacceptable	Performance does not meet contractual requirements and/ or recovery is not likely in a timely or cost effective manner. The contractual performance of the element or sub-element contains serious problem(s) for which the Contractor’s corrective actions appear to be or were ineffective.

5. IMPACT OF PERFORMANCE EVALUATIONS

- 5.1 A Contractor whose interim performance is rated **CAUTIONARY OR BELOW**, in any category, should be requested in writing, to provide, a written response and appropriate corrective action within an acceptable timeframe, in accordance with the Terms and Conditions of the contract documents. Failure of the Contractor do so or if no satisfactory explanation is obtained, the MINISTRY may terminate the Contract.
- 5.2 Final Performance Evaluation shall be used by the MINISTRY for consideration of award of contracts. If a Final evaluation has **not** been completed at the time that a tender award is under review, an Interim evaluation, if available, may be used by the MINISTRY to:
- a) determine if a Bidder submitting a Bid is a Responsible Bidder, and/or
 - b) to evaluate past performance in the submitted tender.
- 5.3 A Contractor that has received a **TOTAL** rating of **90-100%** on the Contract's **Final** Performance Evaluation Form:
- a) Will be considered a Responsible Bidder for future similar Bid submissions to the MINISTRY. ,
 - b) For a multi-year term Contract, the Contract may be extended for up to additional two (2) one (1) year terms, at the discretion of both the MINISTRY and the Contractor. Price adjustments for the extension shall be based on one of the following:
 - (i) any inflationary contract annual increase r stated in the original contract documents or
 - (ii) the same costs as stated in a firm fixed price multi-year Contract.

Where a contract document did not state or request any inflationary annual Contract increase or where the Contractor is not agreeable to continuing the contract at their prices within a firm fixed price multi-year Contract, the contract extension will not apply and the MINISTRY will move forward with a public invitation of new bids.

- 5.4 A Contractor that has received a **TOTAL** rating of **80-89%** on the **Final** Performance Evaluation Form;
- a) will be considered a Responsible Bidder for future similar Bid submissions to the MINISTRY; and
 - b) for a multi-year term Contract, the Contract may be extended for an additional one (1) year term, at the discretion of both the MINISTRY and Contractor. Costs for the extension shall be based on either:
 - (i) any inflationary contract annual increase r stated in the original contract documents or
 - (ii) the same costs as stated in a firm fixed price multi-year Contract.

Where a contract document did not state or request any inflationary annual Contract increase or where the Contractor is not agreeable to continuing the contract at their prices within a firm fixed price multi-year Contract, the contract extension will not apply and the MINISTRY will move forward with a public invitation of new bids.

-
- 5.5 A Contractor that has received a **TOTAL** rating of **65-79%** on the **FINAL** Performance Evaluation Form
- a) may be considered a Responsible Bidder for future similar Bid submissions to the MINISTRY; and
 - b) for multi-year Contracts, is not eligible for any additional extensions outside of the terms of the current Contract.
- 5.6 A Contractor that has received a **TOTAL** rating of **(50-64%)** on the **Final** Performance Evaluation Form;
- a) may or may not be considered a Responsible Bidder for future similar Bid submissions to the MINISTRY; and
 - b) for multi-year Contracts, is not eligible for any extension terms within the current Contract.
 - c) may be asked to demonstrate in writing or by other acceptable means that they have corrected all previously documented areas of **"CAUTIONARY" OR LESS** performance concerns to a standard satisfactory to the MINISTRY, prior to awarding any future Contracts. In addition, a list of new references may be requested by the MINISTRY for work completed by the Contractor since the date of the Performance Evaluation where a rating of **"CAUTIONARY" OR LESS** was given in any category. The MINISTRY reserves the right, at its sole discretion not to award a Contract to any Contractor, for an indefinite period, that fails to provide satisfactory evidence of correcting any documented past performance concerns by the MINISTRY.
- 5.7 A Contractor that has received a **TOTAL** rating of **less than 50%** on the **Final** Performance Evaluation Form;
- a) shall not be considered a Responsible Bidder and shall be recommended for blacklisting by the Authority; and
 - b) Shall not be considered for award of any contract by the MINISTRY.

6. CONTRACTOR RESPONSE PROCESS

- 6.1 The Contractor shall have seven working days to:
- a. Submit a written response to an Interim or Final Performance Evaluation and /or
 - b. Submit a written request to appeal a **Final** Performance Evaluation rating.

If no response is received within the above noted timeframe the Evaluation rating shall be considered final.

7. APPEAL PROCESS

- 7.1 Within ten (10) business days) of receiving an appeal response form in respect to a Final Performance Evaluation Form, the MINISTRY will conduct a full review of the appeal and render a final decision based on the appeal information.
- 7.2 The MINISTRY may request additional information from the Contractor in order to conduct a full review.

PERFORMANCE EVALUATION FORM

Instructions: Use this form to evaluate the overall performance of contractors you are currently working with. Include all information associated with the contractor and apply a performance rating. Definitions are provided below. Be factual and do not include unsubstantiated opinions. Contractor performance evaluations are recommended for all contractors to report all levels of service (exceptional, satisfactory or unsatisfactory).

Contract No:	Description:
Name of Contractor	Address:
Final Evaluation <input type="checkbox"/>	Interim Evaluation <input type="checkbox"/>
Contract Completion Date	Date of Evaluation

DEFINITION OF PERFORMANCE RATINGS

Rating		Description of Rating
10	Exceptional	Performance significantly exceeds the Contract requirements to the MINISTRY's benefit, for example, the Contractor implemented innovative or business process reengineering techniques, which resulted in added value to the MINISTRY. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the Contractor were highly effective.
8-9	Good	Performance meets contractual requirements and exceeds in some area(s) to the MINISTRY's benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the Contractor were effective.
6-7	Satisfactory	Performance meets contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which proposed corrective actions taken by the Contractor appear satisfactory, or completed corrective actions were satisfactory.
5	Cautionary	Performance did not quite meet contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which proposed corrective actions taken by the Contractor appear to be a continued minor concern, or completed corrective actions were slightly below satisfactory.

3-4	Not Satisfactory	Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the Contractor has submitted minimal corrective actions, if any. The Contractor's proposed actions appear only marginally effective or were not fully implemented.
0-2	Unacceptable	Performance does not meet contractual requirements and/or recovery is not likely in a timely or cost effective manner. The contractual performance of the element or sub-element contains serious problem(s) for which the Contractor's corrective actions appear to be or were ineffective.

PERFORMANCE RATING			COMMENTS (Attach additional Sheets if necessary)
Evaluation Criteria	Score out of 10	Rating Category	
1. Work Performed in compliance with contract Terms		Exceptional	
		Good	
		satisfactory	
		Cautionary	
		Unacceptable	
2. Materials, supplies and equipment provided as required		Exceptional	
		Good	
		satisfactory	
		Cautionary	
		Unacceptable	
3. Staff availability		Exceptional	
		Good	
		satisfactory	
		Cautionary	
		Unacceptable	
4. Timeliness of work		Exceptional	
		Good	
		Satisfactory	
		Cautionary	
		Unacceptable	

PERFORMANCE RATING		COMMENTS (Attach additional Sheets if necessary)
5. Staff Professionalism	Exceptional	
	Good	
	satisfactory	
	Cautionary	
	Unacceptable	
6. Customer Service	Exceptional	
	Good	
	Satisfactory	
	Cautionary	
	Unacceptable	
7. Possession of Quality of Equipment	Exceptional	
	Good	
	Satisfactory	
	Cautionary	
	Unacceptable	
8. Availability of Equipment on site	Exceptional	
	Good	
	Satisfactory	
	Cautionary	
	Unacceptable	
9. Quality of Work	Exceptional	
	Good	
	satisfactory	
	Cautionary	
	Unacceptable	
10. Communication and accessibility	Exceptional	
	Good	
	satisfactory	
	Cautionary	
	Unacceptable	
11. Prompt and effective corrections of situations and conditions	Exceptional	
	Good	
	satisfactory	
	Cautionary	
	Unacceptable	

PERFORMANCE RATING			COMMENTS (Attach additional Sheets if necessary)		
12. Contractor's compliance to various government laws		Exceptional			
		Good			
		Satisfactory			
		Cautionary			
		Unacceptable			
TOTAL SCORE					
Would You recommend using this firm again		YES		NO	(Explain)

EVALUATOR'S ACKNOWLEDGEMENT:

I declare that I have completed this evaluation in a fair and honest manner. I further confirm that my judgment in completing this evaluation has not been influenced by any actual or potential conflict of interest.

Evaluator's Name

Signature

APPENDIX 5: TYPICAL QUALITY ASSURANCE PLAN

TABLE OF CONTENTS¹¹

1.0 INTRODUCTION

The purpose of this Construction Quality Assurance (CQA) Plan is to detail the testing methods and quality assurance procedures for required Water supply and sanitation projects. The Project includes:

- *(Narrate the Summarized details of the Project)*

2.0 DEFINITIONS

For the purpose of the CQA Plan, the following terms are defined below:

Construction Quality Assurance (CQA) – A planned system of activities that provide assurance that materials or construction activities are undertaken and installed as specified in the drawings and specifications

Construction Quality Control (CQC) – The process of measuring and controlling the characteristics of the item/product in order to meet the manufacturers or project specifications.

- *(Give definition of other terms and materials used)*

3.0 ROLES OF THE PARTICIPANTS

The participants and/or parties that have been identified as key personnel in the delivery of this project include, but are not necessarily limited to *(Give the Positions of all key personnel in the project)*. The roles and responsibilities of the participants and/or parties are detailed below.

For example

Project Manager

During the Construction, the Project Manager acting on behalf of the Employer, will serve as a single point of contact for the Design Engineer, Contractor and CQA Consultant.

Design Engineer

The design engineering services for the XXXL will be provided by XXXL Consultants. The Design Engineer shall review and approve any proposed changes during construction. He shall also be responsible in specifying the materials to be incorporated in the works.

CQA Consultant¹²

The CQA Consultant is an independent party not affiliated with the contractors, subcontractors, suppliers or manufacturers. The CQA Consultant may be the

¹¹ The CQA Plan must have cover page and Table of Content.

¹² This role can be played by the Project Manager. However in large and complex projects another person may be appointed to take up this role.

Design Engineer. The CQA Consultant has the overall responsibility for managing, coordinating and implementing the CQA activities and confirming that the contractor's construction quality control activities are performed in accordance with the CQA Plan, construction drawings and technical specifications. The critical activities related to the construction, manufacture and installation water pipes, water pumps and other project components will be monitored and documented by the CQA Consultant. The CQA Consultant will be responsible for issuing a Final Certification Report containing CQA documentation sufficient to satisfy regulatory requirements and the requirements of this CQA Plan.

Contractor

The Contractor is responsible for the timely construction of the project, as detailed in the drawings and technical specification and in accordance with this CQA Plan. The Contractor is also responsible for the CQA. In particular, the Contractor shall ensure that:

- Only materials meeting the requirements set forth in the Technical Specifications and drawings are used; and
- The materials are installed in full conformance with the Technical Specifications and Design Drawings.

Soil Testing Laboratory

In the performance of the CQA activities, the CQA Consultant may engage **YYYY** Accredited soils testing laboratory, independent from the contractor, subcontractors, or any material supplier or manufacturer. The testing laboratory will conduct tests on representative samples to evaluate their properties and compliance with the technical specifications.

4.0 DESCRIPTION OF THE WORKS

4.1 BREAKDOWN OF WORKS

The works to be carried out under as given in the construction drawings, Bills of Quantities and Technical Specifications include, but are not limited to the following:

- *[Identify and give detail breakdown of project major work tasks e.g. concreting, formwork, reinforcement work, excavation, drilling and pipe laying e.tc.]*

4.2 WORKS INSPECTION AND TESTING

Works shall be carried out as per prepared methods statements; works inspection at the site is to be conducted for each major work task using standard inspection checklist.

- *[Use project specification documents, agreed standards and guidelines to develop method statements and inspection checklist for each major work task.]*

For the purpose of enhancing monitoring of quality in daily activities, an **Inspection Test Plan**/schedule is prepared. The plan details the type of test/inspection for every activity in work schedule, test standard to be used, means of verification of the test, roles and responsibility of everyone involved.

- *[Use project work schedule, method statements and agreed standards and guidelines to develop Inspection Test Plan]*

All inspections and tests at the site shall be conducted through guidance as provided in the Inspection Testing Plan.

5.0 DAILY REPORTING AND DOCUMENTATION

5.1 General

An effective CQA Plan recognizes all construction activities that should be monitored and assigns responsibility for monitoring each activity.. This is most accomplished and verified by the documentation of quality assurance activities. The CQA Consultant Manager will document that all quality assurance requirements have been satisfied. The CQA Manager Consultant will also maintain at the job site a complete file of construction drawings, technical specifications, CQA Plan, test procedures, daily logs and other pertinent documents.

5.2 Daily Record Keeping

Use the inspection and testing schedule/plan to

Standard reporting procedures will include preparation of daily CQA documentation which, at a minimum, will consist of:

- Field notes, including memoranda of meetings and/or discussions with the Design Engineer or Project Manager;
- CQA consulting logs and testing data sheets; and
- Construction problems and solution summary sheets.

This information will be reviewed by the CQA Consultant, signed and transmitted to the Project Manager on a daily basis.

Monitoring logs and testing data sheets will be prepared daily. At a minimum, these logs and data sheets will include the following information:

- Date, project name and other identification;
- Data on weather conditions;
- A site plan showing work areas and locations selected for random CQA testing;
- Descriptions and locations of ongoing construction;
- Records of deliveries, condition, material roll numbers, description and locations of materials stores;
- Equipment and personnel in each work areas;
- Locations where in-site CQA tests and samples were taken;
- • A summary of test results;

-
- Calibration of test equipment;
 - An identifying sheet number for cross referencing and document control;
 - Decisions made regarding acceptance of units of work and/or corrective actions to be taken; and
 - Signature of CQA Consultant Representative.

5.3 Construction Issues

The contractor will be informed by the CQA Consultant about any significant recurring non-conformance with the construction drawings, technical specifications, or CQA Plan. The cause of the non-conformance will be determined and appropriate changes in procedures or specifications may be recommended. These changes will be submitted to the design engineer for approval. When changes are made and approved, they will become part of the construction documents.

5.4 Photographic Records

Photographs will be taken by the CQA Consultant and documented in order to serve as pictorial record of work progress, problems and mitigation activities. The basic file will contain colour prints and they will be identified with the date, time and location of the photograph.

5.5 Design and/or Specification Change

Design and/or specification changes may be required during construction. In such cases, the CQA Consultant will notify the Design Engineer, the Project Manager and the Contractor.

6.0 REQUIREMENTS OF CQA VALIDATION REPORT

At the completion of the work, the CQA Consultant will submit to the Project Manager a signed final certification report. This report will document that:

- Work has been performed in compliance with the construction documents;
- Physical sampling and testing has been conducted at the appropriate frequencies specified in the CQA Plan;
- The required CQA documentation has been completed.

As a minimum, this report will include

- Materials and equipment manufacturers quality control documentation;
- A summary describing CQA activities and indicating compliance with the drawings and Technical Specifications;
- A summary of CQA testing, including failures, re-test results, non-conformances and corrective measures;
- Records of sample and re-sample locations, the name of the individual conducting the tests, and the results of the tests;
- Daily inspection reports;
- Progress photographs;
- Any other relevant information; and
- As built drawings (See below)

The as-built drawings must detail the following:

- *(Give details to be included in the as-built drawings)*

The validation report must contain a statement by the CQA Consultant that the works have been carried out in accordance with the CPA Plan (and specifications attached to it) and that the validation report (including the drawings and appendices) represents a fair and accurate record of the works.

APPENDIX 6: QUARTERLY PROGRESS REPORTING FORM¹³

Quarterly Progress Report No....

Reporting Period: From...*[insert date]*.....To:..*[insert date]*.....

1.1 Original Contract Details			
Project Name:			
Contract No.			
Name of Contractor:			
Contract Signed on (date):			
Site Handing Over Date:			
Contract Commencement Date:			
Contract Price at Signature:			
Execution Time: Number of Days:			
Start Date:		Completion Date:	
1.2 Performance Security			
Percentage of Contract Price: 10%		Amount:	
Performance security submitted on		Date:	
Performance Security Valid Until		Date:	
1.3 Advance Payments Security			
Advanced Payment Security: 15%		Amount:	
Advance Payment Security submitted on		Date:	
Advance Payment Security Valid Until		Date:	
1.4 Insurance			
Insurance amount		Amount:	
Insurance Date		Date:	
Insurance Valid Until		Date:	
2. CONTRACT EXECUTION			
2.1 Status as of end of reporting period			
Actual Status of Execution	Progress (%)		
	Certified Payment (%)		
Reasons for difference between Progress and Certification:			
Are there any delays in the contract execution? YES or NO			
If the answer is Yes indicate the delay (in days) and give reasons:			

¹³ Insert rows as appropriate where there are many entries.

2.2 Claims (if any)		
2.2.1 Extension of Time:		
Extension of Time Granted YES/NO How long?	If YES , indicate the revised end date:
Date granted	Reason(s) for extension	Comments
2.2.2 Additional Payments:		
Were there any acceptable claims for additional payment? NO/YES		
Description of the claim	Accepted amount	Reasons for the claim
2.3 Amendments/Variations Orders (VO) to the Contract		
Date of amendment/ VO	Description	Remarks
Were there any price consequences as a result of contract amendments/ VO? YES/NO		
Contract amendments/ VO approved by the Tender Board? YES/NO		
2.4 Contract Disputes		
Disputes Arisen During Execution		
Disputes by	Reason	Comments
Were disputes resolved	YES/NO	How?
2.6 Acceptance Certificates (Works)		
Substantial completion Certificate issued?	YES/NO	Date issued:
Defect Liability Period Expires on (date):		
Final Completion Certificate issued?	YES/NO	Date issued:
2.7 Liquidated Damages		
Delivery time respected?	YES/NO	
Liquidated Damages Applied	YES/NO	
Maximum of Liquidated Damage%	Amount:	Date Deducted:

3. PAYMENT

3.1 Advance Payment

Documents Required for Advance Payment:

Date of Application:

Application accompanied with required Documents: YES/NO Remarks:

Expected Date of Payment..... Actual Date of payment

3.2 Interim Payments

Documents Required for Interim Payments:

Schedule of Interim Payments

Amounts	Currency	Date of Invoice/ Certificate	Date of Payment	Delays in Days	All Documents Present	Method of Payment

3.3 Final Payment

Amounts	Currency	Date of Invoice/ Certificate	Date of Payment	Delays in Days	All Documents Present	Method of Payment

3.5 Financial Overruns (summary)

Item	Y/N/NA	Amount	Remarks
Variation Orders			
Claims			
Price Escalation			
Interests on delayed payments			
Others			

Progress Photos
(insert Progress Photos below)