UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN FOR SCHOOL SANITATION PROJECT

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FINAL GRADUATION PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
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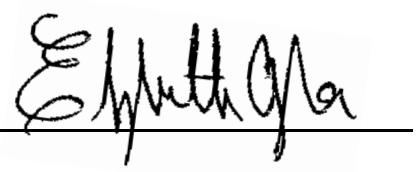

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DEDICATION

To my parents, my daughter and my friends for their support, encouragement, understanding, and patience during this process.

To parents, especially to single mothers, who have put their academic ambitions on hold or have thought of giving up on them. It’s never too late!

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ABSTRACT

The objective of this Final Graduation Project is to develop a project management plan for the School Sanitation Project to improve access to education in Belize. The School Sanitation Project builds sanitation facilities in primary schools and implements accompanying health and hygiene education. Most schools do not provide adequate bathroom facilities to their student population creating a school environment which negatively impacts student health and leads to illnesses and poor attendance. The network of water, sanitation, and hygiene stakeholders in Belize works mostly in isolation, but recenty are seeking to combine efforts.

The final product of this project is the project management plan comprised of a project charter and a subsidiary management plan for each of the nine knowledge areas described in the Project Management Body of Knowledge Guide 6th Edition: scope, schedule, cost, quality, resources, communications, risks, procurement and stakeholders. In addition to the Guide, two research methodologies are used in the elaboration of this project. The qualitative method is applied through a bottom-up approach to collect data from local and community stakeholders, while the quantitative method is applied in analyzing data from partner organizations and government stakeholders in a top-down approach.

As a result of this project it is identified that the sponsor has broad project management processes in place, but there is an opportunity to elaborate on these in much greater detail. It is recommended that the sponsor implement the tools, processes, and standards developed in the project management plan to improve the efficiency and effectiveness of this and future projects.

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ABBREVIATIONS AND ACRONYMS

AC	Actual Cost
APA	American Psychological Association
BCC	Behavior change communication
CBA	Central Building Authority
EV	Earned Value
EVA	Earned Value Analysis
EVM	Earned Value Methodology
FGP	Final Graduation Project
HFLE	Health and Family Life Education
MOE	Ministry of Education
MOH	Ministry of Health
PV	Planned Value
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PTA	Parent Teacher Association
RFP	Request for proposal
SDG	Sustainable Development Goal
TRF	The Rotary Foundation
UN	United Nations
WASH	Water, sanitation, and hygiene
WHO	World Health Organization

EXECUTIVE SUMMARY

As a member of the United Nations, Belize has committed to the achievement of the Sustainable Development Goals by 2030. These goals seek to improve the quality of life of the citizens of each member country. Three of these goals converge in schools and are related to health and well-being, inclusive and equitable education and availability of water and sanitation. The National Development Framework for Belize, Horizon 2030, includes health and education as two of its four strategic priorities. A healthy school environment includes the availability of sanitation facilities and education of the student population in basic hygiene practices.

Many organizations and individuals have contributed to the construction of bathroom blocks to increase the number of schools with internationally accepted infrastructure. The Government of Belize has assembled a national water, sanitation, and hygiene (WASH) group comprised of public and private stakeholders with the aim of standardizing the national WASH response in schools.

Only a third of schools in Belize meet international sanitation standards (UNICEF, n.d.), including the number of toilets per male and female students, facilities for students with disabilities and for female students that are menstruating, among other standards. Effects of this problem include inequitable access to education, absenteeism, gastro-intestinal and water-borne diseases, to name a few. The remaining two thirds of schools rely on available funding and sponsors to build sanitation facilities to these standards.

The link between water and sanitation and education is an important one. Schools must provide students with adequate toilets and handwashing stations and teach personal hygiene and basic sanitation practices to move closer to achieving the national education and health goals. The impact of these facilities and accompanying education will extend beyond the students and school into their homes and communities around the country. The products of this project are intended to serve as a foundation for the standardization of the WASH initiative in schools to guide WASH stakeholders in implementing Project Management Institute standards and best practices in school sanitation projects in Belize.

The general objective is to develop a Project Management Plan, according to the standards of the Project Management Institute, to manage the construction of sanitation facilities in primary schools in Belize and implement the related health and hygiene education. The ten specific objectives were: 1. to develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project, 2. to create a sustainable scope management plan to establish the project deliverables and exclusions, 3. to prepare a schedule management plan to ensure completion of the project within a realistic and agreed timeframe, 4. to generate a cost management plan to ensure efficient use of project budget and the incorporation of all project costs, 5. to produce a quality management plan to define the quality standards for the sanitation facilities, 6. to prepare a resource management plan to ensure the required resources are available

at the right time, 7. to develop a communications management plan to identify the project's communication strategy based on stakeholder needs, 8. to produce a risk management plan to determine the project's risk strategy and risk identification approach, 9. to create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals, and 10. to generate a stakeholder engagement plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.

The research methodology for this project was two-fold: qualitative and quantitative. By applying the quantitative method, data was collected during interviews and documentation provided by key stakeholders and followed an inductive approach to allow flexibility in the analysis of the school environment and local needs and culture. Numerical information was collected including the standards, historical data, similar project information in the quantitative method, where a deductive approach was applied.

The elaboration of the project management plan presented areas of improvement in the sponsor's project management processes. Each subsidiary management plan identifies inputs, tools and techniques, and outputs for each knowledge area, in keeping with the FGP specific objectives and the standards established in the Project Management Body of Knowledge Guide 6th Edition.

The expected result of this project management plan is its successful implementation by the project team during the entire project lifecycle to achieve the planned impact and deliver quality and sustainable products that respond to the community's needs. By documenting, monitoring and controlling the project deliverables, it is expected that the resulting behavior change communication activities and the sanitation facilities will significantly improve the sanitation and hygiene conditions and behavior of the school population. The long-term impact of this improvement is an increase of student attendance which in turn improves the students' academic performance.

1 INTRODUCTION

1.1 Background

During the last thirty years, the member states of the United Nations have collectively adopted a global plan of action that has evolved from Agenda 21 to the Millennium Development Goals to the current Sustainable Development Goals (SDG). The aim of each is to improve the quality of life of the world's population and to protect the environment through sustainable development (United Nations [UN], n.d). As a member state, Belize adopted the global goals and prepared Horizon 2030, the National Development Framework for 2010-2030 (Ministry of Economic Development [MED], 2009), to guide the public sector and its partners as they prepare and implement sectoral plans to achieve its vision.

The Framework comprises two pillars: democratic governance and education for development. Both are also strategic priorities of Horizon 2030, along with economic resilience and "The Bricks and the Mortar – healthy citizens and a healthy environment" (MED, 2009). This prioritization of education and health directly aligns with SDG 3 "Ensure healthy lives and promote well-being for all at all ages," SDG 4 "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all," and SDG 6 "Ensure availability and sustainable management of water and sanitation for all" (UN, n.d.).

Belize is not alone in achieving the national and global targets in health and education for its entire population and particularly for its children and teenagers. National and international organizations and sponsors have funded and supported numerous schools around the country over the last decade to improve bathroom facilities. However, the majority of schools have yet to meet international sanitation standards (UNICEF, n.d.). The Ministry of Health has convened a multisectoral water, sanitation, and hygiene (WASH) body including stakeholders from the Ministry of Education, UNICEF, Belize Red Cross, The Rotary Club, Belize Social Investment Fund, among others (Channel News 5, March 6, 2020). Each stakeholder has

funded and supported the improvement of sanitation facilities in Belizean schools and continues to seek additional sponsors and funds to increase the number of adequate sanitation facilities in local schools.

The School Sanitation Project builds on the opportunity that the WASH stakeholder group represents. This group is committed jointly and within their own organizations to support and promote the improvement of bathroom facilities and of the health curriculum in schools around Belize. The inclusion of the school body, staff and administration and its surrounding community is of the upmost importance for the successful implementation and sustainability of the project's goals and impact.

1.2 Statement of the Problem

Seventy percent of Belizean schools do not have sanitation facilities or the existing installations (latrines, damaged or aged infrastructure) fail to comply with the minimum requirements recommended by the World Health Organization (WHO) (UNICEF, n.d.). These unmet sanitation requirements include separate toilet blocks for boys and girls; reliable water availability for hand washing and flushing toilets; safe drinking water; hygiene education as part of the curriculum; proximity of hand wash stations to toilet blocks; facilities that support menstrual hygiene; one toilet per 25 girls and one for female staff; one toilet and one urinal per 50 boys and one for male staff; at least one toilet cubicle for students and staff with disabilities; availability of hygiene products including soap, toilet paper, menstrual products, trash cans, and cleaning supplies to ensure cleanliness of facilities and to promote proper hygiene; to name a few of the sanitation standards (WHO, 2009).

Poor hygiene practices and lack of adequate sanitation facilities contribute to gastrointestinal, respiratory and skin diseases and to inequitable access to education which then contribute to absenteeism, lower school completion rates, and lower overall community health, well-being and education. Female students may stay home when they are menstruating due to lack of privacy, embarrasment, fear of

bullying, etc. (UNICEF, n.d.). Children with physical disabilities are not provided with the necessary infrastructure and facilities to accommodate their mobility needs which prevents or decreases their regular attendance.

1.3 Purpose

The link between health and education has become more evident in the past two years as the world has adjusted to the impact of COVID-19. Basic hygiene, such as handwashing has been at the forefront of ad campaigns, health advisories, public service announcements, etc. As students return to school, there is greater urgency for safe and healthy sanitation facilities and good hygiene. “Drinking water and adequate facilities are the base of the success of any educational goal” (We Are Water Foundation, 2020). For Belize to achieve its educational goals, it must first meet the health and water and sanitation needs of its student population.

The intended purpose of developing a Project Management Plan for the School Sanitation Project is to provide a project charter and subsidiary management plans that can serve as a guide and be adapted by schools and local organizations, particularly WASH stakeholders, to secure funding for the construction of needed sanitation facilities and to enhance the health curriculum to educate students, staff and parents on the proper implementation and importance of good hygiene practices.

The subsidiary management plans will incorporate a collaborative and community-based approach to ensure that project stakeholders are actively and effectively engaged during project initation and planning. As sustainability of the project outputs is critical to the student’s health and education, special importance will be given to quality standards and resource management. Nevertheless, the project can only be considered successful if the plans provide project management guidelines, standards, and best practices based on each knowledge area of the Project Management Body of Knowledge (PMBOK®) Guide (PMI, 2017) and incorporate local reality and needs.

The Project Management Plan is intended to serve as the basis for a multisectoral response to provide adequate sanitation facilities in schools in Belize, based on community needs, available funds and the sustainability plan in each school. The resulting facilities and hygiene education will positively impact the students, staff, administration, parents and the community by improving knowledge of and behaviour towards basic hygiene, cleanliness, and inclusion.

Benefits from the School Sanitation Project include the physical outputs of toilet blocks and handwashing stations, and the educational outputs of a hygiene and health curriculum. The physical outputs will improve well-being and provide a clean and healthy school environment, while the educational outputs will teach the importance of practicing good hygiene at school and at home and promote inclusion and equitable treatment of all students.

1.4 General Objective

To develop a Project Management Plan, according to the standards of the Project Management Institute, to manage the construction of sanitation facilities in primary schools in Belize and implement the related health and hygiene education.

1.5 Specific Objectives

1. To develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project.
2. To create a sustainable scope management plan to establish the project deliverables and exclusions.
3. To prepare a schedule management plan to ensure completion of the project within a realistic and agreed timeframe.
4. To generate a cost management plan to ensure efficient use of project budget and the incorporation of all project costs.

5. To produce a quality management plan to define the quality standards for the sanitation facilities.
6. To prepare a resource management plan to ensure the required resources are available at the right time.
7. To develop a communications management plan to identify the project's communication strategy based on stakeholder needs.
8. To produce a risk management plan to determine the project's risk strategy and risk identification approach.
9. To create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals.
10. To generate a stakeholder engagement plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.

2 THEORETICAL FRAMEWORK

2.1 Company/Enterprise framework

2.1.1 Company/Enterprise background

Rotary Clubs in Belize have implemented water and sanitation projects in dozens of schools throughout the country over the last decade. As a result, Rotary is a key WASH stakeholder and a member of the Ministry of Health's WASH multi-sectoral group.

Rotary is a global network of professional members who volunteer in various programs to improve lives through sustainable solutions for seven causes: to promote peace; to fight disease; to provide clean water, sanitation, and hygiene; to save mothers and children; to support education; to grow local economies; and to protect the environment. The network has over 1.4 million members in over 46,000 clubs (Rotary, n.d.-a). Belize has nine Rotary Clubs.

The funding for school sanitation projects comes from various sources including Rotary Clubs in the United States, local stakeholder contributions, and grants from The Rotary Foundation (TRF). The documentation resulting from the Final Graduation Project will provide management plans that contribute to the efforts of Rotary and other WASH stakeholders in Belize. Combined resources, knowledge and expertise will allow more schools and communities to benefit from sustainable and effective sanitation projects based on the PMBOK© Guide standards and good practices.

2.1.2 Mission and Vision Statements

Rotary's principal motto is "Service Above Self" which summarizes the global network's mission "We provide service to others, promote integrity, and advance world understanding, goodwill, and peace through our fellowship of business, professional, and community leaders" (Rotary, n.d.-c). It is this focus on service and

goodwill that has driven Rotary Clubs in Belize to fundraise, write grants, and implement water and sanitation projects in local schools. Basic education and literacy and water and sanitation are focus areas of the organization and priorities of the Government of Belize and local communities.

The Rotary vision is “Together, we see a world where people unite and take action to create lasting change — across the globe, in our communities, and in ourselves” (Rotary, n.d.-c). Sustainability and community engagement are critical aspects of the projects which Rotary funds and supports. The School Sanitation project must include a commitment by the partner schools of proper maintenance, cleanliness and enforcement of international health and hygiene education and standards.

2.1.3 Organizational structure

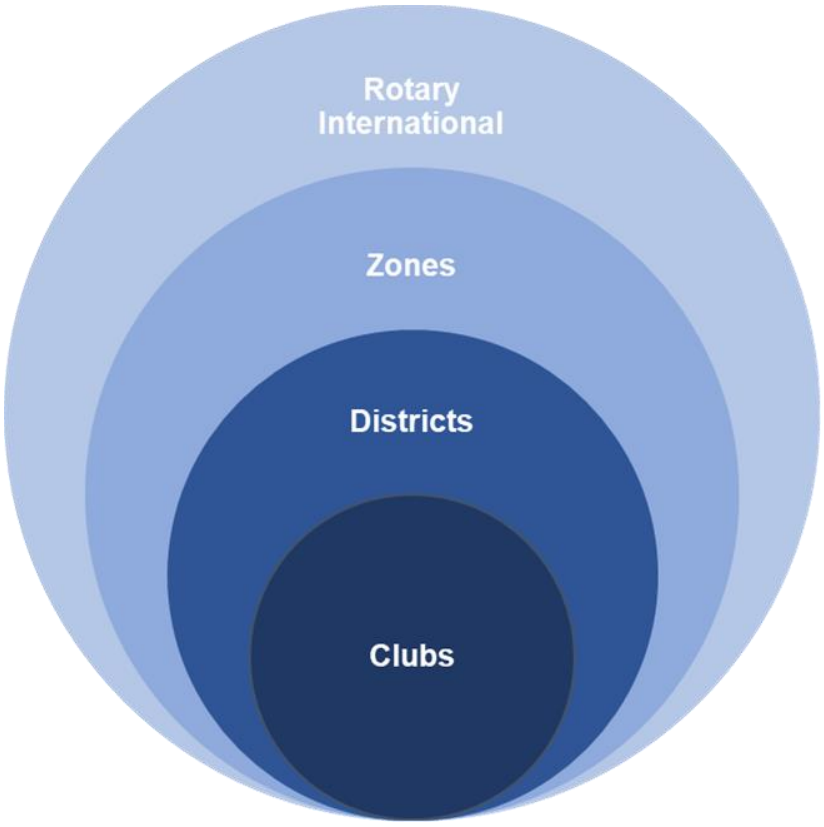
The Rotary clubs, Rotary International, and The Rotary Foundation (TRF) are the three main components that make up the organization. The Rotary Foundation is a global fund that provides grants for the implementation of service projects designed, implemented, and supported by its members.

All the organization’s members, known as Rotarians, belong to a Rotary club. These clubs are the heart of the organization and are grouped into districts led by a district governor. Districts are then grouped into regional zones, led by a regional team. All Rotary clubs belong to Rotary International, led by a president and board of directors (Rotary, n.d.-b). Figure 1 represents the interconnectedness between each of these bodies in the Rotary structure.

Rotary is highly democratic. Each club has autonomy over the selection and implementation of their projects and activities which must be aligned with one or more of the organization’s focus areas. Elections are held annually to choose club leadership including a president, president-elect, secretary, and treasurer. Every club creates committees comprised of all the club members. The service project committee is responsible for organizing, leading, and coordinating the club’s projects.

Figure 1

Rotary Organizational Structure



Note. Adapted from Rotary. (n.d.-b). Rotary Basics: A reference guide for members, p. 4-5. https://my-cms.rotary.org/en/document/rotary-basics

The School Sanitation project will be led by members of the service project committee in the partnering club who will identify and engage all the relevant project stakeholders throughout the project lifecycle. Figure 2 shows the key stakeholders that comprise the basic project structure. As funding sources may vary, additional stakeholders may be added as these are identified or existing groups are further broken down, to reflect more precise information, such as a village council, a department under the ministries of health or education, or sponsoring Rotary clubs.

Figure 2

School Sanitation Project Structure

Note. Prepared by Author

2.1.4 Products offered

Rotary offers seven programs that “are developing the next generation of leaders, providing funding to make the world a better place and making peace a priority:” Rotary Peace Fellowships, Community Corps, Rotary Youth Leadership Awards, Youth Exchange, New Generations Service Exchange, Grants and Scholarships (Rotary, n.d.-d).

Grants fund Rotary clubs’ service projects in the seven focus areas. Past school sanitation projects in Belize have received TRF global grants. The subsidiary plans to be developed in this Final Graduation Project will provide the required documentation to successfully apply for grants and partner with other organizations.

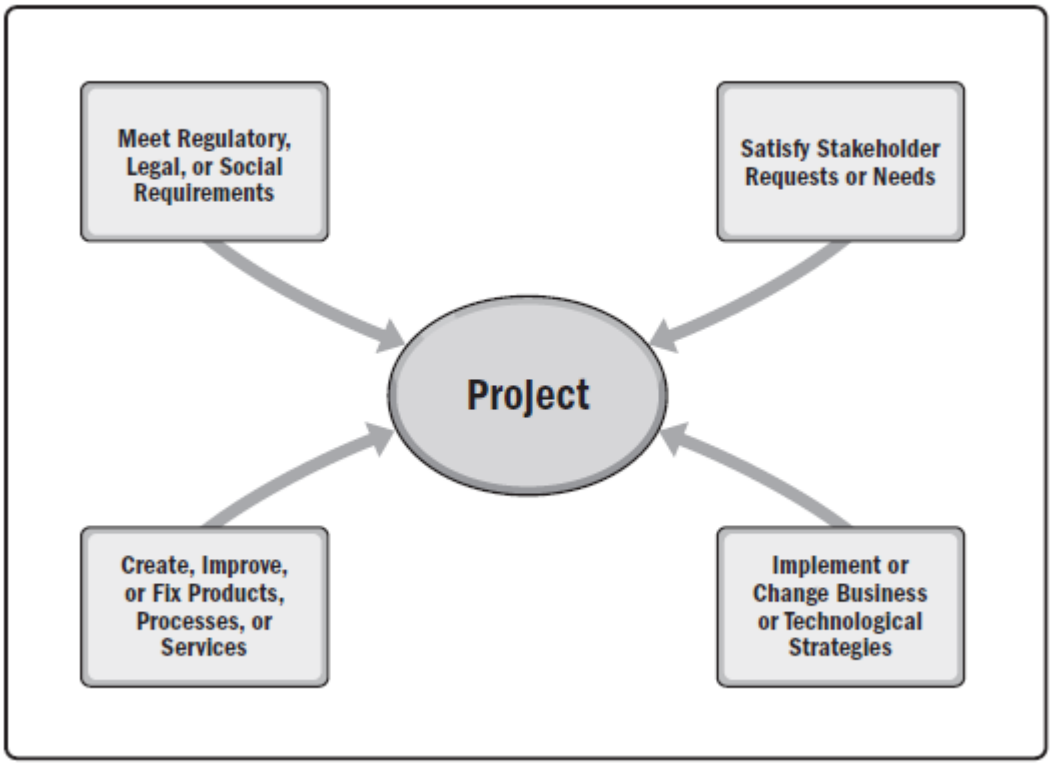
2.2 Project Management Concepts

2.2.1 Project

Tom and Jeff Mochal (2011, p.5) define a project as “temporary work used to do new things and build new or enhanced products.” They identify three characteristics of all projects: a finite time frame, uniqueness, and deliverables. “A project is a temporary endeavor undertaken to create a unique product, service, or result” (PMI, 2017, p. 4). Projects may be as complicated as an airport construction or as simple as the upgrade of a software app. As depicted in Figure 3, projects allow organizations to respond to four key factors that impact their strategies and day-to-day operations.

Figure 3

Project Initiation Context



Note. A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition. Project Management Institute, 2017, Figure 1-2, p. 8. Copyright 2017 by Project Management Institute, Inc.

The School Sanitation Project responds to three of these factors. First, it ensures that bathroom facilities and health curriculum in participating schools meet international WASH standards, moving Belize closer to achieving the education and health targets for children per SDG 3, 4 and 6. Second, it addresses students' need for clean, healthy, and equitable access to education. Third, it improves project management processes for future school sanitation projects in Belize which WASH stakeholders, including Rotary, can implement individually or jointly. The third factor also responds to the strategic goals of Rotary and other stakeholders.

2.2.2 Project Management

Project resources and timelines are finite. Their success relies on their effective and efficient implementation through project management, "a discipline that serves to guide and integrate the processes necessary to initiate, plan, execute, control and close projects in order to complete all work required to execute a project and fulfill the stipulated scope within defined cost and time constraints" (Inter-American Development Bank [IDB], 2012, p.13-14). Project Management "enables the achievement of organizational goals and objectives" (PMI, 2017, p.16). It is the "application of processes, methods, skills, knowledge and experience to achieve specific project objectives according to the project acceptance criteria within agreed parameters" (Association for Project Management [APM], n.d.). The goal of Rotary and WASH stakeholders in the context of the School Sanitation project is to improve the health and education of students in Belize.

Rotary in Belize has implemented dozens of similar projects; thus, there is project management knowledge and experience. Nevertheless, these projects will benefit from implementing the PMI's PMBOK® Guide best practices, guidelines, and standards. This presents an opportunity to improve project management practices and processes in future projects for greater efficiencies and sustainability.

In keeping with the PMBOK® Guide's Key Components, this document will define the project life cycle (Section 2.2.3), project management processes (Section 2.2.4)

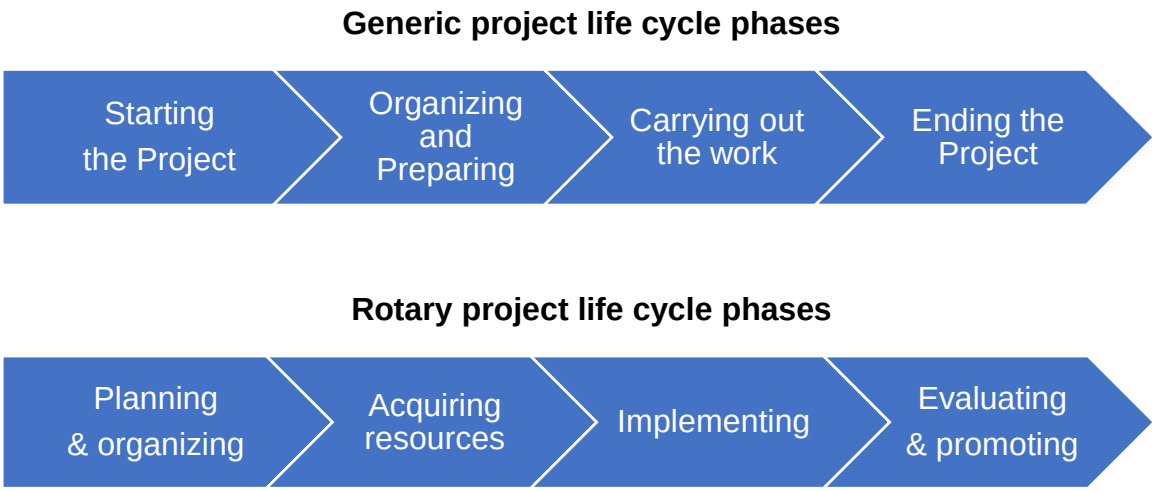
and project management knowledge areas (Section 2.2.5) and will present their importance and relation to the School Sanitation project.

2.2.3 Project Life Cycle

Every temporary endeavor has a beginning and an end. The phases between those two points are the project life cycle. There are four generic project phases (PMI, 2017, p.18). These may vary in number and name based on the organization or company and on the project's nature and needs. Figure 4 compares the PMBOK® Guide's generic life cycle phases with the project life cycle phases used by Rotary. They are equal in number and the activities related to each are well defined by Rotary. Further evaluation of these through this FGP may present useful conclusions and recommendations for greater efficiency in their implementation.

Figure 4

Comparison of Project Life Cycle Phases



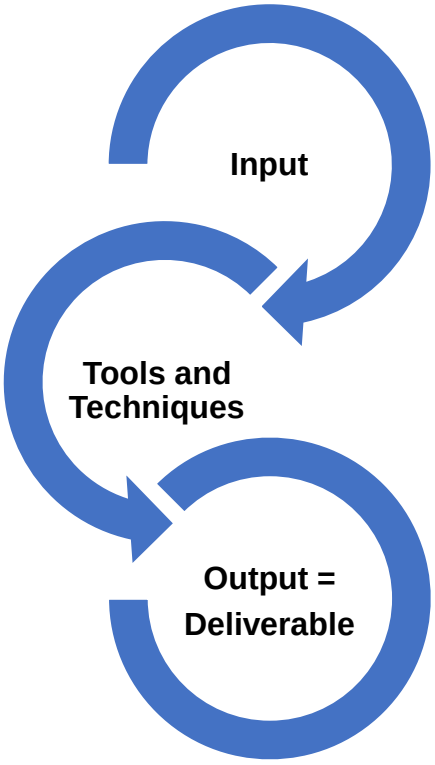
Note. Generic life cycle is adapted from *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition*. Project Management Institute, 2017 Figure 1-5, p. 18 Copyright 2017 by Project Management Institute, Inc. and Rotary life cycle is adapted from *Project Lifecycle Resources.* Rotary, n.d.-e, https://my.rotary.org/en/take-action/develop-projects/project-lifecycle-resources

2.2.4 Project Management Processes

Project management processes allow the implementation of the project life cycle. A tool or technique is applied to each input to obtain one or more outputs which can be a project deliverable or an input to a subsequent process (PMI, 2017, p.22). Figure 5 shows a generic process where the output is a deliverable. When an output becomes an input, as illustrated in Figure 6, the project life cycle continues to the next project management process. Based on the nature of the process, it may be performed once, periodically, or continuously depending on the needs of the project.

Figure 5

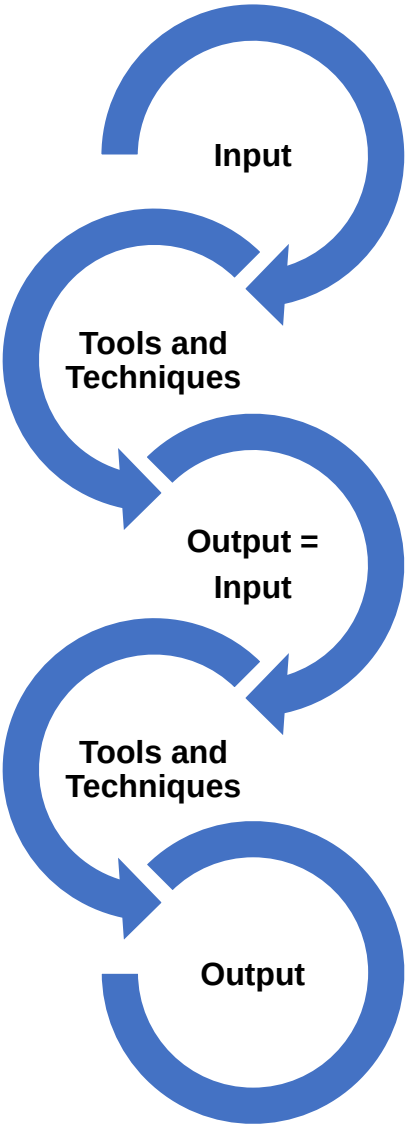
Generic Project Management Process: Output is a deliverable



Note. Adapted from *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* Sixth Edition. Project Management Institute, 2017, p. 22. Copyright 2017 by Project Management Institute, Inc.

Figure 6

Generic Project Management Process: Output is an Input



Note. Adapted from *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* Sixth Edition. Project Management Institute, 2017, p. 22. Copyright 2017 by Project Management Institute, Inc.

The PMBOK® Guide organizes processes into five project management process groups (PMI, 2017, p.23):

- Initiating Process Group: identifies objectives and needs to be addressed through new projects or phases and secures approval to initiate them.
- Planning Process Group: develops the project management plan and its subsidiary plans to achieve the project goals.
- Executing Process Group: implements the project management plan per the requirements established in its subsidiary plans.
- Monitoring and Controlling Process Group: performs change management processes based on the review and evaluation of project implementation.
- Closing Process Group: ensures required actions are taken during project/phase completion/closure.

As represented in Figure 6, an output from one process can become the input for another process, even one in a different Process Group.

Although Rotary does not explicitly define process groups, it does have internal processes such as the grant application process that would fall under one of the five project management process groups. The FGP will identify such existing processes that can be grouped to facilitate their planning and future implementation. The scope of the FGP includes the initiation, planning, executing, monitoring and controlling process groups.

2.2.5 Project management knowledge areas

Projects perform processes in two broad manners: based on specific project objectives and based on knowledge requirements. The former was described under the five process groups (Section 2.2.4) and the latter is grouped into ten knowledge areas:

- Project Integration Management
- Project Scope Management
- Project Schedule Management
- Project Cost Management

- Project Quality Management
- Project Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management
- Project Stakeholder Management

The Project Management Plan will incorporate the processes pertaining to the ten knowledge areas that are most relevant to the successful completion of the FGP process and to the School Sanitation project. The specific objectives (Section 1.5) will guide its development and ensure that the general objective (Section 1.4) is achieved. The process groups and knowledge areas are interconnected as shown in Figure 7.

A short description of each knowledge area as it relates to the FGP is included in this section. The link between the project management knowledge areas and FGP specific objectives is described briefly to provide clarity in the expected outputs of this project.

- Project Integration Management

This is the only knowledge area with processes in every Process Group. Its importance is critical to any project as it coordinates the components and actions in all the knowledge areas and process groups to avoid duplicated efforts, wasted resources, miscommunication, and to ensure adequate change management.

The FGP general objective and first specific objective respond to the processes under this knowledge area. The subsidiary plans for the School Sanitation project are outputs from each of the knowledge areas that become inputs to the completion of the Project Management Plan. The FGP Project Charter (Appendix A) serves as the foundation from which the plans will be developed. The processes to be undertaken by this project in this knowledge area are Develop Project Charter and Develop Project Management Plan.

Figure 7

Project Management Process Group and Knowledge Area Mapping

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Note. Reprinted from *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition*, by Project Management Institute, 2017, p. 25.

- Project Scope Management

Successful projects have clear objectives and scope. They identify which activities will and will not be included based on how they contribute to accomplishing the project goals. Project scope management consists of the six processes that determine, validate, and control the project parameters.

The project scope has been identified at high level in the FGP Project Charter (Appendix A) and more in detail in the work breakdown structure (WBS) (Appendix B) prepared during the FPG seminar. The scope management plan presented in the results (Section 4.2) prepared during the development of the FPG includes the six processes: Plan Scope Management, Collect Requirements, Define Scope, Create WBS, Validate Scope and Control Scope.

- Project Schedule Management

Along with scope and cost, the project schedule is a key component of the triple constraint in project management. While additional components are now being considered, including quality and sustainability, the schedule continues to be a critical indicator to ascertain project performance. Project Schedule Management incorporates six processes, five related to plan, to decompose, and to sequence project activities and to estimate their timeframes. The schedule management plan for the School Sanitation project (Section 4.3) is an output of the FGP.

The six processes were considered in this exercise: Plan Schedule Management, Define Activities, Sequence Activities, Estimate Activity Durations, Develop Schedule and Control Schedule. In coordination with the project sponsor the related activities were researched and the processes completed accordingly to prepare a realistic and achievable project schedule.

Milestones and an initial schedule (Appendix C) were prepared for the FGP process starting with the Graduation Seminar in November 2021 and ending with the presentation of the FGP to the Board of Examiners anticipated for June 2022.

- Project Cost Management

Projects can suffer cost overruns and budget constraints based on the input from other knowledge areas, such as scope and schedule management. Project Cost Management relies on the adequate planning and estimation of these areas to prepare the project costs and budget accurately.

The School Sanitation project has a very clear scope which facilitates the development of the four processes: Plan Cost Management, Estimate Costs, Determine Budget and Control Costs. Given that project funding comes from different sources, the project's cost management plan (Section 4.4) incorporates this consideration for transparency with all project stakeholders, especially project sponsors and donors. This is key for Rotary as they are recognized for their transparent and sustainable management of the donor funding from around the world.

- Project Quality Management

The quality of project outputs must meet the established criteria agreed upon with the project stakeholders, so they contribute to the project objectives and goals. Three processes were performed in the quality management plan (Section 4.5): Plan Quality Management, Manage Quality and Control Quality.

Quality standards are established for the construction of the bathroom and hand washing facilities in the School Sanitation project and the education curriculum to be implemented. These are based on the international standards defined by the WHO and the national health education curriculum developed by the Ministries of Education and Health. The quality management plan details the quality standards to be implemented in the partnering schools.

- Project Resource Management

Projects may benefit from adequate budget and precise scope, but if the required resources are not available as and when needed, the project can face delays while

waiting for construction material, technical expertise, etc., and even impact the quality of project deliverables. Project resource management prevents these potential setbacks by determining the resources and team required to obtain the intended project results.

The School Sanitation project will require both physical and human resources to build the toilet blocks and deliver hygiene education sessions. The resource management plan (Section 4.6) determines how to plan, estimate, acquire, and control resources and develop and manage the project team.

- Project Communications Management

Miscommunication is the source of many misunderstandings and in project management can cause delays, errors, and create a hostile work environment when the project team and stakeholders have competing interests and priorities. The importance of project communications management is evident in addressing and preventing these challenges.

The communication strategy will be an output of the plan communications management process for the School Sanitation project. Considering the wide network of project stakeholders that make up the project structure (Figure 2), documenting stakeholder communication needs, communication channels and technologies, frequency and escalation processes is critical.

The communication management plan (Section 4.7) will incorporate these aspects in response to stakeholder communication needs and requests to facilitate project communication and documentation of decisions, recommendations, and activities and determine how to manage and monitor project communications.

- Project Risk Management

Problems and challenges can arise at any stage of the project life cycle. Some of them can be prevented or avoided completely while others can only be mitigated or

accepted. Before they materialize, they are part of the project's risks and must be identified, analyzed and response plans prepared to address them. This knowledge area consists of seven processes: Plan Risk Management, Identify Risks, Perform Qualitative Risk Analysis, Perform Quantitative Risk Analysis, Plan Risk Responses, Implement Risk Responses, and Monitor Risks.

The risk management plan (Section 4.8) for the School Sanitation project will include six of the seven processes. Based on the project and stakeholder needs and available information, Perform Quantitative Risk Analysis is not suitable for this project as it is a relatively small and non-complex and access to software and expertise in quantitative risk analysis is not available.

- Project Procurement Management

Goods and services to be acquired due to their unavailability within the organization are covered by the project procurement management processes. Outputs from the plan procurement process include the procurement management plan (Section 4.9), the procurement strategy, bid documents, procurement statement of work, source selection criteria, among other project documents. Based on the analysis and research during the FGP, the plan includes the Conduct Procurements and Control Procurements processes.

- Project Stakeholder Management

The key role of project stakeholders is evident as their identification is part of the initiation process group. Identify Stakeholders, Plan Stakeholder Engagement, Manage Stakeholder Engagement, and Monitor Stakeholder Engagement are the four processes that comprise the stakeholder engagement plan (Section 4.10).

The project stakeholders for the School Sanitation project are included in the project structure (Figure 2). This process must be closely developed and coordinated with the communication management plan to engage stakeholders effectively throughout the project life cycle.

2.3 Other applicable theory/concepts related to the project topic and context

- Development projects

“Projects in the realm of development have the final objective of obtaining concrete results that help boost a country or region’s socio-economic development” (Inter-American Development Bank [IDB], 2012, p.10). The School Sanitation project falls within this definition, as it seeks to boost the socio-economic development of the school and its surrounding community. With the implementation of this project in other schools throughout the country, it will ultimately have a national impact.

The IDB (2012, p.12) further defines the assumptions under which these projects are developed based on a “rationale of gradual change, with long-term results only achieved through attainment of intermediate results.” In many instances, the results of development projects are not immediately visible, but have medium or long-term impacts in the communities or environment where they are implemented.

They also identify three unique characteristics of development projects: the diversity of stakeholders, sustainability, and social return. These characteristics differentiate development projects, such as the School Sanitation project, from private sector projects whose main objective tends to be of a monetary nature, where the focus is on the profit to be earned.

3 METHODOLOGICAL FRAMEWORK

3.1 Information sources

The Merriam-Webster dictionary (n.d.) defines information as “knowledge that you get about someone or something: facts or details about a subject.” The Cambridge Dictionary (n.d.) defines a source as “someone or something from which you obtain information.”

Information sources can be classified in different ways based on their nature, format, or originality: documentary and non-documentary (physical or live source) (Anand, 2017, p. 2); printed, electronic, and micro (Suprayogi, 2019, p. 94); or primary and secondary sources (new or reworked) (Horkoff, 2015, p. 206), respectively.

3.1.1 Primary sources

In Writing for Success (2015), Tara Horkoff defines primary sources as “direct, firsthand sources of information or data.” The Indira Gandhi National Open University (IGNOU) (2017) describes them as “sources which contain original material that has been published, reported or recorded for the first time and has not been interpreted, commented upon, summarized or evaluated by a secondary party” and which include “new raw data, new observation or experiment, new interpretation of previously known fact or idea.”

Horkoff (2015) includes examples such as research articles, literary texts, historical documents, and autobiographies and IGNOU (2017) adds the following sources: newspapers, technical reports, dissertations, conference papers, patents, standards, and trade and product bulletins.

Primary sources for the School Sanitation project consist of interviews with the project sponsor and relevant project stakeholders and existing project-related documentation, such as initial needs assessment, school population report, etc.

3.1.2 Secondary sources

“Secondary sources discuss, interpret, analyze, consolidate or otherwise rework information from primary sources” (Horkoff, 2015, p. 206) and “are mostly dependent upon primary sources of information for their existence” (IGNOU, 2017, p.14) Examples of these according to Horkoff (2015) include magazine articles, biographical books, literary and scientific reviews, and television documentaries. IGNOU (2017) groups them into four types: indexes, surveys, reference books, and technical translations.

Secondary sources for developing the project management plan for the FGP include the PMBOK® Guide 6th edition, virtual and physical historical information on similar projects, international (WHO, SDG, UNICEF) and national sanitation and health guidelines and standards, and virtual information on sponsor and stakeholder internal financing and monitoring processes and requirements.

Chart 1

Information Sources

Objectives	Information Sources	
	Primary	Secondary
1. To develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects
2. To create a sustainable scope management plan to establish the project	Project-related documentation from and interviews with	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards;

Objectives	Information Sources	
	Primary	Secondary
deliverables and exclusions.	project sponsor and key stakeholders	and historical information for similar projects
3. To prepare a schedule management plan to ensure completion of the project within a realistic and agreed timeframe.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects
4. To generate a cost management plan to ensure efficient use of project budget and the incorporation of all project costs.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects
5. To produce a quality management plan to define the quality standards for the sanitation facilities.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects
6. To prepare a resource management plan to ensure the required resources are available at the right time.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects
7. To develop a communications management plan to identify the project's communication strategy based on stakeholder needs.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects

Objectives	Information Sources	
	Primary	Secondary
8. To produce a risk management plan to determine the project's risk strategy and risk identification approach.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects
9. To create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects
10. To generate a stakeholder engagement plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.	Project-related documentation from and interviews with project sponsor and key stakeholders	PMBOK® Guide 6th edition; stakeholder websites; sanitation and education guidelines and standards; and historical information for similar projects

Note: Prepared by author.

3.2 Research methods

The American Psychological Association (APA) (n.d.) dictionary of psychology defines a research method as “a procedure for the formulation and evaluation of hypothesis that is intended to reveal relationships between variables and provide an understanding of the phenomenon under investigation.” There are two main categories of research methods: quantitative and qualitative (Wang & Park, 2016).

3.2.1 Qualitative method

Qualitative research collects nonnumerical data to answer a research question (Christensen, Johnson & Turner, 2015, p. 46) and refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things (Lune & Berg, 2017, p. 12). It has three main components: interpretive, multimethod, and takes place in the subject's natural setting (Christensen, Johnson & Turner, 2015, p. 69). The FGP will use triangulation (multiple methods) to collect information from the various local stakeholders in preparing the project management plan subsidiary plans and project charter.

3.2.2 Quantitative method

Quantitative research collects numerical data to answer a research question (Christensen, Johnson & Turner, 2015, p. 46) and refers to counts and measures of things, the extents and distributions of the subject matter (Lune & Berg, 2017, p. 12). Available numerical data from the school, other partner organizations, similar projects, and project sponsors will be analyzed using a top-down approach.

Chart 2

Research Methods

Objectives	Research methods	
	Qualitative	Quantitative
1. To develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.

Objectives	Research methods	
	Qualitative	Quantitative
2. To create a sustainable scope management plan to establish the project deliverables and exclusions.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.
3. To prepare a schedule management plan to ensure completion of the project within a realistic and agreed timeframe.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.
4. To generate a cost management plan to ensure efficient use of project budget and the incorporation of all project costs.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.
5. To produce a quality management plan to define the quality standards for the sanitation facilities.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders,

Objectives	Research methods	
	Qualitative	Quantitative
	provides flexibility as it focuses on the improvement of the school environment.	and similar projects. Based on the nature of the project a quasi-experimental design can be applied.
6. To prepare a resource management plan to ensure the required resources are available at the right time.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.
7. To develop a communications management plan to identify the project's communication strategy based on stakeholder needs.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.
8. To produce a risk management plan to determine the project's risk strategy and risk identification approach.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.

Objectives	Research methods	
	Qualitative	Quantitative
9. To create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.
10. To generate a stakeholder engagement plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.	Triangulation will be applied through the data collection methods identified in Chart 1. This method is inductive (bottom-up) and provides flexibility as it focuses on the improvement of the school environment.	This deductive or top-down method will be applied when analyzing data provided by project sponsors, stakeholders, and similar projects. Based on the nature of the project a quasi-experimental design can be applied.

Note: Prepared by Author.

3.3 Tools

A tool is something tangible used in performing an activity to produce a product or result (PMI, 2017, p.725). The PMBOK® Guide combines tools and techniques as the means with which the Project Manager and project team can develop the desired outputs for each project management process. A technique is “a defined systematic procedure employed by a human resource to perform an activity that produces a product or result or delivers a service, and that may employ one or more tools” (PMI, 2015, p. 196).

Chart 3 includes the tools and techniques that will be used for the development of the ten deliverables of the FGP. They respond to the processes related to each of the nine knowledge areas and will be detailed in Chapter 4.

Chart 3

Tools

Objectives	Tools
1. To develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project.	Expert judgement, interviews
2. To create a sustainable scope management plan to establish the project deliverables and exclusions.	Expert judgement, decomposition, interviews, benchmarking, data analysis
3. To prepare a schedule management plan to ensure completion of the project within a realistic and agreed timeframe.	Expert judgement, data analysis, decomposition, analogous estimating
4. To generate a cost management plan to ensure efficient use of project budget and the incorporation of all project costs.	Expert judgement, data analysis, analogous estimating, financing
5. To produce a quality management plan to define the quality standards for the sanitation facilities.	Expert judgement, benchmarking, interviews, data analysis, data

Objectives	Tools
	representation, inspection planning
6. To prepare a resource management plan to ensure the required resources are available at the right time.	Expert judgement, data representation, data analysis, analogous estimating
7. To develop a communications management plan to identify the project's communication strategy based on stakeholder needs.	Communication requirement analysis, communication technology, communication methods
8. To produce a risk management plan to determine the project's risk strategy and risk identification approach.	Expert judgement, interviews, data analysis, risk categorization, data representation, strategies for threats and for opportunities, contingent response strategies
9. To create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals.	Expert judgement, data gathering, source selection analysis
10. To generate a stakeholder engagement plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.	Brainstorming, data analysis, data representation

Note: Prepared by Author.

3.4 Assumptions and constraints

An assumption is “a factor in the planning process considered to be true, real, or certain, without proof or demonstration” (PMI, 2017, p. 699). A constraint is “a factor that limits the options for managing a project, program, portfolio, or process” (PMI, 2017, p. 701). Chart 4 includes the assumptions and constraints for the ten specific objectives of the FGP.

Chart 4

Assumptions and Constraints

Objectives	Assumptions	Constraints
1. To develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project.	Project charter will be authorized promptly and is useful for developing remaining deliverables.	Broad and potentially inaccurate estimates and information due to limited details available for Project Charter creation.
2. To create a sustainable scope management plan to establish the project deliverables and exclusions.	Available information suffices to develop an accurate project scope.	International standards allow no flexibility to define project scope.
3. To prepare a schedule management plan to ensure completion of the project within a realistic and agreed timeframe.	Estimated timeframes are accurate. Project does not encounter significant delays.	Availability and access to financing impacts project timeframe. Project funding must be secured to start.
4. To generate a cost management plan to ensure efficient use of	Estimated costs are accurate and sponsor funding is secured.	Import taxes and prices of materials are frequently raised.

Objectives	Assumptions	Constraints
project budget and the incorporation of all project costs.		
5. To produce a quality management plan to define the quality standards for the sanitation facilities.	Adherence to quality standards will be within allocated budget.	International standards allow no flexibility.
6. To prepare a resource management plan to ensure the required resources are available at the right time.	Competent resources will be available when required by project team.	COVID-19 safety measures must be considered and implemented.
7. To develop a communications management plan to identify the project's communication strategy based on stakeholder needs.	Stakeholder communication needs will be identified accurately, and project team will implement the strategy effectively.	Numerous stakeholders require different communication methods and frequency. Significant amount of time is required.
8. To produce a risk management plan to determine the project's risk strategy and risk identification approach.	Risk response plans and strategies are effective in preventing delays and cost overruns.	COVID-19 and extreme weather present risks that have high impact and could cause significant delays.
9. To create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals.	Competent contractors and required goods are available when needed and within the estimated cost.	Supply chain and import tariffs limit availability and variety of materials. Limited stakeholder knowledge in procurement methods.
10. To generate a stakeholder engagement	Low turnover of key stakeholders will allow	Stakeholders have other priorities and

Objectives	Assumptions	Constraints
plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.	continuity and consistency during project implementation. Stakeholders are actively engaged.	responsibilities. Many are still working from home due to COVID-19.

Note: Prepared by author.

3.5 Deliverables

A deliverable is “any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project” (PMI, 2017, p. 704). Deliverables to be developed during the FGP are the project charter and nine subsidiary plans briefly described in Chart 5 that comprise the project management plan for the School Sanitation project.

Chart 5

Deliverables

Objectives	Deliverables
1. To develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project.	Project Charter – will be signed and authorized during graduation seminar to allow the development of the FGP.
2. To create a sustainable scope management plan to establish the project deliverables and exclusions.	Scope management plan – will describe how the project scope will be defined, developed, monitored, controlled, and validated.
3. To prepare a schedule management plan to ensure completion of the	Schedule management plan – will establish criteria and activities to

Objectives	Deliverables
project within a realistic and agreed timeframe.	develop, monitor and control the project schedule.
4. To generate a cost management plan to ensure efficient use of project budget and the incorporation of all project costs.	Cost management plan – will describe how costs will be planned, structured, and controlled.
5. To produce a quality management plan to define the quality standards for the sanitation facilities.	Quality management plan – will describe how policies, procedures, and guidelines will be implemented.
6. To prepare a resource management plan to ensure the required resources are available at the right time.	Resource management plan – will describe how project resources will be acquired, allocated, monitored, and controlled.
7. To develop a communications management plan to identify the project's communication strategy based on stakeholder needs.	Communications management plan – will describe the administration and dissemination of project information.
8. To produce a risk management plan to determine the project's risk strategy and risk identification approach.	Risk management plan – will describe how to structure and perform risk management activities.
9. To create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals.	Procurement management plan – will describe the acquisition process for external goods and services.
10. To generate a stakeholder engagement plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.	Stakeholder engagement plan – will identify strategies and actions to promote productive stakeholder involvement.

Note. Prepared by Author.

4 RESULTS

The result of the Final Graduation Project is the Project Management Plan for the School Sanitation Project. The plan incorporates the PMBOK© Guide's ten project management knowledge areas. The content and proposed processes for each knowledge area cover four project management process groups: initiating, planning, executing, and monitoring and controlling (PMI, 2017, p.18). The Project Management Plan consists of the project charter and nine subsidiary management plans detailed in this chapter.

4.1 Project Charter

The Global Grant Application submitted to The Rotary Foundation for past school sanitation projects provided high-level project information required to complete some areas of the Project Charter (Chart 6) presented in this section. The remaining areas are the result of information and details gleaned from interviews with the project sponsor and from online research.

Chart 6

Project Charter for the School Sanitation Project

PROJECT CHARTER	
Date	**Project Name:**
February 20 , 2021	Project Management Plan for School Sanitation Project
Knowledge Areas / Processes	**Application Area (Sector / Activity)**
Project Integration Management Project Scope Management Project Schedule Management Project Cost Management Project Quality Managrement Project Resource Management Project Communications Management Project Risk Management Project Procurement Management Project Stakeholder Engagement Initiating, Planning, Monitoring, and Controlling	Water, sanitation, and hygiene Construction

Start date	Finish date
July 1, 2022	March 23, 2023

Project Objectives (general and specific)

General Objective:

To increase student attendance through the construction of sanitation faciities and the implementation of good hygiene practices and behavior change.

Specific Objectives:

1. To improve school sanitation facilities following World Health Organization standards to decrease water-borne illnesses in the school compound.
2. To implement good hygiene practices among the school population through a behavior change strategy and communication material that promote student health at school and at home.
3. To train school staff and parent teacher association members on adequate maintenance of sanitation facilities for sustainable operation and maintenance of improved infrastructure.
4. To conduct baseline and post-implementation evaluations of hygiene practices and sanitation knowledge and behavior of the school population to measure project impact.
5. To develop and implement management processes according to PMI standards to plan, manage, control, and monitor project activities and deliverables.

Project purpose or justification (merit and expected results)

Only a third of schools in Belize meet international standards for school sanitation facilities. The lack of adequate sanitation facilities and proper hygiene practices contribute to poor student attendance, lower school completion rates, and increased water-borne diseases. Female students stay home when they are menstruating. Schools with sanitation facilities rarely provide infrastructure that meets the needs of students with physical disabilities.

The School Sanitation Project will build toilet blocks with hand washing stations in schools in Belize. The construction includes toilets and urinals for boys; toilets for girls and an area that provides privacy when they are menstruating; and handicap accesible facilities. The project will meet World Health Organization (WHO) water, sanitation and hygiene (WASH) standards for schools including safe drinking water, separate facilities for boys and girls, basic hygiene products (soap, toilet paper, menstrual products, trash cans), and hygiene education for students, staff and parents.

The Project Management Plan to be developed through the Final Graduation Project (FGP) will guide the School Sanitation Project team and stakeholders during its planning, execution, monitoring and control processes by establishing the guidelines and standards related to each knowledge area of the Project Management Body of Knowledge (PMBOK) Guide (PMI, 2017). The Project Management Plan is intended to serve as the basis for the construction of sanitation facilities in schools throughout the country, based on community needs, available funds and the sustainability plan in each school.

Description of Product to be generated by the Project – Final Project Deliverables

The School Sanitation Project will consist of the following deliverables aligned with the project's specific objectives:

1. Project Charter and nine subsidiary management plans
2. Toilets blocks and handwashing stations for boys, girls and a handicap accessible toilet
3. Behavior change communication and education campaign and materials
4. Behavior change training for students, school staff and parents
5. Operation and maintenance manual and training
6. Baseline and Final evaluations

Assumptions

1. The School Sanitation Project can be completed in nine months.
2. The school administration and staff, parents, and community support the project and its objectives.
3. The cost of the School Santiation Project is within the available budget.
4. The Ministries of Education and Health support the project objectives and ensure the required availability and effective participation of their technical officers for behavior change trainings.
5. Contractor incorporates safety measures to ensure student and adult safety and minimal disruption.

Constraints

1. School will be in session and students will be on campus during the construction.
2. Limited availability of preferred construction material due to delays in imports resulting from the pandemic.
3. Construction will take place during hurricane season.
4. Frequent increase in fuel prices may impact transportation of construction materials and equipment.
5. Indoor plumbing and potable water are not available in all student homes.
6. Local sanitation and hygiene practices are poor and ingrained in the school population.

Preliminary risks

If safety precautions are not strictly implemented throughout construction, students or adults may be injured on campus, impacting the wellbeing of the school population and reducing support for the project.

If behavior change messages and materials do not respond to local culture and practices, the intended audience may not be receptive, reducing the positive impact the project can have on the wider community.

If alternate sanitation and hygiene techniques are not developed and included in the trainings, students and families without potable water and indoor plumbing will have limited benefits from the project outcomes.

If there is a severe weather event during project implementation, electricity and water supply may be unavailable for several hours or days, potentially delaying the project and increasing its cost.

Budget

The anticipated expenses for the School Santiation Project include the following:

1. Construction of sanitation facilities US $66,230.00
2. Contingency US $3,410.00
3. Communication campaign US $1,400.00
4. Evaluations US $400.00

Milestones and dates

Milestone	Start date	End date
Project Start	July 1, 2022	July 1, 2022
Septic Tank completed	September 15, 2022	October 13, 2022
Foundation completed	October 14, 2022	November 10, 2022
Walls completed	November 11, 2022	December 1, 2022
Roof completed	December 2, 2022	December 28, 2022
Finishes completed	December 29, 2022	January 18, 2023
Communication strategy completed	January 19, 2023	February 22, 2023
Plumbing and electrical fixtures installed	January 19, 2023	January 25, 2023
Inauguration of toilet blocks	January 26, 2023	January 26, 2023
Project end	March 22, 2023	March 22, 2023

Relevant historical information

Adequate sanitation facilities in Belizean schools respond to the United Nations' Sustainable Development Goal (SDG) 6: Ensure availability and sustainable management of water and sanitation for all. While some progress has been made, two thirds of schools in Belize have yet to achieve this goal.

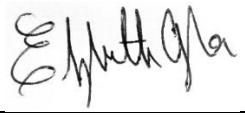
Given the global and national commitment to achieving the SDGs, private, public, local and international sponsors have provided funding to build proper sanitation facilities in schools around the country. However, these efforts and resources have been isolated.

Through the development of a Project Management Plan for the School Sanitation Project, the aim is to provide a project charter and subsidiary management plans that can be easily adopted by local organizations and schools to secure funding for their schools to benefit from the construction of sanitation facilities.

Stakeholders

Direct stakeholders: students, school administration, teachers, funding agencies/organizations; contractors

Indirect stakeholders: parents, communities, Ministry of Education, Ministry of Health

Project Manager: Elizabeth Ayala	**Signature:** 
Authorized by: Carlos Brenes Mena	**Signature:**

Note: Prepared by author.

4.2 Scope Management Plan

The scope management plan is the first subsidiary management plan developed for the School Sanitation Project. It builds on the Project Charter described in Section 4.1 and describes six scope management processes that will define and control the work required by the project team and stakeholders to achieve the project objectives. The process outputs include the project scope statement, the work breakdown structure (WBS), requirements, updates to project documents and scope baseline, and acceptance of the project deliverables.

Rotary Clubs in Belize have experience in similar school water and sanitation projects. However, this is the first time that PMI processes are fully incorporated to the organization's established project management cycle in Belize.

4.2.1 Plan Scope Management

The project life cycle adopts the four phases established for Rotary-sponsored projects: planning and organizing, acquiring resources, implementing, and evaluating and promoting. Given the nature of the project and its time frame its development life cycle is the predictive waterfall approach.

The project team convened meetings with school, community, and government stakeholders to develop the scope management plan. Rotary International project guidelines, policies and procedures will be adhered to throughout the project lifecycle. Expert judgement will be provided by local and international Rotary club members and government officials experienced in similar sanitation projects and training. Data and lessons learned from similar projects will be analyzed to determine alternatives to project requirements and scope to ensure the most effective and efficient attainment of project objectives.

4.2.2 Requirements

Project requirements based on interviews with project stakeholders, benchmarking of best practices from past projects and documentation analysis of similar projects are presented in the Requirements Traceability Matrix (Chart 7).

Chart 7

School Sanitation Project Requirements Traceability Matrix

ID	WBS ID	Requirements Description	Business Needs, Opportunities, Goals, Objectives	Project Objectives	WBS Deliverable	Stakeholder
1	1.1.1	Project completed within schedule and budget in compliance with agreed standards.	Successful completion of project objectives.	Timely, efficient, management of project resources.	Project Management Plans	Project Team
2	1.1.1	Align with TRF mission and one of Rotary's areas of focus; local and international sponsors; Rotarians participate actively; signage on project site; submission of progress and final reports.	Sustainable, and measurable outcomes that address community needs.	Compliance with Rotary funding requirements.	Project Monitoring and Control	Project Team
3	1.2.1	All vestiges of construction work on the site are properly removed and there is no safety hazard for the school population.	Improved school sanitation facilities.	To prepare and secure construction site.	Preliminary Works	Contractor
4	1.2.2	Septic tanks have no leakage; lids are securely closed and are easily accessible for pumping purposes.	Improved school sanitation facilities.	To build septic tank and soak-away.	Septic Tank	Contractor

ID	WBS ID	Requirements Description	Business Needs, Opportunities, Goals, Objectives	Project Objectives	WBS Deliverable	Stakeholder
5	1.2.3	Toilet blocks are completed per the technical specifications of the works contract and comply with WHO and CBA standards.	Improved and inclusive school sanitation facilities.	To build handicap accessible toilet blocks for boys and girls.	Toilet Blocks	Contractor
6	1.3.3	BCC Strategy includes situation analysis, audience segmentation and is aligned with national health and education standards.	To improve the school population and community's hygiene practices	To develop and disseminate BCC strategy and materials.	Behavior change communication strategy and materials	Project Team and MOE
7	1.3.2	BCC materials and trainings are tailored to each audience's learning needs, living situation and availability.	To improve the school population and community's hygiene practices	To deliver BCC training	Behavior change communication training	Project Team and MOE
8	1.3.2	The Operation and maintenance manual and plan are provided in hard and electronic copy.	To ensure sustainability of project deliverables	To develop maintenance plan.	Operation and maintenance manual and training	School Authorities and PTA
9	1.4	Results of each project evaluation are presented in a report that is submitted to the project sponsor and to the relevant stakeholders.	To document the medium- and long-term impact of project outputs.	To measure project impact.	Baseline survey and final evaluation	Project Team and school authorities

Note: Prepared by Author.

During project initiation, field visits were conducted to observe and document current school sanitation conditions and to speak to school authorities, staff, and parents to identify the requirements that best respond to the school population's needs.

4.2.3 Project Scope Statement

Project Name	School Sanitation Project
Date	April 4, 2022

Project Objectives
General Objective: To increase student attendance through the construction of sanitation faciities and the implementation of good hygiene practices and behavior change. Specific Objectives: 1. To improve school sanitation facilities following World Health Organization standards to decrease water-borne illnesses in the school compound. 2. To implement good hygiene practices among the school population and surrounding community through behavior change interventions and communication that promote student health at school and at home. 3. To train school staff and parent teacher association members on adequate maintenance of sanitation facilities for sustainable operation and maintenance of improved infrastructure. 4. To conduct baseline and post-implementation evaluations of hygiene practices and sanitation knowledge and behavior of the school and community population to measure project impact. 5. To develop and implement management processes according to PMI standards to plan, manage, control, and monitor project activities and deliverables.
Product Scope Definition
Scope includes improved and inclusive school sanitation facilities; water, sanitation and hygiene (WASH) behavior change communication (BCC); project evaluation and impact; and management. School population needs will guide the design and construction to provide separate spaces for boys and girls including handicap accessibility. Educational

material and training sessions will improve the school population and community's hygiene practices. Project evaluations will measure the medium and long term impact of the project outputs. Project management, including procurement, finances and reporting will be planned, monitored and controlled by the project team in coordination with project stakeholders and sponsors.

Project Requirements

- Project completed within schedule and budget in compliance with agreed standards.
- Align with TRF mission and one of Rotary's areas of focus; Rotarians participate actively; local and international sponsors; signage on project site; submission of progress and final reports.
- All vestiges of construction work on the site are properly removed and there is no safety hazard for the school population.
- Septic tanks have no leakage; lids are securely closed and are easily accessible for pumping purposes.
- Toilet blocks are completed per the technical specifications of the works contract and comply with WHO and CBA standards.
- BCC Strategy includes situation analysis, audience segmentation and is aligned with national health and education standards.
- BCC materials and trainings are tailored to each audience's learning needs, living situation and availability.
- The Operation and maintenance manual and plan are provided in hard and electronic copy.
- Results of each project evaluation are presented in a report that is submitted to the project sponsor and to the relevant stakeholders.

Project Exclusions

- Maintenance and operations of infrastructure. Upon hand-over of the infrastructure and completion of maintenance training, the school authorities will be solely responsible for the proper upkeep of the sanitation facilities.
- Salary or compensation of school wardens.
- One-time hygiene sessions to transfer knowledge and not change behavior.
- Communication material or training not directly related to improved hygiene and sanitation practices in the school and impacted community.
- Construction or refurbishment of school infrastructure other than the sanitation facilities. Small infrastructure works, such as covered sidewalks or fencing can be included in the scope based on the final design and cost.

Project Deliverables

- Toilets blocks and handwashing stations for boys and girls handicap accessibility
- Behavior change communication and education campaign and materials
- Behavior change training for students, school staff and parents
- Operation and maintenance manual and training
- Baseline and Final evaluations

Product Acceptance Criteria

- All vestiges of construction work on the site are properly removed and there is no safety hazard for the school population.
- Septic tank is properly sealed with no leakage in structure or plumbing.
- Septic tank lids are properly and securely sealed and are easily accessible for pumping purposes.
- Each toilet block is completed per the technical specifications outlined in the works contract.
- Each toilet block is fully functional, all finishes and electrical and plumbing fixtures are working as intended.
- BCC Strategy includes situation analysis, audience segmentation and is approved by project stakeholders
- BCC materials and trainings are tailored to each audience's learning needs, living situation and availability.
- Operation and maintenance manual is provided in hard and electronic copy.
- Results of each project evaluation are presented in a report that is submitted to the project sponsor and to the relevant stakeholders.

Project Constraints

- School will be in session and students will be on campus during the construction.
- Limited availability of preferred construction material due to delays in imports resulting from the pandemic.
- Construction will take place during hurricane season.
- Frequent increase in fuel prices may impact transportation of construction materials and equipment.
- Indoor plumbing and potable water is not available to all students in their homes.
- Local sanitation and hygiene practices are poor and ingrained in the school population.

Project Assumptions

- The School Sanitation Project can be completed in five months.
- The school administration and staff, parents, and community support the project and its objectives.
- The estimated cost of the School Santiation Project is within the available budget.
- The Ministries of Education and Health support the project objectives and ensure the required availability and effective participation of their technical officers for behavior change trainings.
- Contractor incorporates safety measures to ensure student and adult safety and minimal disruption.

Initial Project Organization

The Project Team includes a Project Manager, the Club Treasurer, a Technical Specialist, a Communications Specialist, and a Monitoring and Evaluation Specialist. The Team reports to the Service Project Committee who reports to the Club's Board. Stakeholders include school authorities, parents, members of Parent Teacher Association (PTA), government partners, international sponsors, contractors, community members and students.

Schedule Milestones

Milestone	**Date**
Project Start	July 1, 2022
Septic Tank completed	October 13, 2022
Foundation completed	November 10, 2022
Walls completed	December 1, 2022
Roof completed	December 28, 2022
Finishes completed	January 18, 2023
Communication strategy completed	February 22, 2023
Plumbing and electrical fixtures installed	January 25, 2023
Inauguration of toilet blocks	January 26, 2023
Project end	March 22, 2023

Fund Limitation

TRF does not finance the following WASH activities: one-time education sessions providing standardized education and not aimed at behavior change; projects that only build water and sanitation systems.
TRF finances projects with a minimum budget of US$30,000. Projects that exceed US$50,000 may be subject to a technical review and site visit.

Approval Requirements
Acceptance of infrastructure milestones and completed sanitation facilities will be the responsibility of the Project Manager based on the Technical Specialist's recommendations. The former will submit the related progress reports to project sponsors for their final approval of the product. The behavior change communication deliverables will be approved by a previously agreed committee comprised of key stakeholders including representatives from the Ministries of Health and Education. Deliverables from the Evaluations component will also be presented to the project sponsors for approval.

Decision	
☐ Approved	☐ Rejected
☐ Approved with modifications	☐ Deferred
Required Modifications	
Additional Comments	

_____ _____

Approver's Printed Name Date

_____

Title

_____

Signature

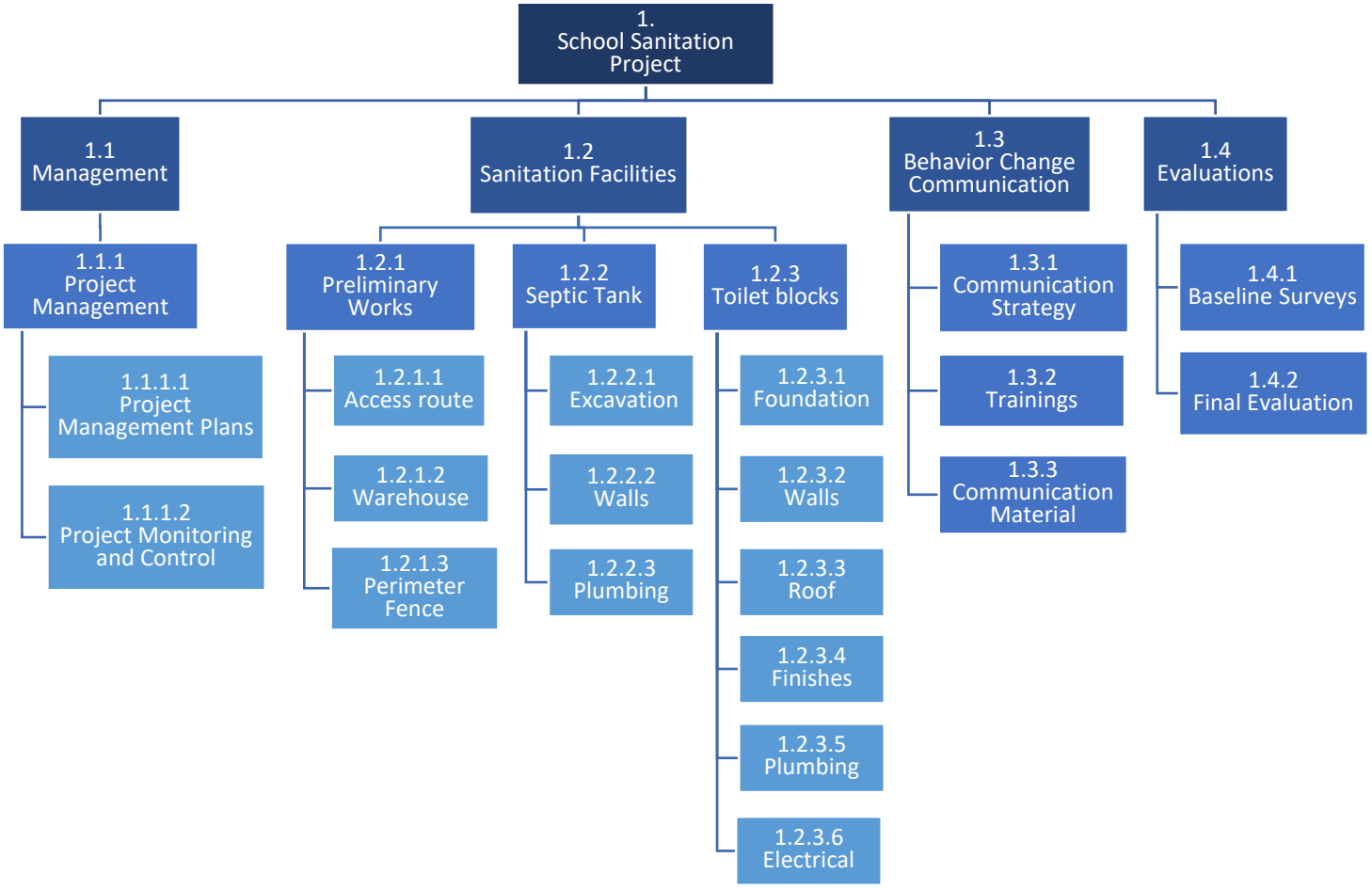
4.2.4 Work Breakdown Structure (WBS)

By applying the decomposition technique, the project scope and project deliverables were subdivided to develop the project's WBS. Figure 8 shows the four WBS levels. The second level identifies the four project components, the third level shows the project deliverables, and the fourth level introduces the project's work packages.

Chart 8 presents the WBS dictionary detailing the person responsible, related milestone, assumptions and constraints, quality metrics, cost, schedule, and required resource for each work package.

Figure 8

School Sanitation Project Work Breakdown Structure (WBS)



Note: Prepared by Author.

4.2.5 WBS Dictionary

Chart 8

School Sanitation Project WBS Dictionary

WBS ID	Description of work	Owner	Milestone	Assumptions/ Constraints	Quality metrics	Cost	Schedule	Resource required
				1.1 Management				
1.1.1.1	Project Management Plans	Project Manager	Project Start	Plans only require final review and approval. /Poor internet connection.	# of approved management plans	$0	Jul 1-14, 2022	Computer, Internet
1.1.1.2	Project Monitoring and Control	Project Team	Project Start & End	Project team is available for entire project lifecycle. /COVID-19 cases still being reported.	# of approved minutes and reports	$0	Weekly, Monthly	Computer, Internet, phone
				1.2 Sanitation Facilities / 1.2.1 Preliminary Works				
1.2.1.1	Access route	Technical Specialist/ Contractor	N/A	Minimal land clearing is required to define route. /Classes are in session.	# of access routes	$300	Sep 9-12 2022	Construction equipment and tools
1.2.1.2	Warehouse	Technical Specialist/ Contractor		Can be built in one day. /No security on school campus.	# of warehouses	$1,500	Sep 13 2022	
1.2.1.3	Perimeter Fence	Technical Specialist/ Contractor		Can be completed in 2 days. /Classes are in session.	# of fences completed	$1,500	Sep 13-14 2022	

WBS ID	Description of work	Owner	Milestone	Assumptions/ Constraints	Quality metrics	Cost	Schedule	Resource required
1.2 Sanitation Facilities / 1.2.2 Septic Tank								
1.2.2.1	Excavation			Equipment is available. /Days off for Independence Day.		$1,500	Sep 15-28 2022	
1.2.2.2	Walls	Technical Specialist/ Contractor	Septic Tank Completed	No delays due to rain. /Close supervision required.	# of septic tanks completed	$980	Sep 29 - Oct 10 2022	Construction equipment and tools
1.2.2.3	Plumbing			Cost of supplies unchanged. /Close supervision required.		$1,000	Oct 11-13 2022	
1.2 Sanitation Facilities / 1.2.3 Toilet Blocks								
1.2.3.1	Foundation		Foundation completed	Equipment is available. Laborers are available, skilled, and experienced. / Stronger events tend to occur at the end of hurricane season (Nov/Dec). Reduced number of laborers during end of year holidays.	# of toilet blocks completed	$2,750	Oct 14 - Nov 10 2022	
1.2.3.2	Walls	Technical Specialist/ Contractor	Walls completed			$1,000	Nov 11 – Dec 12 2022	Construction equipment and tools
1.2.3.3	Roof		Roof completed			$4,500	Dec 2 – 28 2022	
1.2.3.4	Finishes	Technical Specialist/ Contractor	Finishes completed	Material available and within budget. /Rework not an option.	# of beneficiaries	$25,000	Dec 29 ‘22– Jan 18 ‘23	Construction tools
1.2.3.5	Plumbing		Toilet blocks completed	Supplies are within budget. /Close supervision required.		$17,000	Jan 19 - 25 2023	
1.2.3.6	Electrical					$9,200	Jan 19 - 25 2023	

WBS ID	Description of work	Owner	Milestone	Assumptions/ Constraints	Quality metrics	Cost	Schedule	Resource required
1.3 Behavior Change Communication								
1.3.1	Communication Strategy	Comms. Specialist/ MOE	BCC completed	Active MOE participation and availability. /Sole partner.	# of approved strategies	$0	Jan 19 – 25 2023	Computer, Internet
1.3.2	Communication Material			Cost of material within budget. /Limited public bulletin boards	# of printed material	$1,200	Jan 26 - Feb 8 2023	
1.3.3	Trainings			High turnout and active participation. /Limited schedule options.	# of participants # of plans	$200	Feb 9 – 22 2023	Computer, Projector
1.4 Evaluations								
1.4.1	Baseline Surveys	Monitoring and Evaluation Specialist	N/A	Data collected accurately. /Start of school year.	% of student attendance	$200	Jul 15 - Aug 4 2022	Paper, Pen, Computer, Internet
1.4.2	Final Evaluation		Project Close	Data collected accurately. /Reduced availability after project completion.	% of student attendance	$200	Feb 22 – Mar 22 2023	

Note: Prepared by Author.

4.2.6 Validate Scope

The Project Manager will conduct inspection visits to the construction site, as determined in the works contract, upon the achievement of specific project milestones. The purpose of these visits is to validate compliance with safety and industry standards and acceptance criteria. The Technical Specialist will accompany the Project Manager and will prepare a site inspection report to document the progress to date and the acceptance or additional work required on the deliverables.

The behavior change communication deliverables will be approved by a previously agreed committee comprised of key stakeholders including representatives from the Ministries of Health and Education. Deliverables from the Evaluations component will be presented to the project sponsors for approval.

Work performance information on project progress in all its components will be documented in a monthly report prepared by the project team. The report will facilitate the tracking of achievement of project targets and project performance.

4.2.7 Control Scope

The inspection visits, the review of project deliverables and the monthly project performance reports may identify variances between the planned and actual project results. Changes to the scope and schedule baselines and to the subsidiary project management plans can only be applied through a change request submitted to the Project Manager using the change request form. The request will include a detailed impact analysis of the change, including potential effects to the project’s cost, schedule, and quality provided by the relevant technical expert.

The Project Manager must review and provide their non-objection before distributing the change request to the local and international project sponsors. A meeting will be convened to review the request and project sponsors will decide if it is approved, rejected or if adjustments or further information are required. If there is no objection, the Project team will register it in the change request log and update the impacted project documents (schedule baseline, cost baseline, etc.) accordingly.

4.3 Schedule Management Plan

The project's schedule must be closely managed to ensure that all its activities are completed within the agreed timeframe. This schedule management plan details the processes, procedures, and documentation which the Project Manager and their team will use to plan, execute, manage, and control the School Sanitation Project schedule.

4.3.1 Plan Schedule Management

The Project Manager and the Technical Specialist from the local Rotary Club will use scheduling software (Microsoft Project) to plan and manage the project schedule. Meetings will be held with the participation of the project team, project sponsors, and relevant stakeholders. They will analyze and select the most appropriate schedule method, the level of detail of the schedule plan, and the level of time and effort necessary for reporting and managing the project schedule. The WBS presented in Figure 8 will be the basis of the schedule management plan to ensure that the duration of each project deliverable and all their work packages are accurately represented in the project schedule in MS Project.

4.3.2 Activity List

The project activities will be defined by decomposing the work packages represented in level 3, the lowest level of the WBS. This decomposition exercise will be completed by the project team during the meetings described in Section 4.3.1. The WBS and WBS dictionary will be key inputs to define the project's activity list. An initial activity list is presented in Chart 9 which must be revised and updated by the Project Team when the project planning begins.

Chart 9

School Sanitation Project Activity List

WBS ID	Work Package	Activity Name	Description
1.1.1.1	Project Management Plans	Develop Project Charter	Develop Project Charter for School Sanitation Project.
1.1.1.1	Project Management Plans	Develop Scope Management Plan	Describe how the project scope will be defined, developed, monitored, controlled, and validated.
1.1.1.1	Project Management Plans	Develop Schedule Management Plan	Establish criteria and activities to develop, monitor and control the project schedule.
1.1.1.1	Project Management Plans	Develop Cost Management Plan	Describe how costs will be planned, structured, and controlled.
1.1.1.1	Project Management Plans	Develop Quality Management Plan	Describe how policies, procedures, and guidelines will be implemented.
1.1.1.1	Project Management Plans	Develop Resource Management Plan	Describe how project resources will be acquired, allocated, monitored, and controlled.
1.1.1.1	Project Management Plans	Develop Communication Management Plan	Describe the administration and dissemination of project information.
1.1.1.1	Project Management Plans	Develop Risk Management Plan	Describe how to structure and perform risk management activities.
1.1.1.1	Project Management Plans	Develop Procurement Management Plan	Describe the bidding process for hiring of works contractor.
1.1.1.1	Project Management Plans	Develop Stakeholder Engagement Plan	Identify strategies and actions to promote productive stakeholder involvement.
1.1.1.2	Project Monitoring and Control	Procurement Management	Preparation of bidding package, invitation to bidders, coordination of evaluation meeting, and submission of final report.

WBS ID	Work Package	Activity Name	Description
1.1.1.2	Project Monitoring and Control	Financial Management	Monitoring and control of payments, management of and reporting on project budget.
1.1.1.2	Project Monitoring and Control	Administration and reporting	Daily project administration, preparation of monthly progress reports, baseline survey report and final project report.
1.2.1.1	Access route	Land clearing for Access	Preparation of alternate access route to construction site.
1.2.1.1	Access route	Gate installation	Construction of temporary gate to use access route.
1.2.1.2	Warehouse	Warehouse Construction	Build and secure warehouse for construction material.
1.2.1.3	Perimeter Fence	Construction of Perimeter Fence	Build fence around the perimeter of the construction site.
1.2.2.1	Excavation	Site Layout for Pits	Location of septic tank and soak-away are identified and marked.
1.2.2.1	Excavation	Pit Excavation	Pits are dug for septic tank and soak-away.
1.2.2.2	Walls	Pit Site Preparation	Preparation of base, installation of reinforcement bars.
1.2.2.2	Walls	Construction of septic tank walls	Construction of concrete walls.
1.2.2.3	Plumbing	Septic tank Plumbing installation	Install and connect plumbing fixtures for septic tank and soak-away.
1.2.3.1	Foundation	Level ground	Clear and prepare site for bathroom facilities.
1.2.3.1	Foundation	Concrete slab	Pouring and leveling of concrete foundation slab for bathroom facilities.
1.2.3.2	Walls	Footers	Installation of reinforcement bars and footers for bathroom facilities.
1.2.3.2	Walls	Wall construction	Build exterior and interior concrete block walls of bathroom facilities.

WBS ID	Work Package	Activity Name	Description
1.2.3.3	Roof	Roof Frame	Build and secure roof structure for bathroom facilities.
1.2.3.3	Roof	Roof Installation	Install and seal zinc sheets on roof structure for bathroom facilities.
1.2.3.4	Finishes	Window and door Installation	Install windows and doors to bathroom facilities.
1.2.3.4	Finishes	Painting	Paint inside and outside bathroom facilities.
1.2.3.4	Finishes	Floor installation	Install tile flooring in bathroom facilities.
1.2.3.5	Plumbing	Installation of fixtures	Install pipes, connect to water supply, and septic tank.
1.2.3.5	Plumbing	Installation of artifacts	Install toilets, urinals, and sinks.
1.2.3.6	Electrical	Electrical wiring	Install conduits, wires, breaker, and circuits in bathroom facilities.
1.2.3.6	Electrical	Installation of electrical fixtures	Install lights, outlets, and switches.
1.3.1	Communication Strategy	Prepare BCC Strategy workplan	Develop BCC strategy workplan.
1.3.1	Communication Strategy	Implement BCC Strategy workplan	Consultations, meetings, drafting and completion of BCC strategy.
1.3.2	Communication Material	Prepare BCC Material workplan	Develop BCC material workplan.
1.3.2	Communication Material	Implement BCC Material workplan	Design, print, and disseminate communication material about hygiene.
1.3.3	Trainings	Prepare BCC Training workplan	Develop BCC training workplan.
1.3.3	Trainings	Implement BCC training workplan	Prepare and deliver trainings on behavior change communication about hygiene.
1.4.1	Baseline Surveys	Teacher session	Initial training for teachers on data collection.

WBS ID	Work Package	Activity Name	Description
1.4.1	Baseline Surveys	Data collection	School population and community surveys to establish baseline.
1.4.2	Final Evaluation	Data collection	Final evaluation with school population and the community.
1.4.2	Final Evaluation	Final Project Report	Preparation and presentation of project results.

Note: Prepared by author.

4.3.3 Activity Dependencies and Sequencing

In the construction component of the School Sanitation project most of the activities have a mandatory dependency on their predecessor. The foundation must be poured and completed before walls can be built; the walls must be completed before the roof can be built, etc. A few of the activities have a discretionary dependency. These include the start of the septic tank, finishes, plumbing, and electrical fixtures. Given the scope of the project and the available budget, it was determined that two construction sites on the school campus working simultaneously would not be an option due to safety and cost implications. Therefore, the septic tank and soak-away will be built before starting the toilet blocks.

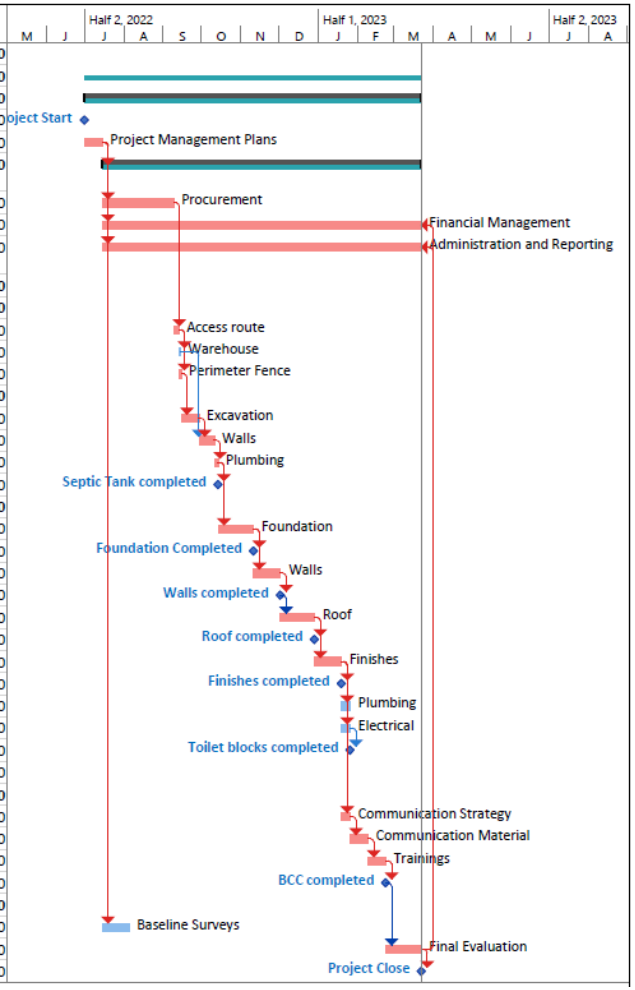
The first activity of the WASH BCC component (development of the communication strategy) is also discretionary as it can begin at any time. However, the training will be completed after the toilet blocks are completed and fully functional, so their proper use can be demonstrated to students and school administration and staff. Figure 9 illustrates dependencies and sequencing in the predecessor column and Gantt chart.

The baseline evaluation must be completed before the toilet block construction begins and the final evaluation must begin after the completion of all preceding project activities to ascertain the achievement of the project objectives.

Figure 9

School Sanitation Project Schedule

ID	WBS	Task Name	Duration	Start	Finish	Cost
1	1	School Sanitation Project	189 days?	Fri 01-07-22	Wed 22-03-23	$71,440.00
2	1.1	Management				$0.00
3	1.1.1	Project Management	189 days?	Fri 01-07-22	Wed 22-03-23	$0.00
4		Project Start	0 days?	Fri 01-07-22	Fri 01-07-22	$0.00
5	1.1.1.1	Project Management Plans	10 days	Fri 01-07-22	Thu 14-07-22	$0.00
6	1.1.1.2	Project Monitoring and Control	179 days?	Fri 15-07-22	Wed 22-03-23	$0.00
7	1.1.1.2.1	Procurement	40 days?	Fri 15-07-22	Thu 08-09-22	$0.00
8	1.1.1.2.2	Financial Management	179 days	Fri 15-07-22	Wed 22-03-23	$0.00
9	1.1.1.2.3	Administration and Reporting	179 days	Fri 15-07-22	Wed 22-03-23	$0.00
10	1.2	Sanitation Facilities	99 days	Fri 09-09-22	Wed 25-01-23	$69,640.00
11	1.2.1	Preliminary Works	4 days	Fri 09-09-22	Wed 14-09-22	$3,300.00
12	1.2.1.1	Access route	2 days	Fri 09-09-22	Mon 12-09-22	$300.00
13	1.2.1.2	Warehouse	1 day	Tue 13-09-22	Tue 13-09-22	$1,500.00
14	1.2.1.3	Perimeter Fence	2 days	Tue 13-09-22	Wed 14-09-22	$1,500.00
15	1.2.2	Septic Tank	21 days	Thu 15-09-22	Thu 13-10-22	$3,480.00
16	1.2.2.1	Excavation	10 days	Thu 15-09-22	Wed 28-09-22	$1,500.00
17	1.2.2.2	Walls	8 days	Thu 29-09-22	Mon 10-10-22	$980.00
18	1.2.2.3	Plumbing	3 days	Tue 11-10-22	Thu 13-10-22	$1,000.00
19	1.2.2.4	Septic Tank completed	0 days	Thu 13-10-22	Thu 13-10-22	$0.00
20	1.2.3	Toilet Blocks	74 days	Fri 14-10-22	Wed 25-01-23	$62,860.00
21	1.2.3.1	Foundation	20 days	Fri 14-10-22	Thu 10-11-22	$2,750.00
22		Foundation Completed	0 days	Thu 10-11-22	Thu 10-11-22	$0.00
23	1.2.3.2	Walls	15 days	Fri 11-11-22	Thu 01-12-22	$1,000.00
24		Walls completed	0 days	Thu 01-12-22	Thu 01-12-22	$0.00
25	1.2.3.3	Roof	19 days	Fri 02-12-22	Wed 28-12-22	$4,500.00
26		Roof completed	0 days	Wed 28-12-22	Wed 28-12-22	$0.00
27	1.2.3.4	Finishes	15 days	Thu 29-12-22	Wed 18-01-23	$25,000.00
28		Finishes completed	0 days	Wed 18-01-23	Wed 18-01-23	$0.00
29	1.2.3.5	Plumbing	5 days	Thu 19-01-23	Wed 25-01-23	$17,000.00
30	1.2.3.6	Electrical	5 days	Thu 19-01-23	Wed 25-01-23	$9,200.00
31		Toilet blocks completed	0 days	Wed 25-01-23	Wed 25-01-23	$0.00
32	1.2.3.7	Contingency Reserve				$3,410.00
33	1.3	Behavior Change Communication	25 days	Thu 19-01-23	Wed 22-02-23	$1,400.00
34	1.3.1	Communication Strategy	5 days	Thu 19-01-23	Wed 25-01-23	$0.00
35	1.3.2	Communication Material	10 days	Thu 26-01-23	Wed 08-02-23	$1,200.00
36	1.3.3	Trainings	10 days	Thu 09-02-23	Wed 22-02-23	$200.00
37		BCC completed	0 days	Wed 22-02-23	Wed 22-02-23	$0.00
38	1.4	Evaluations	179 days	Fri 15-07-22	Wed 22-03-23	$400.00
39	1.4.1	Baseline Surveys	15 days	Fri 15-07-22	Thu 04-08-22	$200.00
40	1.4.2	Final Evaluation	20 days	Thu 23-02-23	Wed 22-03-23	$200.00
41		Project Close	0 days	Wed 22-03-23	Wed 22-03-23	$0.00



Note: Prepared by Author.

4.3.4 Activity Durations

Analogous estimating and bottom-up estimating will be used to arrive at the duration of project activities. Estimates and activity scheduling from similar projects provided historical and disaggregated data that allowed the project team and project sponsors to develop and agree on activity durations. The Project Manager will ensure the basis of estimate is documented by the project team for future reference. Changes to assumptions and constraints based on developing local and world events may require that activity durations be revisited during project execution.

4.3.5 Project Schedule

The schedule of completion deadlines for project milestones is included in Chart 10. It represents key project dates (start and close) and project deliverables. Milestones were selected at the completion of important deliverables during the construction period. This will facilitate the timely reporting and analysis of project progress to allow the project team and project sponsors to identify delays and necessary adjustments to the project schedule.

Figure 9 builds on the preceding sections of this schedule management plan and presents the schedule baseline and project schedule developed for the School Sanitation Project using MS Project. The project intends to start with the final review of the project management plans on July 1, 2022 and close with the completion of the Final Evaluation on March 22, 2023. The duration is 189 days, almost 9 months. The activities of the Sanitation Facilities component and the procurement of the works contractor represent almost two thirds (139 days) of the project schedule. Subsequently, these activities must be closely monitored and controlled as detailed in Section 4.3.6 to prevent delays in the project timelines.

4.3.6 Control Schedule

The project schedule will be controlled using variance analysis and performance reviews based on the work performance information in the monthly progress reports. The project Milestones Schedule will provide specific deadlines for achieving the project deliverables. The monthly milestones included for the sanitation facilities

must be monitored closely. The project team will evaluate the source of any delays and will propose the most appropriate and efficient technique to get the project back on schedule. Techniques may include schedule compression, where resources are increased to shorten the schedule or where activities are implemented in parallel where possible.

Project sponsors may accept the use of the project's contingency and management reserves to finance the implementation of a proposed technique. Any requests for the use of these reserves must follow the project's change management process as described in Section 4.2.7.

Chart 10

School Sanitation Project Milestone Schedule

WBS ID	Activity	Project Schedule Time Frame							
		Jul/Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1.1M	Project Start	◆							
1.2.2M	Septic Tank completed			◆					
1.2.3.1M	Foundation Completed				◆				
1.2.3.2M	Walls Completed					◆			
1.2.3.3M	Roof Completed						◆		
1.2.3.4M	Finishes completed							◆	
1.2.3.6M	Toilet Blocks completed							◆	
1.3M	BCC Completed								◆
1.4M	Project Close								◆

Note: Prepared by Author

4.4 Cost Management Plan

Project cost management is the third project management knowledge area and includes four processes to this end: plan cost management, estimate costs, determine budget, and control costs. The Cost Management Plan is the third subsidiary plan of the School Sanitation Project management plan. It details the processes, procedures, and baseline that will guide the Project Manager, project team, stakeholders, and project sponsors to execute, manage, and complete the project within budget and how to request changes to the cost baseline and use of project contingency and management reserves, if these become necessary during the project execution.

4.4.1 Plan Cost Management

Cost planning for the School Sanitation Project will consider the different funding sources (local and international Rotary Clubs, TRF, local sponsors) and their requirements, if any, to determine control thresholds, reporting formats and frequency, and level of accuracy. The Project Manager will convene project team planning meetings to develop the cost management plan.

The project team member responsible for project finances or their representative from each participating Rotary Club must attend the planning meetings. Their expertise and that of the Technical Specialist must be considered and incorporated. Other team members, key stakeholders, and project sponsors with knowledge and experience in cost estimating and budgeting for similar projects may also be invited. Rotarians who prepared and submitted the grant proposal to TRF and will be responsible for reporting project progress and use of funding must also be included.

The WBS presented in Figure 8 and the School Sanitation MS Project file will link each WBS component (control account) number with the accounting system of the local Rotary Club.

4.4.2 Costs Estimation

The project costs are estimated using analogous and bottom-up estimating from historical and recent projects of a similar nature and scope. As a Rotary-sponsored project, the School Sanitation Project has a significant advantage in reduced costs in several activities considering that the project team members and sponsors are volunteers and do not represent a cost to the project. Project communication and documentation will be electronic, also representing additional cost savings.

Cost estimates for the WASH BCC and evaluation components in Chart 11 represent the cost of printing material such as posters and flyers to be displayed and disseminated on bulletin boards and classrooms in the school compound and in key locations in the community. Evaluation costs incorporate the need to print surveys and evaluations.

Chart 11

School Sanitation Project Cost Estimates

WBS ID	Activity	Estimated Cost (USD)
1.1.1.1	Develop Project Charter	$0.00
1.1.1.1	Develop Scope Management Plan	$0.00
1.1.1.1	Develop Schedule Management Plan	$0.00
1.1.1.1	Develop Cost Management Plan	$0.00
1.1.1.1	Develop Quality Management Plan	$0.00
1.1.1.1	Develop Resource Management Plan	$0.00
1.1.1.1	Develop Communication Management Plan	$0.00
1.1.1.1	Develop Risk Management Plan	$0.00
1.1.1.1	Develop Procurement Management Plan	$0.00
1.1.1.1	Develop Stakeholder Engagement Plan	$0.00
1.1.1.2	Procurement Management	$0.00
1.1.1.2	Financial Management	$0.00
1.1.1.2	Administration and reporting	$0.00

WBS ID	Activity	Estimated Cost (USD)
1.2.1.1	Land clearing for Access	$50.00
1.2.1.1	Gate installation	$250.00
1.2.1.2	Warehouse Construction	$1,500.00
1.2.1.3	Construction of Perimeter Fence	$1,500.00
1.2.2.1	Site Layout for Pits	$250.00
1.2.2.1	Pit Excavation	$1,250.00
1.2.2.2	Pit Site Preparation	$280.00
1.2.2.2	Construction of septic tank walls	$700.00
1.2.2.3	Septic tank Plumbing installation	$1,000.00
1.2.3.1	Level ground	$1,000.00
1.2.3.1	Concrete slab	$1,750.00
1.2.3.2	Footers	$250.00
1.2.3.2	Wall construction	$750.00
1.2.3.3	Roof Frame	$1,000.00
1.2.3.3	Roof Installation	$3,500.00
1.2.3.4	Window and door Installation	$10,000.00
1.2.3.4	Painting	$5,000.00
1.2.3.4	Floor installation	$10,000.00
1.2.3.5	Installation of fixtures	$5,000.00
1.2.3.5	Installation of artifacts	$12,000.00
1.2.3.6	Electrical wiring	$6,200.00
1.2.3.6	Installation of electrical fixtures	$3,000.00
1.3.1	Prepare BCC Strategy workplan	$0.00
1.3.1	Implement BCC Strategy workplan	$0.00
1.3.2	Prepare BCC Material workplan	$0.00
1.3.2	Implement BCC Material workplan	$1,200.00
1.3.3	Prepare BCC Training workplan	$0.00
1.3.3	Implement BCC training workplan	$200.00
1.4.1	Teacher session	$100.00
1.4.1	Data collection (Baseline Survey)	$100.00
1.4.2	Data collection (Final Report)	$100.00

WBS ID	Activity	Estimated Cost (USD)
1.4.2	Final Project Report	$100.00

Note: Prepared by Author

The Project Manager will ensure the basis of estimates is documented by the project team for future reference. Changes to assumptions and constraints based on fluctuations in exchange rate or increase in prices due to developing world events may require that cost estimates to be revisited during project planning.

4.4.3 Budget Determination

The project budget is financed in part by TRF (USD32,500) and the remainder (USD37,500) by the local Rotary club and four international Rotary clubs. TRF organizational requirements for accessing grant funds, described in Section 4.2.2, have been fulfilled and those required during and after project execution will not incur expenses.

The Project Manager and budget team met for cost and budget planning to develop the cost baseline, detailed in Chart 12, based on their expertise in financial matters, funding requirements, and knowledge of similar past projects. Through data analysis they will define the contingency and management reserves for the project.

Chart 12 includes a 5% contingency reserve of USD 3,410 for component 1.2 Sanitation Facilities. The chart details the project's cost baseline; thus, does not include the management reserve of USD5,000 that may be accessed from international funds. If the need for this reserve arises, the project team must follow the established change control process and secure the approval of the project sponsors and stakeholders.

Chart 12

School Sanitation Project Cost Baseline

WBS	Task Name	Cost
1	School Sanitation Project	$71,440.00
1.1	Management	$0.00
1.1.1	Project Management	$0.00
	Project Start	$0.00
1.1.1.1	Project Management Plans	$0.00
1.1.1.2	Project Monitoring and Control	$0.00
1.1.1.2.1	Procurement	$0.00
1.1.1.2.2	Financial Management	$0.00
1.1.1.2.3	Administration and Reporting	$0.00
1.2	Sanitation Facilities	$69,640.00
1.2.1	Preliminary Works	$3,300.00
1.2.1.1	Access route	$300.00
1.2.1.2	Warehouse	$1,500.00
1.2.1.3	Perimeter Fence	$1,500.00
1.2.2	Septic Tank	$3,480.00
1.2.2.1	Excavation	$1,500.00
1.2.2.2	Walls	$980.00
1.2.2.3	Plumbing	$1,000.00
1.2.3	Toilet Blocks	$62,860.00
1.2.3.1	Foundation	$2,750.00
1.2.3.2	Walls	$1,000.00
1.2.3.3	Roof	$4,500.00
1.2.3.4	Finishes	$25,000.00
1.2.3.5	Plumbing	$17,000.00
1.2.3.6	Electrical	$9,200.00
1.2.3.7	*Contingency Reserve*	$3,410.00
1.3	Behavior Change Communication	$1,400.00
1.3.1	Communication Strategy	$0.00
1.3.2	Communication Material	$1,200.00

WBS	Task Name	Cost
1.3.3	Trainings	$200.00
1.4	Evaluations	$400.00
1.4.1	Baseline Surveys	$200.00
1.4.2	Final Evaluation	$200.00

Note: Prepared by Author.

4.4.4 Control Costs

Project costs will be controlled through the work performance information provided in the monthly progress reports including the updated earned value analysis (EVA). The Treasurer must apply the earned value methodology (EVM) based on the project's progress in cost and time at the end of each month and include this analysis in the monthly progress report. Figure 10 defines the earned value indexes.

The planned value (PV) was calculated from the project's cost baseline (Chart 12) and schedule baseline (Figure 9). The two scenarios described in Chart 13 determined the actual cost (AC) and earned value (EV) using the EVM. The detailed calculation template is provided (see Appendix D) for the Treasurer and Project Manager to conduct monthly calculations during project execution.

The AC was projected in a scenario where the preliminary work starts a month late and the corresponding expenses are incurred until October. This scenario illustrates the potential impact of delays in the procurement process for the works contractor. The EV was projected considering that the cost for preliminary works is split between August and September (rather than a single advance for both activities in August).

Figure 10

Earned Value Calculations Summary Table

Earned Value Analysis					
Abbreviation	**Name**	**Lexicon Definition**	**How Used**	**Equation**	**Interpretation of Result**
PV	Planned Value	The authorized budget assigned to scheduled work.	The value of the work planned to be completed to a point in time, usually the data date, or project completion.		
EV	Earned Value	The measure of work performed expressed in terms of the budget authorized for that work.	The planned value of all the work completed (earned) to a point in time, usually the data date, without reference to actual costs.	EV = sum of the planned value of completed work	
AC	Actual Cost	The realized cost incurred for the work performed on an activity during a specific time period.	The actual cost of all the work completed to a point in time, usually the data date.		
BAC	Budget at Completion	The sum of all budgets established for the work to be performed.	The value of total planned work, the project cost baseline.		
CV	Cost Variance	The amount of budget deficit or surplus at a given point in time, expressed as the difference between the earned value and the actual cost.	The difference between the value of work completed to a point in time, usually the data date, and the actual costs to the same point in time.	CV = EV – AC	Positive = Under planned cost Neutral = On planned cost Negative = Over planned cost
SV	Schedule Variance	The amount by which the project is ahead or behind the planned delivery date, at a given point in time, expressed as the difference between the earned value and the planned value.	The difference between the work completed to a point in time, usually the data date, and the work planned to be completed to the same point in time.	SV = EV – PV	Positive = Ahead of schedule Neutral = On schedule Negative = Behind schedule
CPI	Cost Performance Index	A measure of the cost efficiency of budgeted resources expressed as the ratio of earned value to actual cost.	A CPI of 1.0 means the project is exactly on budget, that the work actually done so far is exactly the same as the cost so far. Other values show the percentage of how much costs are over or under the budgeted amount for work accomplished.	CPI = EV/AC	Greater than 1.0 = Under planned cost Exactly 1.0 = On planned cost Less than 1.0 = Over planned cost
SPI	Schedule Performance Index	A measure of schedule efficiency expressed as the ratio of earned value to planned value.	An SPI of 1.0 means that the project is exactly on schedule, that the work actually done so far is exactly the same as the work planned to be done so far. Other values show the percentage of how much costs are over or under the budgeted amount for work planned.	SPI = EV/PV	Greater than 1.0 = Ahead of schedule Exactly 1.0 = On schedule Less than 1.0 = Behind schedule
EAC	Estimate at Completion	The expected total cost of completing all work expressed as the sum of the actual cost to date and the estimate to complete.	If the CPI is expected to be the same for the remainder of the project, EAC can be calculated using: If future work will be accomplished at the planned rate, use: If the initial plan is no longer valid, use: If both the CPI and SPI influence the remaining work, use:	EAC = BAC/CPI EAC = AC + BAC – EV EAC = AC + Bottom-up ETC EAC = AC + [(BAC – EV)/ (CPI x SPI)]	

Note: Reprinted from "A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition," by Project Management Institute, 2017, p. 267. Copyright 2017 by Project Management Institute, Inc.

Chart 13

Earned Value Methodology Scenarios

Scenario	Project duration	Month	Date
1	33%	3	September 2022
2	66%	6	December 2022

Index	Scenario 1	Interpretation	Scenario 2	Interpretation
PV	$6,980.00	N/A	$40,230.00	N/A
EV	$3,500.00	PV>EV = delayed	$38,640.00	PV>EV = delayed
AC	$100.00	AC<EV = underbudget	$41,835.00	AC>EV = overbudget
SV	(3,480.00)	Negative = delayed	$(1,590.00)	Negative = delayed
CV	$3,400.00	Positive = under planned cost	$(3,195.00)	Negative = over planned cost
CPI	35.00	>1 = under planned cost	0.92	< 1 = over planned cost
SPI	0.50	<1 = delayed	0.96	<1 = delayed
EACt	18 months	Estimated duration doubled	9.4 months	Estimated duration delayed by 2 weeks
EAC1	$2,041.14	Projected cost $69,398.86 under planned cost	$77,347.11	Projected cost $5,907.11 over planned cost

Note: Prepared by Author.

The EVA amounts in Chart 14 were obtained from the calculation of the EVM scenarios (see Appendix D). They facilitate the development of the project's S-curve illustrated in Figure 11 which will be prepared monthly by the Treasurer.

Chart 14

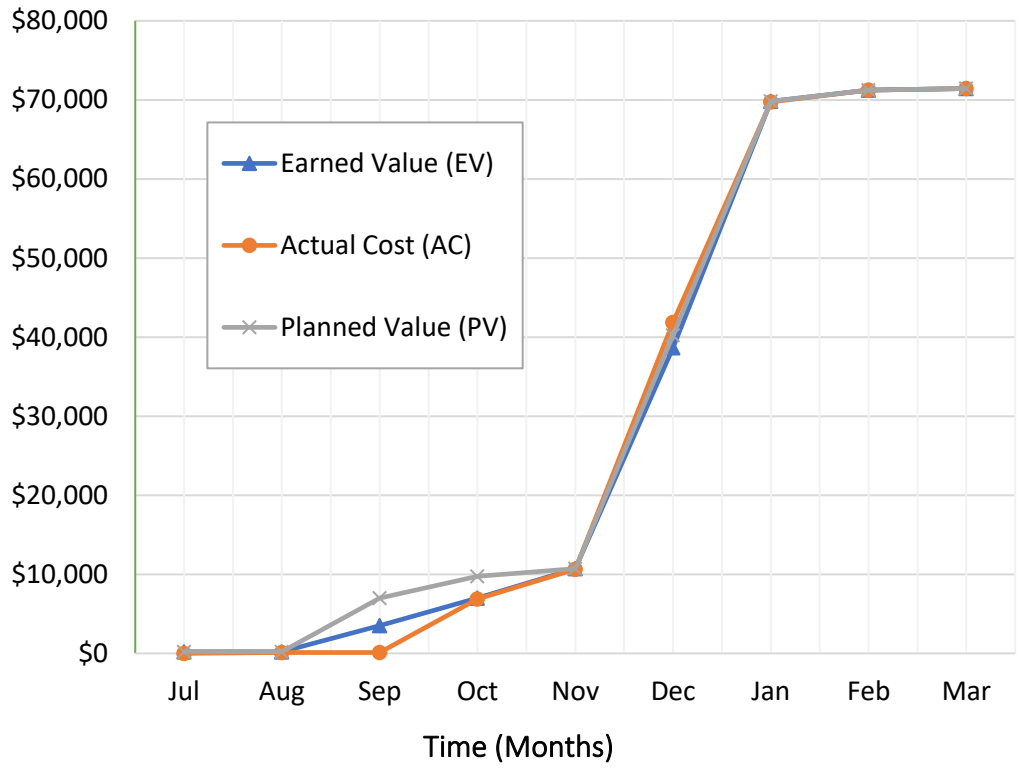
School Sanitation Project Earned Value Analysis

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Earned Value	$200	$200	$3,500	$6,980	$10,730	$38,640	$69,840	$71,240	$71,440
Actual Cost	$0	$100	$100	$6,880	$10,630	$41,835	$69,740	$71,240	$71,440
Planned Value	$200	$200	$6,980	$9,730	$10,730	$40,230	$69,840	$71,240	$71,440

Note: Prepared by Author. Amounts in USD.

Figure 11

School Sanitation Project S-Curve



Note: Prepared by Author

When variances larger than 5% of the cost baseline are reported, the project team will evaluate the reason for the variance and prepare a proposal to realign the project expenses with the established budget. Changes to the cost baseline and access to the contingency and management reserves must be processed through a formal change request form following the change control procedure for the project. If the project sponsors and stakeholders approve the change, all related project documents and impacted project management plans will be updated promptly and disseminated to all impacted parties.

4.5 Quality Management Plan

As described in the project background (Section 1.1), the School Sanitation project responds to SDG 3, 4, and 6, related to ensuring healthy lives, inclusive and equitable quality education, and availability of sanitation for all. Rotary and the Government of Belize are committed to supporting these development goals through their community projects.

Rotary-sponsored projects must comply with predefined quality standards to ensure that the time, effort, and resources invested by the project sponsors and key stakeholders contribute positively and efficiently toward improving the beneficiaries' quality of life. Sustainability, measurable outcomes, and active community engagement are key requirements for all Rotary projects that contribute towards the organizational and community goals.

The quality of the infrastructure and accompanying training and behavior change communication is critical for achieving sustainability, longevity, and meaningful impact for the community. The success of the project includes complying with scope, schedule, and cost, but also in delivering quality products and services. This section details the quality to be attained during the School Sanitation Project and how it will be measured.

4.5.1 Plan Quality Management

The quality management plan for the School Sanitation Project identifies the quality standards, objectives, control, and tools to be followed by the project team during project planning, implementation, monitoring, and evaluation.

The following planning tools and techniques facilitated the development of this project quality management plan:

- Expert judgement from project Technical Specialists, the local contractor, and local authorities to ensure adherence to quality standards.

- Benchmarking of similar sanitation projects conducted by other Rotary clubs and WASH stakeholders to replicate good practices.
- The cost of quality will focus on prevention and appraisal costs (training, education, inspections, etc.) to build quality deliverables.
- Inspection visits will be conducted regularly by the project Technical Specialist and Project Manager during construction.
- The Project Manager will convene planning meetings to finalize the quality management plan.

Additional techniques will serve to manage and control the project quality and are described in sections 4.5.2 and 4.5.3.

Several local and international quality standards will guide the project team toward achieving the project's quality objectives:

- Rotary Global Grant requirements
- TRF standard measures for water and sanitation measures
- PMI project management processes per the PMBOK Guide 6th edition
- WHO water, sanitation, and hygiene standards for schools in low-cost settings
- Central Building Authority construction regulations
- Ministry of Education health and family life education (HFLE) guidelines
- Ministry of Health public health regulations

In line with these quality standards, Chart 15 details the project's quality baseline, comprised of the project quality objectives and their respective metrics, expected outcome, frequency and responsible.

4.5.2 Manage Quality

Considering the scope of the project, quality reports will not be required. Instead, the monthly progress reports will include a section for reporting quality issues identified by or reported to the project team in any of the project interventions or processes. Any project stakeholder can alert the project team about quality issues they observe. The Project Manager will convene a quality review meeting to address quality issues. The project team and relevant stakeholders will define the problem, identify its root

cause, brainstorm solutions, and select the most efficient one. If the solution implies a change to any of the project baselines, the change control process will be followed. If the solution does not impact project baselines, it will be implemented promptly, and its effectiveness will be analyzed in a subsequent meeting.

The Technical Specialist will use checklists based on the specifications included in the works contract during their inspection visits. These checklists will be agreed with the contractor before the groundbreaking. The completed checklist will be an annex to the respective monthly progress report. In addition to these processes, specific activities to manage quality for each project deliverable are presented in Chart 16.

4.5.3 Control Quality

The work performance information included in the monthly progress reports, described in Section 4.2.6, will incorporate the fulfillment of project requirements, corrective actions, verified deliverables, status of quality metrics and any rework or process adjustments required. To facilitate the control quality process the project team will rely on the milestone schedule included in Chart 10 to inspect and verify the correctness of project deliverables at key intervals during project lifecycle and product development.

Inspections of the construction site and development will be conducted monthly by the Technical Specialist to verify compliance with WHO and Rotary standards. Inspectors from CBA and the utility companies will also conduct site inspections during the relevant construction phases to verify compliance with national standards. At least once a quarter, the Project Manager will organize a retrospective meeting to review lessons learned, identify areas of improvement and success during that period. The meeting will take place following the submission of the latest monthly progress report to ensure project information is the most recent. Beneficiary satisfaction and behavior change will be collected through surveys and questionnaires at the beginning of the project to establish the baseline and upon its completion to determine achievement of project quality objectives.

Chart 15

School Sanitation Project Quality Baseline

Quality Objective	Metric	Metric definition	Expected outcome/result	Measurement frequency	Owner
To reduce water-borne illnesses by building safe and inclusive bathroom facilities for students in Q1 2023.	# of toilet blocks completed # of direct beneficiaries	Completion certificate signed by site supervisor following a walk-through inspection of the site.	Student bathroom facilities in compliance with WHO and CBA standards	Once, upon completion of construction in January 2023.	Rotary
To increase visibility and awareness of good hygiene practices through behavior change communication in Q1 2023.	# of approved BCC strategies # of BCC material printed and disseminated	BCC strategy and material approved by sponsors and posted within school campus and the community.	BCC strategy and materials are culturally sensitive. Material is present in popular community sites.	Once, upon submission of strategy and upon acceptance of materials.	Rotary
To improve hygiene and sanitation practices of school population through BCC training in Q1 2023.	# of students that receive hygiene training	Student attendance record when hygiene and sanitation training takes place.	Hygiene lessons are participatory and develop age-appropriate WASH knowledge and skills.	Daily, when hygiene lessons are imparted.	Rotary MOE

Quality Objective	Metric	Metric definition	Expected outcome/result	Measurement frequency	Owner
To improve parents and guardians' hygiene and sanitation knowledge and practices in Q1 2023.	# of participants % of participants that learn at least two good hygiene practices	Attendance record for PTA hygiene and sanitation training. Session report including quiz results.	Participants develop the knowledge, attitudes, and skills to support good WASH practices at home.	Daily, when hygiene lessons are imparted.	Rotary MOH
To ensure sustainability and maintenance of infrastructure deliverables starting in Q1 2023.	# of manuals completed # of persons trained	Operation and maintenance manual handed over to school and PTA authorities. Attendance list of maintenance training session.	School and PTA authorities receive material and training that allows them to develop the first annual maintenance plan.	Once, upon hand over of completed infrastructure.	Contractor Rotary
	# maintenance plans completed	Annual maintenance plan completed by school and PTA authorities.	School authorities prepare and implement an annual maintenance plan.	Annually after project closure.	School and PTA authorities
To increase school attendance through improved sanitation and hygiene by Q1 2023.	% of students attending at least 80% of school days	Reports of baseline surveys and final evaluation results analyzing project impact.	Project interventions improve sanitation conditions which increases the number of students regularly attending classes.	Once, before construction begins and once upon completion of all project interventions.	Rotary

Note: Prepared by author.

Chart 16

School Sanitation Project Quality Activities Matrix

Deliverable	Requirement	Manage Activities	Control Activities	Frequency	Responsible
Toilets blocks	Contractor procured through a competitive bidding process.	• Bidding documents • Evaluation report	Review and approval of evaluation report to verify fair and transparent process.	Once	Project Team and Sponsors
	Construction complies with WHO and CBA standards	• Site inspections based on specifications checklist.	Review and approval of inspection reports to verify quality of deliverables and specification compliance.	Monthly	Technical Specialist, Project Manager
BCC Strategy	Includes situation analysis and audience segmentation.	• List of requirements, including acceptance criteria, for each deliverable.	Verify compliance with quality standards of the sponsor and national guidelines.	Once	Project Manager, Sponsor
BCC Material	Tailored to learning needs, language, and participants' availability			Once	Project Team
BCC training		• Training report		Per training	MOH, MOE
Op. & mainten. manual and training	Hard and soft illustrated copies delivered to school & PTA at training.	• Requirements' checklist • Training report	Verify compliance with sponsor's sustainability requirements.	Once	Project Team
Evaluations	Surveys and questionnaires to collect beneficiary satisfaction.	• Baseline survey and final evaluation reports	Review and approval of reports to verify achievement of project objectives.	Twice (start and end of project)	Project Team

Note: Prepared by author.

4.6 Resource Management Plan

Team resources must be adequately and timely managed throughout the School Sanitation project lifecycle by implementing the resource management processes described in this section. As a Rotary-sponsored project, it has unique characteristics including the composition of its project team and its broad group of stakeholders that are incorporated into this resource management plan. Acquisition of physical resources is limited in this project, but tools and processes to manage them are included.

4.6.1 Plan Resource Management

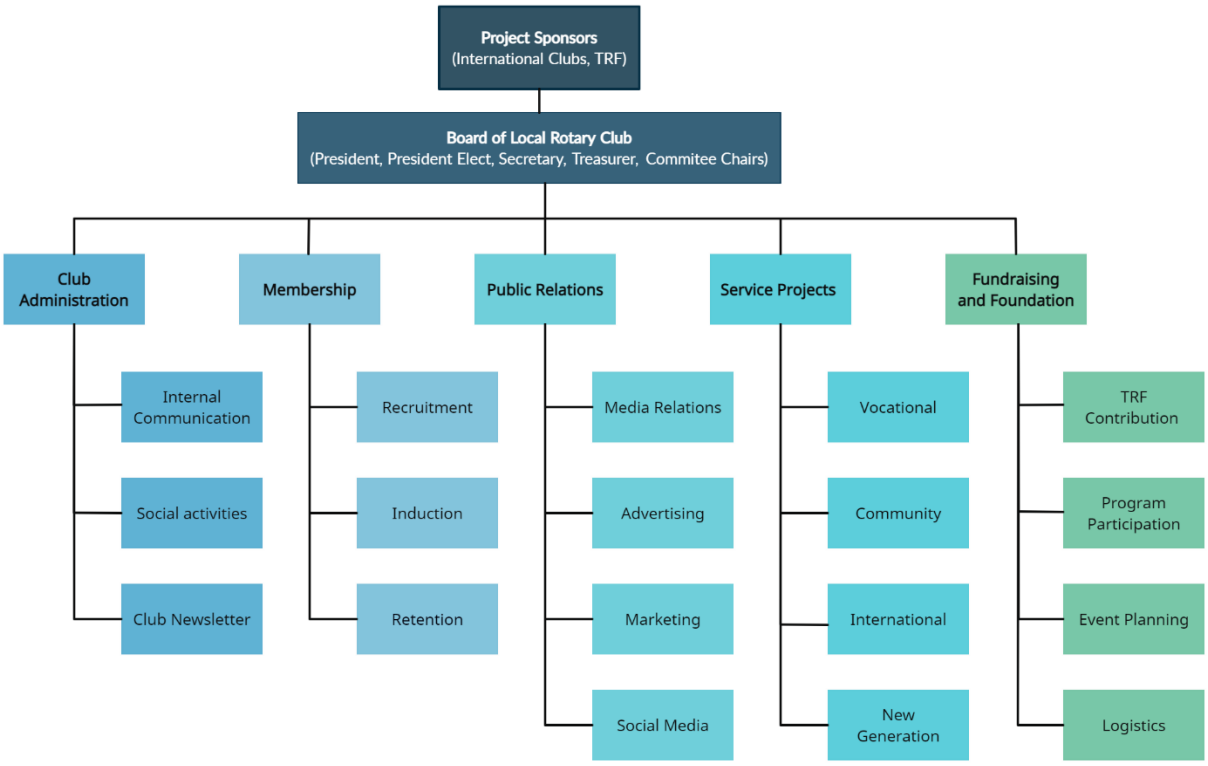
Sanitation facilities and behavior change communication are the main project deliverables. Their work packages and activities represent over two thirds of the project scope, cost, and schedule. The former requires external resources and the latter, along with Project Management and Evaluations, requires internal resources to ensure the satisfactory completion of project objectives and organizational goals.

The project team members for the School Sanitation project are atypical. Due to the nature of the organization, they are all volunteers. Further, they have free access to technical advisors, experts, and best practices from similar projects in other countries and regions through Rotary's local and international membership. Figure 12 shows the organizational breakdown structure of the local Rotary Club.

The School Sanitation Project will be designed, planned, managed, controlled and closed by a project team consisting of local club members. The Service Project Committee will lead the project activities in close collaboration with the Board and members of other committees based on their area of expertise and knowledge of past school sanitation projects and projects funded by TRF. The project team must adhere to the organizational requirements listed in Section 4.2.2 and any additional requirements or guidelines that may arise during project execution.

Figure 12

School Sanitation Project Organization Breakdown Structure



Note: Prepared by author.

The local Rotary club is known as the host sponsor, while external clubs are the international sponsors. Each of the latter will also identify a team within their Service Project committee to communicate with and provide the necessary financial assistance, technical support and other guidance that may be required. If deemed relevant, international sponsors can participate in site visits at critical phases of the project to ensure timely, effective, and efficient results and impact.

Chart 17 is the RACI (responsible, accountable, consult and inform) chart which can facilitate the assignment of roles and responsibilities of the project team and the key project sponsors. The chart can be reviewed and revised as needed by holding resource management meetings with the relevant stakeholders and team members.

Chart 17

School Sanitation Project Team RACI Chart

Activity	Role				
	Project Manager	Treasurer	Technical Specialist	Service Projects Committee	International Sponsor
Conduct community assessment	A			R	C
Prepare monthly progress reports	A	R	R	I	I
Submit change request	A	I	R	R	C
Convene team meetings	R	I	I	A	I
Manage project budget	A	R	C	I	I
Monitor project schedule	A	I	R	R	C
Conduct trainings	A	I	I	R	C
Approve project deliverables	A	I	R	I	R

R = Responsible A = Accountable C = Consult I = Inform

Note: Prepared by author.

4.6.2 Activity Resource Estimation

The project resources are projected based on bottom-up and analogous estimating, and expert judgement during planning meetings. As mentioned in Section 4.6.1, the team resources do not represent a cost to the project, as all project team members

are volunteers. All project meetings will be virtual, not incurring costs and not requiring facilities to this end. Project team members and, if necessary, international sponsors will provide their own transportation and donate their time to conduct the required site and inspection visits.

The resource breakdown structure is included in Figure 13. The Sanitation Facilities component does not require physical resources from the organization, as a contractor will be hired to build the facilities. The procurement process for these works is described in the procurement management plan in Section 4.9. The printing of BCC material, including posters, flyers, and infographics, will require the services of a local printing company. The project budget includes the hiring and purchase of both these resources. The project team and public relations committee will develop the BCC material in coordination with the relevant stakeholders.

The data collection exercise for the baseline surveys and the final evaluation of the student population will be conducted by the teachers as part of their daily attendance reports. Data collection for the PTA trainings will be carried out by the project team.

4.6.3 Resource Acquisition

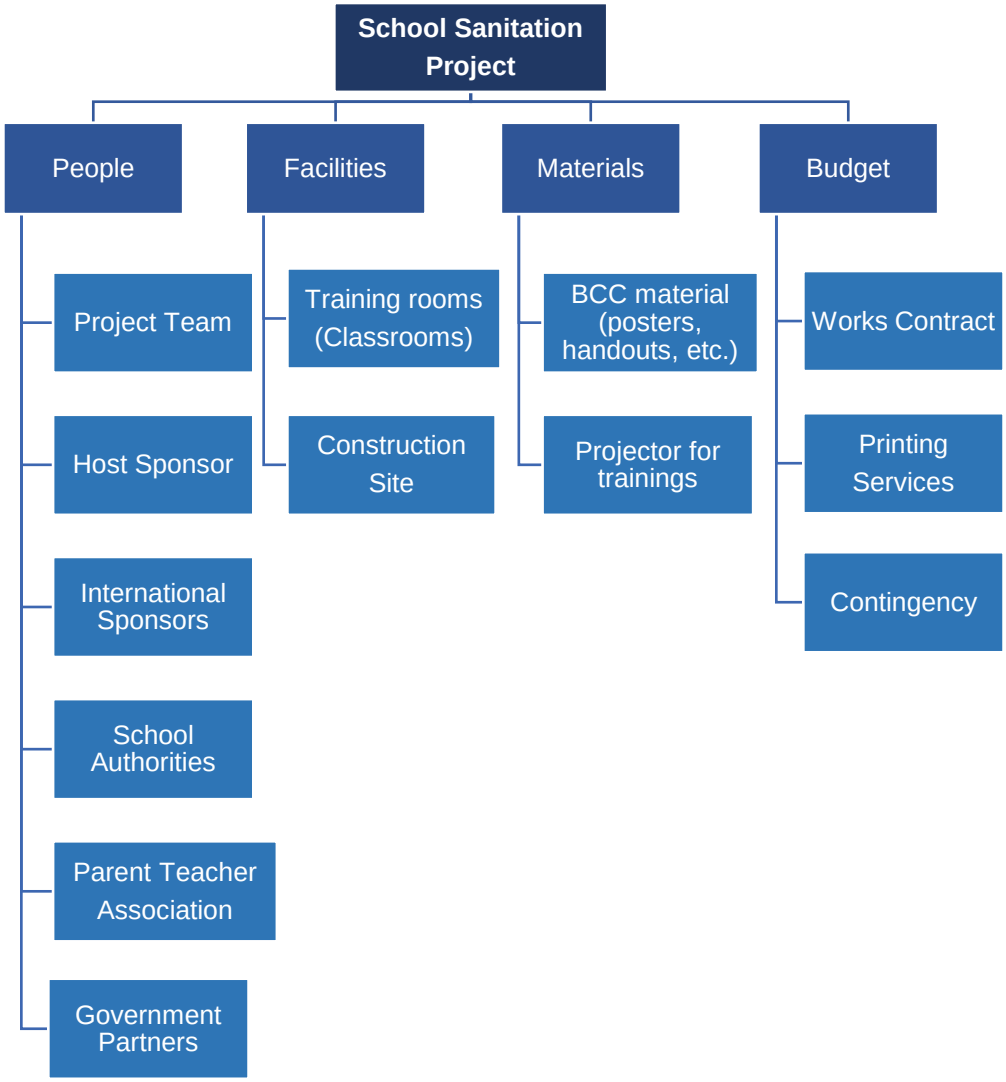
The project team is assigned using the following techniques:

- Decision-making: club members are selected based on their interests, availability, experience, knowledge, and skills.
- Pre-assignment: the club treasurer, and specific committees (Public Relations and Service Projects) will be responsible for key project activities. The committee chair will identify the best suited member of their team, including the Project Manager.
- Virtual Teams: Due to COVID-19 restrictions club meetings were changed to virtual. The project team will also be virtual, facilitating the active participation of international sponsors, including Technical Advisors and experts.
- Resource calendar: the project service committee will develop and manage a resource calendar to identify and document stakeholders' availability.

- Change requests: Substantial changes or lack of availability of team members, facilities, budget, materials, or external stakeholders, must be reported to the Project Manager. If they impact project scope, schedule or cost, a change request must be submitted following the change control process to prevent or mitigate the impact.

Figure 13

School Sanitation Project Resource Breakdown Structure



Note: Prepared by author.

4.6.4 Team Development

The host sponsor holds a weekly meeting with all club members as established in the club's articles of association. During these virtual meetings a guest speaker is invited to present a specific topic or service activity. This space can serve to enhance project and club members' knowledge and skills in project management and teamwork through guest speakers with expertise in these areas.

The Service Projects committee can also incorporate specific training sessions with interested members to address any areas of improvement identified in the monthly performance reports. International sponsors and local experts in construction and sanitation projects can share their past experiences and advise the project team on challenges they are facing or opportunities they can seize.

Outstanding participation and involvement from any of the project team members during project approval, planning or execution will be recognized during the weekly club meeting to ensure the entire membership is aware of their contribution to the project and community objectives. At the end of the project, these contributions are formally recognized during the hand-over ceremony on the school compound. An exceptional project team member may be inducted into the Paul Harris Society if the club contributes US$1,000 or more to TRF in their name.

Rotary online platforms and virtual spaces will be used to disseminate best practices, lessons learned, and project successes to clubs in Belize and abroad. Spotlighting the School Sanitation project's achievements during project fairs and in the Rotary Showcase recognizes the team's efforts and accomplishments throughout the wider organization.

4.6.5 Team Management

Conflict management and emotional intelligence are imperative to manage and lead the team successfully toward the expected outcomes. The RACI chart (Chart 16) and resource breakdown structure (RBS) (Figure 12) must serve as a reference of

the required resources for each project deliverable and the related responsibilities of each role. These tools must be revisited as often as necessary and updated to reflect the project's current performance and resource availability.

The Project Manager will be responsible for managing the team, addressing conflicts and miscommunications, and following the established problem-solving process and change control mechanism where needed. They will work closely with the Service Project Committee Chair to promptly replace any team member that is no longer able to continue in their role.

4.6.6 Control Resources

The project team will be in close communication with the school authorities to agree on and schedule dates for the use of classrooms for the training sessions, and to report and address any safety concerns in or around the construction site that negatively impact or represent a hazard to the school population.

The Technical Specialist and Project Manager will control the project resources through the work performance information included in the monthly progress reports and where necessary by creating change requests to incorporate corrective or preventative actions. The club Treasurer will be informed of the work performance to ensure payments are processed in a timely manner for the works contract and printing of BCC material.

4.7 Communications Management Plan

The broad group of project stakeholders for the School Sanitation Project make this communications management plan necessary. As described in previous sections, stakeholders include local and international Rotary clubs, technical support, contractors, government counterparts, school authorities, staff and administration, students, parents, and community members. Section 4.10 is dedicated to the Stakeholder Engagement Plan, while this section focuses on how project communication will be managed within the project team and with all project stakeholders.

The communication management plan consists of three processes: planning, managing, and monitoring. The combination of these will address specific stakeholder communication needs and interests. Successful communication management will facilitate prompt approvals, decision-making, problem-solving, and transparency throughout the project phases and decrease and prevent delays and misunderstandings in project performance. Effective and timely communication with stakeholders will significantly increase their acceptance and ownership of the final project deliverables.

4.7.1 Plan Communications Management

Communication management planning delivers the communications strategy which serves to identify the stakeholder communication requirements, methods, technologies, frequency, responsible, escalation process and resource allocation. Chart 18 defines the stakeholder communication interests and corresponding strategies to be implemented by the project team with the support and close collaboration of project stakeholders.

Chart 18

School Sanitation Project Stakeholder Strategies

Stakeholder	Interests	Strategy
International sponsor	Stay informed of project performance to ensure sustainable and lasting response to community needs and compliance with organizational goals. Evidence of transparency in use of global funds. Visibility of funding source at project site. Dissemination of project achievements.	Provide monthly project progress report. Provide final project report. Place signage identifying project sponsors and project name at entrance of school compound. Share project best practices at project fairs and on Rotary online platforms.
Host Sponsor	Ensure sustainability of project deliverables through beneficiary ownership. Timely support, approvals, and resource allocation from international sponsors. Timely support and availability of government partners. Successful completion of all project deliverables and goals. Visibility and awareness of project success within the Rotary network and in the community.	Consult and engage the beneficiaries bi-weekly. Meet with international sponsors monthly to report progress and challenges. Meet with and engage government partners in BCC and training activities. Weekly team meetings to monitor and control project activities. Share best practices at project fairs, on Rotary website, and during PTA meetings.
School Authorities	Infrastructure responds to school population needs. Safety of school population during construction.	Conduct needs assessment. Conduct walk-throughs with school authorities to ensure safety of construction site.

Stakeholder	Interests	Strategy
	Changed behavior in students, teachers, and parents Successful completion of all project deliverables and goals within or ahead of schedule. Adequate hand-over and training in maintenance of new infrastructure.	Meet biweekly or monthly to share project advances. Engage in BCC activities. Coordinate data collection by teachers for baseline and final evaluation. Train teachers, authorities and administration staff on operation and maintenance of sanitation facilities.
Parent Teacher Association	Safety of school population during construction. Safe and reliable access to sanitation facilities for students. Changed behavior in students, teachers and parents regarding hygiene and sanitation practices. Sustainability of deliverables.	Inform about safety measures during construction and of completed infrastructure. Engage in BCC activities and share information on WASH good practices. Train on importance of proper maintenance and operation of sanitation facilities.
Students	Safe and reliable access to sanitation facilities. Improved behavior toward hygiene and sanitation related issues. (Girls are not bullied when menstruating.)	Aim BCC activities and messages at students based on their own reality and available resources. Teach about the benefits of proper maintenance and operation of bathrooms.
Ministry of Education	Implementation of hygiene and sanitation curriculum. Improved teacher awareness and behavior on these topics. Increase in school attendance and improved academic performance.	Engage in and consult on BCC activities. Support preparation and logistics of MOE teacher trainings. Inform about project impact on academic performance.

Stakeholder	Interests	Strategy
Ministry of Health	Safe and reliable access to sanitation facilities. Improved overall cleanliness of campus and decrease of water-borne diseases. Improved awareness and behavior toward hygiene and sanitation related issues.	Inform of sanitation facility's requirements and acceptance criteria. Conduct walk-through of completed facilities. Invite to BCC trainings as observers. Inform about project impact on student health and improved WASH practices.
Contractor	Timely procurement process. Timely payments. Agreed change control process. Quality requirements are detailed. Inspection visits are mutually agreed and scheduled.	Prepare bidding package. Convene evaluation meeting. Coach evaluation committee members on procurement process to ensure availability and timely responses. Ensure change requests are reviewed and addressed promptly. Establish inspection visit schedule. Inform treasurer of upcoming payments.
Community members	Safe and reliable access to sanitation facilities on school campus for students. Awareness of sanitation and hygiene best practices.	Inform about project achievements. Disseminate WASH best practices through posters and flyers.

Note: Prepared by author.

4.7.2 Communications Management

The Communications Matrix included in Chart 19 describes how the strategies presented in Section 4.7.1 will be implemented and managed by the School Sanitation project team for each project stakeholder. The specific actions for effective project communication comprise the three communication methods.

The project's sustainability relies on active stakeholder engagement; thus, interactive communication includes site visits, meetings, trainings, phone calls, WhatsApp groups, presentations, and project fairs. Push communication which will distribute project and WASH information includes reports, emails, signs, flyers, pamphlets, and infographics. Pull communication will be limited to information uploaded to the Rotary website or, if they so choose, to partners' websites.

Chart 19

School Sanitation Project Communication Matrix

Communication Type	Audience	Description/ Purpose	Frequency	Owner	Channel
Reports	Host sponsors	Present project performance updates	Monthly	Project Team	Formal document
Reports	International Sponsors	Results of Baseline survey	Once	Project Team	Formal document
Reports	All Project stakeholders	Results of final evaluation	Once	Project Team	Formal document
Signage	School population, community members	Visibility of project sponsors	Once	Project Team	Sign
International meetings and events	International sponsors	Share best practices and project achievements	As needed	Host sponsor	Meetings, project fair, Rotary website

Communication Type	Audience	Description/ Purpose	Frequency	Owner	Channel
Local Meetings	Government partners	Prepare BCC activities	Weekly	Project Team	Hybrid meetings
Local Meetings	Government partners, school authorities	Prepare training logistics	Weekly	Project Team	Hybrid meetings
Local Meetings	Host Sponsor, Project team	Plan, monitor and control project activities	Weekly	Project Team	Virtual meetings
Local Meetings	School authorities, and PTA	Present project and its safety measures	Once	Project Team	Hybrid meetings
Local Meetings	School authorities, and PTA	Present project status updates	Bi-monthly	Project Team	Virtual meetings
Local Meetings	International sponsors	Present project status and challenges	Monthly	Project Team	Virtual meetings
Local Meetings	Host Sponsor, Project team	Plan, monitor and control project activities.	Weekly	Project Team	Virtual meetings, Formal document
Local Meetings	Host Sponsor, Project team	Review and address change requests	As needed	Project Team	Virtual meetings, Formal document
Presentations	Host Sponsor	Present project status updates to host club	As needed	Project Team	Virtual meetings
Presentations	All Project Stakeholders	Inauguration and hand-over	Once	Project Sponsors	In-person event
Visits	Project Team	Construction site Inspection	Monthly	Project Team	In-person site visit

Communication Type	Audience	Description/ Purpose	Frequency	Owner	Channel
Visits	School Authorities	Walk-through to show project site safety measures	Once	Project Team	In-person site visit
Visits	Project Stakeholders	Walk-through of completed facilities	Once	Project Team	In-person site visit
Trainings	School Authorities	Prepare data collection exercise	Once	Project Team	Virtual training
Trainings	School authorities and PTA	Prepare maintenance plan	Once	Project Team	In-person training
Trainings	PTA	BCC on WASH good practices	Once	MOE	Hybrid session
Trainings	Students	BCC on WASH good practices	Once	MOE	In-person training
Trainings	Procurement Evaluation committee	Coach on procurement process	As needed	Project Sponsors	Virtual meetings
Public Announcements	Local Contractors	Invitation to bid	Once	Project Team	Mass emails, calls
External communication	School population, community members	Disseminate WASH best practices	Once	Project Team	Posters, flyers, infographics
Internal Communication	Project Team	Regular project communication	Daily	Project Team	Emails, calls, WhatsApp group

Note: Prepared by author.

4.7.3 Communications Monitoring

The Project Manager is responsible for the adequate and efficient monitoring of the project's communications. Miscommunication and lack of stakeholder engagement may have a significant impact on the project scope, schedule, cost, and quality as will be discussed in Section 4.8 in the risk management plan. Chart 20 is the communications escalation process to be followed based on three levels of potential communication issues.

This communication management plan incorporates stakeholder interests and communication needs based on the circumstances and information available at the start of the project. Changes during project execution must follow the established change control process to update this plan and if pertinent the stakeholder engagement plan in Section 4.10.

Chart 20

School Sanitation Project Communications Escalation Matrix

Priority	Definition	Decision Authority	Resolution Timeframe	Triggers
Critical	Major impact to project baselines; if not addressed immediately project sponsors' reputation will be damaged.	Board of Host Sponsor	24 hours	Credible physical or material threats or acts of violence near or at project sites. Public protests or boycotts.
Major	High impact to project schedule or cost if not addressed promptly; high reputational risk for project sponsors.	Service Project Committee Chair	2 days	Accusations of misuse of funds. Rumors on social media or in the community about the quality of project facilities. Theft or damage to project infrastructure or resources.
High	Medium impact to project schedule or cost	Project Manager	2-4 business days	Disgruntled project staff. Disgruntled project beneficiaries. Contractor threatens to abandon contract or sue. Stakeholders provide late and poor feedback on deliverables.

Note: Prepared by author.

4.8 Risk Management Plan

One critical success factor in the School Sanitation Project is adequate and timely risk management comprised of planning and identifying risks, performing a qualitative risk analysis, and planning, implementing, and monitoring risk responses. This section describes how the project team is to implement each of these processes. The expected result is the mitigation or elimination, where possible, of negative impacts to the project and the capitalization of opportunities that keep the project on target to deliver the intended impact.

This risk management plan must be reviewed on a regular basis by the project team and key stakeholders to ensure the assumptions and constraints initially identified are accurate and updated promptly based on evolving circumstances that may affect project scope, cost, schedule, and quality.

4.8.1 Plan Risk Management

Sources of project risks may be numerous and may impact various aspects of the organization, its partners, and the project itself. Consequently, risk management must be prioritized throughout the project lifecycle, beginning with project planning. Risk management planning begins with the creation of the risk breakdown structure (RBS). This is the reference tool that the project team will consult and update to identify project risks. The RBS, represented in Chart 21, decomposes the potential sources of project risk into three levels. This tool was prepared specifically for the School Sanitation Project as the host sponsor does not have a customized RBS for its projects.

Chart 21

School Sanitation Project Risk Breakdown Structure

Risk Level 0	RBS Level 1	RBS Level 2	RBS Level 3
0.0 All Sources of Project Risks	1.0 External Environment	1.1 Natural	1.1.1 Natural Disasters
			1.1.2 Weather Conditions
		1.2 Social	1.2.1 Reputational and loss of goodwill
			1.2.2 Gender perspective
		1.3 Economic	1.3.1 Prices for goods
			1.3.2 Offer from local suppliers
		1.4 Political	1.4.1 Changes in government priorities
		1.5 Legal	1.5.1 Building Permits
			1.5.2 Safety and Health standards
	2.0 Internal Environment	2.1 Organizational Structure	2.1.1 Responsibilities and lines of authority
			2.1.2 Reporting
			2.1.3 Organizational Culture
		2.2 Internal Processes	2.2.1 Planning and monitoring
			2.2.2 Quality management
			2.2.3 Accounting and Reporting
		2.3 Human Resources	2.3.1 Team Skills and Experience
			2.3.2 Workload

Risk Level 0	RBS Level 1	RBS Level 2	RBS Level 3
0. All Sources of Project Risks	3.0 Project Management		2.3.3 Communication
		2.4 Integrity	2.4.1 Conflict of interest
			2.4.2 Misuse/waste of resources
		3.1 Sustainability	3.1.1 Beneficiary attitude to change
			3.1.2 Operation and Maintenance
		3.2 Governance	3.2.1 Decision-making mechanism
			3.2.2 Inter-institutional coordination
			3.2.3 Change control mechanism
		3.3 Technical	3.3.1 Needs assessment
			3.3.2 Measuring results and impact
		3.4 Planning	3.4.1 Schedule estimation
			3.4.2 Cost estimation
			3.4.3 Work package dependencies
			3.4.4 Contingencies
		3.5 Environmental and social	3.5.1 Safety measures
			3.5.2 Pollution

Note: Prepared by author.

Chart 22

School Sanitation Project Risk Register

RBS Code	Cause	Risk	Consequence	Probability	Impact	PxI	Trigger	Owner	Strategy	Cost (USD)
1.1.2	Heavy rain during construction	Construction site is flooded; equipment cannot operate in heavy rain	Delays in project schedule; increased cost to repair any damaged infrastructure	1	3	3	Natural event is predicted to impact the country at or near the project site.	Project Manager/ Technical Specialist	**Escalate**: Project Manager informs the Board of the Local Rotary Club for a decision to halt construction or take alternative actions.	N/A (Based on damage and delays)
1.2.1	Social taboo around menstraution ingrained in the school population	Female students are ashamed, bullied or cannot afford sanitary products.	Female students' attendance does not improve. Project does not achieve its goals.	3	3	9	Baseline study and community assessment identify causes of female students' regular absence.	School authorities	**Transfer:** School authorities will provide sanitary products to female students free of cost and enforce inclusive facilities and behavior.	$0
1.3.1	Price of fuel increases globally	Works cost estimations are exceeded due to increases in transportation and prices of goods.	Project budget is insufficient to complete planned activities.	4	4	16	Government announcement of an increase of over 20% to the cost of fuel.	Project Manager/ Project Sponsor	**Escalate**: Project Manager informs the Board of the Local Rotary Club for a decision to access contingency funds or to take alternative actions.	Up to $3,410

RBS Code	Cause	Risk	Consequence	Probability	Impact	PxI	Trigger	Owner	Strategy	Cost (USD)
1.4.1	Government prioritizes other health topics over WASH initiatives	MOE Technical Officers will no longer facilitate BCC trainings	BCC training deliverables cannot be met without facilitators.	2	3	6	During project planning, MOE participation in BCC trainings is not confirmed.	Communications Specialist	**Accept**: Project sponsors identify WASH specialists that can deliver the trainings.	$0
1.5.1	Contractor does not comply with safety standards.	A student is injured near or in construction site.	Family sues the school; reputational risk for project sponsors and school.	2	4	8	Non-compliance with safety standards is identified during inspection visit.	Technical Specialist/ Project Manager	**Transfer:** Construction will halt immediately until all safety standards are met. Contractor must possess civil liability insurance for bodily injury to third parties.	Cost of insurance
2.1.2	Project or final report are overdue	Project sponsors will not be awarded new grants.	Future projects will not be eligible for Rotary grants; reputational risk for sponsor.	2	3	6	Reminder email sent to host sponsor 2 months ahead of report deadline.	Project Manager /Project Services Chair	**Avoid:** Project Services Chair and Project Manager will establish a timeline to complete and submit report ahead of deadline.	$0
2.2.2	Contractor does not comply with quality standards.	Deliverables are of poor quality and will not have the expected long-term effect.	Potential safety hazard; formal complaint from beneficiaries; project's sustainability is jeopardized.	2	4	8	Acceptance criteria is not met during inspection visit.	Technical Specialist/ Project Manager	**Mitigate:** Technical Specialist will prepare supervision schedule to monitor construction quality and progress at key phases and request timely adjustments, if necessary.	$0

RBS Code	Cause	Risk	Consequence	Probability	Impact	PxI	Trigger	Owner	Strategy	Cost (USD)
2.3.2	Project team members leave the club or are unavailable for entire project.	One or more of the project team roles is vacant.	Workload assigned to the role (s) is unfulfilled causing delays.	3	2	6	Team member submits letter of resignation from the project team or from the club entirely.	Project Manager	**Accept**: Project manager and club board to delegate pending workload and identify Rotarian to fill the vacant role.	$0
3.1.1	Limited support and participation from parents in behavior change activities	Behavior change is solely reinforced at school by staff and authorities	Students' behavior change is limited; project targets are not met; Rotary's reputation is at risk	2	3	6	Low parent and PTA turnout to initial project activities.	Communications Specialist/ Project Services Chair	**Mitigate**: Interview parents to identify knowledge, attitude, and practices; include findings into BCC strategy for active engagement.	$0
3.2.2	Active collaboration with MOH WASH multisectoral group	**Opportunity:** Strengthen and streamline WASH inter-institutional coordination	Share best practices and lessons learned to reduce costs and times in future projects	4	3	12	Identification of project stakeholders during project initiation.	Project Manager/ Project Services Chair	**Share:** WASH stakeholder collaboration optimizes resources and success of WASH SDG targets	N/A
3.3.1	Community needs assessment provides holistic view of broader needs	**Opportunity:** Broader needs align with Rotary's areas of focus	Future Rotary grants address literacy, education, or environment needs	2	3	6	Community assessment identifies needs outside project scope, but in areas of focus.	Project Manager	**Escalate:** Findings are escalated to the Service Projects Committee for consideration for future projects.	$0

Note: Prepared by Author.

4.8.2 Risk Identification

Based on the risk categories in the RBS (Chart 21) the project team and project stakeholders identify individual and overall project risks. The identification process includes brainstorming, interviews, and analyzing project assumptions and constraints during meetings to produce the project's risk register (Chart 22). The first four columns identify the risk, its related RBS code, its cause, and consequence. Risks may be negative (threats) or positive (opportunities). The risk probability and impact levels applied in columns 5, 6, and 7 are defined in Section 4.8.3 and the risk responses included in the final four columns are elaborated in Section 4.8.7

4.8.3 Qualitative Risk Analysis

The project manager, project team, and stakeholders prioritize the project risks by conducting a qualitative risk analysis based on their probability of occurring and their potential impact on the project processes and objectives. Chart 23 and Chart 24 describe the probability and impact levels for the School Sanitation project that will guide the project team when rating each risk in the risk register.

Chart 23

Probability Scale for School Sanitation Project Risks

Level	Likelihood	Probability Description
1	Rare	The event may only occur in exceptional circumstances.
2	Unlikely	The event could occur at some time
3	Possible	The event might (or should) occur at some time
4	Likely	The event will probably occur in most circumstances
5	Almost certain	The event is expected to occur in most circumstances

Note: Prepared by Author

Chart 24

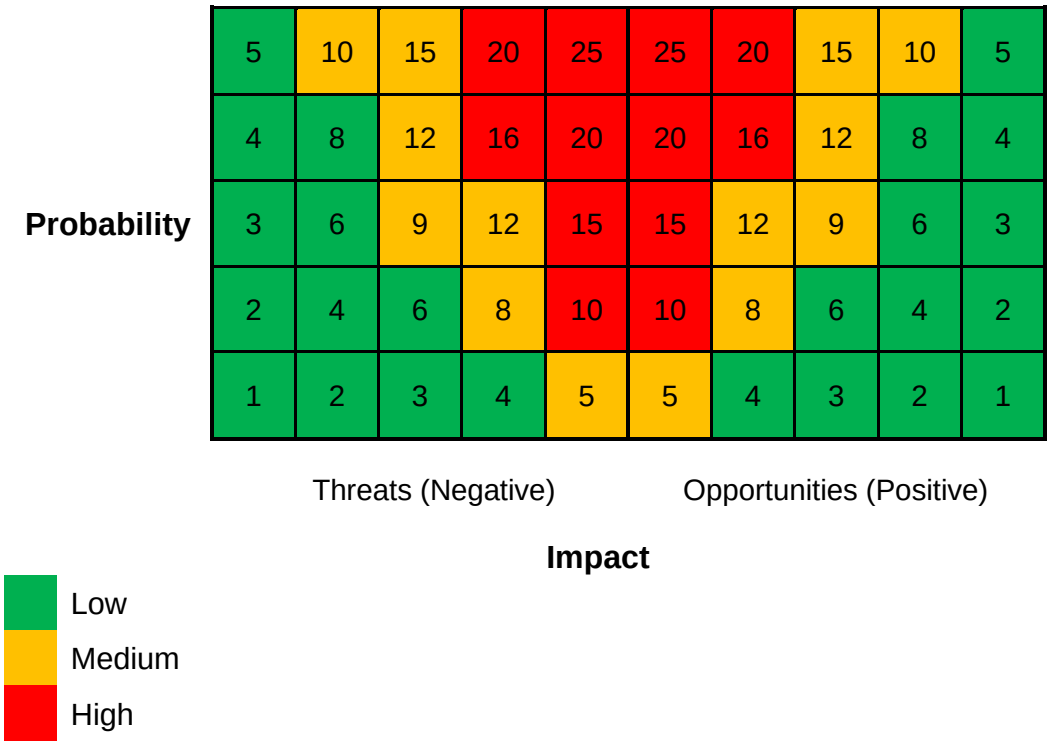
Impact Scale for School Sanitation Project Risks

Level	Scale	Cost Increase
1	Insignificant	Less than 5%
2	Minor	5.1 % -10%
3	Moderate	10.1%-20%
4	Major	20.1%-40%
5	Catastrophic	More than 40.1%

Note: Prepared by Author

Chart 25

Probability and Impact Matrix for School Sanitation Project



Note: Prepared by Author.

The probability and impact matrix in Chart 25 determines which of the three priority groups a risk can be classified under based on the combination of its likelihood and impact on project processes and objectives. Each color indicates a different level or degree of risk, and its value is determined by multiplying the corresponding levels of probability and risk along the x and y axis.

4.8.4 Quantitative Risk Analysis

Given the critical impact of risks to the success or failure of the project, the risk management process consists of seven processes, six of which are detailed in this risk management plan. Considering the size and non-complex nature of the School Sanitation Project, a quantitative risk analysis is outside the scope of this management plan.

4.8.5 Risk Response Planning

The final four columns of the risk register in Chart 22 (strategy, trigger, owner, and cost) comprise the risk responses to address individual and overall project risks. The responses are developed and updated by the project team throughout the project lifecycle. There are five strategies that may be applied for responding to threats and opportunities:

- Escalate – when the threat or opportunity exceeds either or both the project scope and the project manager's authority; the appropriate owner (Project Service Committee Chair or Host Sponsor Board) manages the threat or opportunity at the program level.
- Avoid/Exploit – the response either eliminates the threat or it exploits the opportunity; the risk owner avoids the negative impact of the former or capitalizes on the positive impact of the latter.
- Transfer/Share – when a threat or opportunity exceeds the project and/or organization's scope; it is transferred (when negative) or shared (when positive) with a partner; examples of the former include insurance, guarantees, etc. and of the latter include local or international partnerships.
- Mitigate/Enhance – the response reduces the probability or impact of a threat or increases the probability and/or impact of an opportunity.

- Accept – when the threat or opportunity is accepted either because the risk level is low or a response is not cost effective; the contingency reserve included in the project cost baseline (Chart 12) is an example of this strategy.

Any required changes to project baselines or plans will follow the established change control process to update the project management plans and baselines accordingly.

4.8.6 Risk Response Implementation

The Project Manager must ensure that the risk response plans are implemented in a timely, efficient, and effective manner to obtain the desired project impact. Expert judgement and influencing can be used to this end. Local and international experts can be consulted to provide their recommendations for improving the planned risk responses. Risk owners outside the project team and host sponsor organization can be reminded and encouraged by the Project Manager or the Monitoring and Evaluation Specialist to take the necessary actions within the agreed timeframes.

Changes to project baselines or plans will follow the established change control process, by submitting a change request, to update the project management plans, project documents, and baselines accordingly.

4.8.7 Monitor Risks

Risk review meetings will be held at least once a month or more frequently based on the work performance information included in the monthly progress reports. Project assumptions and constraints must be revised during these meetings and at least twice a month during project team meetings to identify risk response triggers and any required changes to this risk management plan, the risk register, the RBS, and other project management plans.

Changes to risk responses and the inclusion of new or updated risks which impact project baselines or documents and require additional resources or escalation for decision-making must be submitted as change requests to the Project Manager and follow the established change control process.

4.9 Procurement Management Plan

The School Sanitation project has an unusually low number of procurement processes required to achieve the project objectives. As detailed in the resource management plan in Section 4.6, the voluntary nature of Rotary, the sponsor organization, reduces a significant number of costs as well as purchases and contracting of external resources and services.

The scope of the project includes only two activities that require and will be included in this procurement management plan: the works contract for the construction of the sanitation facilities and the hiring of printing services for the behavior change communication material. The procurement management plan consists of three processes: planning, conducting, and controlling procurements.

4.9.1 Plan Procurement Management

The Project Manager is responsible for the oversight of the School Sanitation project procurement processes. The Technical Specialist will prepare contractor specifications, bidding documents, and is responsible for contract management of the sanitation facility works. The Communications Specialist will manage the process for the printing of the BCC material. A procurement committee composed of the Service Project Committee Chair, 2 international sponsors with expertise in construction and chaired by the Project Manager will evaluate bids, award the works contract, approve the purchase order for printing of BCC material, and approve contract variations. Costs of office supplies (USD 600.00) related to final reports and trainings will be paid from petty cash and are not included in this process.

As Rotary does not have an organizational procurement policy, the United Nations Procurement Manual (UN Procurement Division, 2020) will serve as the guiding policy, where applicable, to the project's procurement processes. The School Sanitation project procurement plan in Chart 26 details the two processes to be implemented.

Chart 26

School Sanitation Project Procurement Plan

WBS Code	Activity	Procurement Method	Contract Type	Procurement Document	Statement of Work	Estimated Amount (USD)	Launch Process	Contract Signature	Contract Close
WORKS									
1.2	Construction of Sanitation Facilities	National Competitive Bidding	Firm-fixed price	Request for Proposal	Yes	$66,230	Jul 15 2022	Sep 8 2022	Jan 25 2023
NON-CONSULTING SERVICES									
1.3.3	Printing of BCC material	Shopping	Unit price	Request for Quotation	No	$1,200	Jan 26 2023	Jan 31 2023	Feb 8 2023

Note: Prepared by Author.

Constraints that may negatively impact the procurement activities include:

- Supply chain and import tariffs limit availability and variety of materials causing delays, cost overruns, or selection of alternatives.
- Limited stakeholder knowledge about procurement methods and processes.

Assumptions made when preparing this procurement management plan include:

- Availability and competence of contractors within the estimated cost.
- Availability and expertise of international sponsors to guide procurement committee's activities.
- Schedule for procurement processes is realistic and there is no need to relaunch process.
- At least three contractors submit their bid before the deadline.

Potential risks that may negatively impact the procurement process are included in Chart 27 along with the proposed response.

Chart 27

School Sanitation Project Procurement Risks

Risk	Probability	Impact	Response Strategy
Submitted bids do not meet minimum qualifications.	Low	High	Mitigate: Advertising channels are aimed at competent contractors.
Insufficient bids are received	Medium	High	Mitigate: Project Team advertises bidding process in at least 3 websites (chambers of commerce, professional associations, etc.).
Works cost estimations are exceeded due to increases in transportation and prices of goods.	Medium	High	Escalate: Project Manager informs the Board of the Local Rotary Club for a decision to access contingency funds or to take alternative actions.

Risk	Probability	Impact	Response Strategy
Deliverables are of poor quality and will not have the expected impact.	Low	High	Mitigate: Technical Specialist will prepare supervision schedule to monitor construction quality and progress at key phases and request timely adjustments.
A student is injured near or in construction site.	Low	High	Transfer: Construction will be halted immediately until all safety standards are met. Contractor must possess civil liability insurance for bodily injury to third parties.

Note: Prepared by Author.

4.9.2 Conduct Procurements

The procurement process for the printing of BCC material consists of 6 steps: 1) prepare request for quotation (RFQ), 2) disseminate RFQ, 3) evaluate quotations, 4) select best quotation, 5) approve purchase order, and 6) approve final product. The communications specialist is responsible for steps 1 and 2 and the procurement committee the remaining steps. The Club Treasurer is responsible for preparing and finalizing the purchase order and delivery of the product.

The procurement strategy for the construction of sanitation facilities includes the following elements:

- The design-build delivery method to consolidate the construction into a single procurement process and a single contract.
- The fixed price (lump sum) contract payment type.
- The sequence of the procurement process consists of 6 steps: 1) prepare tender documents, 2) advertise bidding opportunity, 3) evaluate and rank bids, 4) award contract, 5) manage contract, 6) approve final deliverables.

The Project Manager will convene the procurement committee for an evaluation meeting once the period for submission of bids has closed. The evaluation criteria that guide the procurement committee to grade and rank the bids is the following:

Eligibility Criteria

- Legal entity
- Financial stability (annual statements)
- Technical and professional capacity
- References
- Relevant experience on projects of similar nature and complexity

Technical Criteria

- Qualifications, availability, and competence of key staff
- Assets and equipment
- Work plan and methodology
- Financial Resources

Following the committee's deliberation and selection of the top three ranked contractors, the Project Manager will contact the top ranked contractor to attend a negotiation meeting. The Project Manager, Technical Specialist, at least one international sponsor (with expertise in construction and procurement) and the Service Project Chair must be present during negotiations.

If negotiations are successful and all parties agree to the contract terms, these will be incorporated into the final contract and approved by the procurement committee before signature. If negotiations fail, the Project Manager will convene the second-ranked contractor for another round of negotiations.

4.9.3 Control Procurements

The Technical Specialist manages the relationship with the contractor and monitors their performance through the following actions:

- Conducts inspection visits to the construction site at key points as detailed in the milestones schedule (Chart 10).

- Prepares monthly progress reports including work performance information and recommends adjustments, as needed.
- Prepares change requests for the Project Manager's concurrence per the established change control mechanism.
- Recommending approval and payment of completed deliverables.

The Project Manager and Monitoring and Evaluation Specialist apply earned value analysis to determine if there are any deviations to the cost or schedule baselines. The earned value methodology is described in Section 4.4.4 and includes an example of the potential impact that delays in the procurement process would represent for the project schedule and cost.

4.10 Stakeholder Engagement Plan

Rotary approves projects that can ensure a sustainable response to community needs. The School Sanitation project team cannot achieve this requirement without the active participation of all its stakeholders. This stakeholder engagement plan identifies and classifies the various groups of stakeholders, along with their interest in, and influence and power over the project; and determines how each group will be engaged during all project phases. The communications management plan presented in Section 4.7 provides critical inputs to this engagement plan.

The local Rotary Club (Host Sponsor) is responsible for the initiating, planning, executing, monitoring, controlling, and closing of the School Sanitation project. The role and participation of and expected impact on the remaining stakeholders are detailed in this stakeholder management plan.

4.10.1 Identify Stakeholders

As described in the scope management plan (Section 4.2) there are two principal project deliverables, sanitation facilities and behavior change communication, and two additional deliverables, management and evaluations. The latter will manage and measure the impact of the project. The main deliverables require significant input and participation from external stakeholders to be completed successfully and to secure ownership and sustainability of the final products.

The management and evaluations deliverables require consultation with key stakeholders at critical moments of the project lifecycle. The main responsibility of their related activities falls on the project's internal stakeholders. Their success or failure is entirely on the project team and requires collaboration with externals.

The project charter (Chart 6) and communications management plan (Section 4.7) introduce the initial list of project stakeholder groups and roles. The stakeholder register presented in Chart 28 expands on this list to identify individual stakeholders.

Chart 28

School Sanitation Project Stakeholder Register

ID	Stakeholder	Position	Role in Project	Type of Stakeholder	Type of Communication	Expectations	Influence	Impact
A	Elizabeth	Member	Project Manager	Internal	Meetings, emails, calls	Achieve project goals and impact	Medium	Low
B	James	Service Project Chair	Portfolio Manager	Internal	Meetings, emails, calls	Achieve project goals and impact	High	Low
C	Sanjay	Member	Technical Specialist	Internal	Meetings, emails, calls, reports	Construction complies with all standards	High	Medium
D	Alice	Public Relations Chair	Communications Specialist	Internal	Meetings, emails, calls	Project visibility, active engagement	Low	Low
E	Luis	Member	Monitoring and Evaluation Specialist	Internal	Meetings, emails, calls	Compliance with standards; project achieves targets	Low	Low
F	Melissa	Club Treasurer	Financial management	Internal	Meetings, emails, calls	Accounting and finance within budget	Low	Low
G	Olivia	Intl. sponsor Construction Expert	Procurement Committee	Internal	Meetings, emails, calls	Construction complies with all standards	High	High
H	Oscar	Intl. sponsor Construction Expert	Procurement Committee	Internal	Meetings, emails, calls	Construction complies with all standards	High	High

ID	Stakeholder	Position	Role in Project	Type of Stakeholder	Type of Communication	Expectations	Influence	Impact
I	Isabel	International sponsor	WASH Expert	Internal	Meetings, emails, calls	Achieve WASH targets	High	Medium
J	Local Club Board	Host Sponsor	Approval authority	Internal	Meetings, emails, calls	Timely and quality project within budget	High	High
K	School Authorities	Management and staff	Product Owner	External	Meetings, trainings, reports	Safe and sustainable facilities	Medium	High
L	Parent Teacher Association	-	Indirect beneficiaries	External	Meetings, trainings, reports	Safe and reliable facilities	Low	Medium
M	Students	-	Beneficiaries	External	Trainings	Safe and reliable facilities	Low	Low
N	Ministry of Health	Government Partner	Advisors	External	Meetings, trainings, reports	Improved WASH	Low	Medium
O	Ministry of Education	Government Partner	Trainers	External	Meetings, trainings, reports	Increased attendance	Medium	High
P	Construction Companies	-	Bidders, Contractor	External	Bidding documents, reports, site visits	Timely bidding process and payments	Low	High
Q	Community members	-	Indirect beneficiaries	External	Meetings	WASH awareness	Low	Low

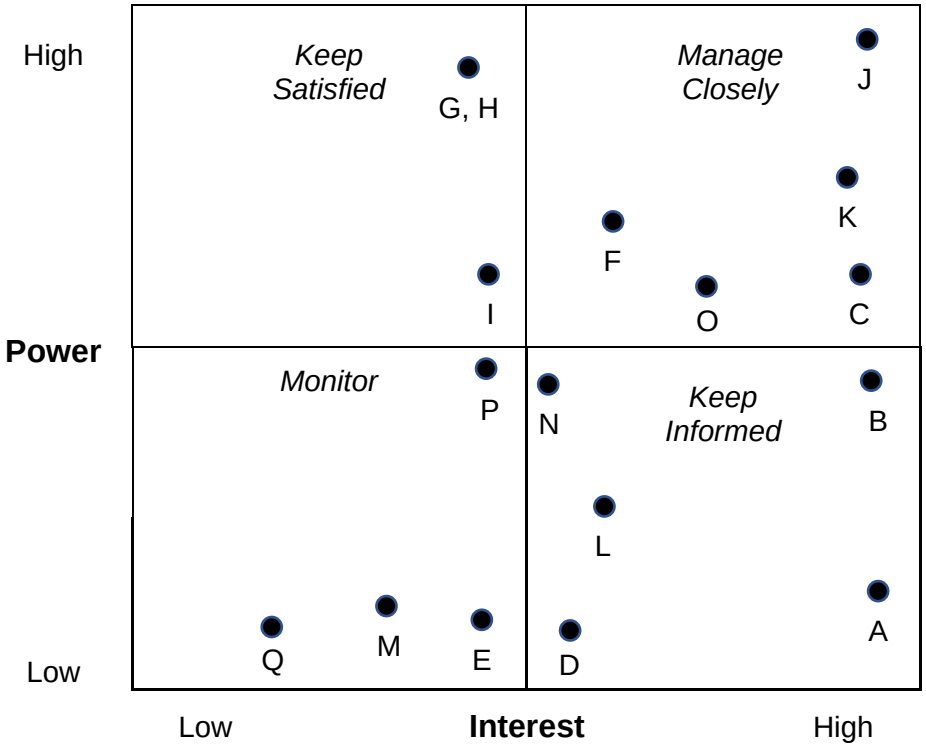
Note: Prepared by Author.

Stakeholder identification and engagement are iterative processes whose success relies on the continuous and effective communication with the project stakeholders based on their evolving needs, priorities, and availability. The Communications Specialist and Project Manager are responsible for driving these processes based on the levels of influence and impact identified in the stakeholder register (Chart 28) and power and interest plotted in the power/interest matrix (Figure 14). The definitions of these categories are defined as follows:

- Influence is the ability to influence the project outcomes.
- Impact is the ability to cause changes to the project's planning or execution.
- Interest is the level of concern about the project's outcomes.
- Power is the stakeholder's level of authority (PMI, 2017, p. 512).

Figure 14

School Sanitation Project Power/Interest Matrix



Note: Prepared by Author.

4.10.2 Plan Stakeholder Engagement

The analysis presented in the stakeholder register (Chart 28) and the categorization conducted in the power/interest matrix (Figure 14) inform the engagement and communication actions and strategies to be implemented by the Project Manager and Communications Specialist. Based on the quadrant which the stakeholder is in in the power/interest matrix, the project team will prepare and use the appropriate communication channels to address the engagement needs. To this end, the Stakeholder Strategies (Chart 18) and Communication Matrix (Chart 19) in the communication management plan must be revised and updated through the change control process as needed.

The stakeholder engagement assessment matrix in Chart 29 presents the current (C) and desired (D) engagement level of each stakeholder. This matrix must be reviewed and updated regularly to respond to changing stakeholder engagement needs. Required stakeholder action and response will vary throughout the project phases and depend on the activities underway. Each time stakeholder identification is conducted the level and frequency of stakeholder engagement will be reassessed and may require updates to the related planning tools included in the preceding sections.

Chart 29

School Sanitation Project Stakeholder Engagement Assessment Matrix

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Project Manager				C	D
Construction Expert	C			D	
WASH Expert			C	D	
Local Club Board				C	D
School Authorities			C	D	
Parent Teacher Association	C			D	
Students			C	D	
Ministry of Health			C	D	
Ministry of Education	C				D
Construction Companies	C				D
Community members	C		D		

Note: Prepared by Author.

4.10.3 Manage Stakeholder Engagement

The Communications Specialist will be the main point of contact with external stakeholders, except for the contractors who will be the responsibility of the Technical Specialist. The Project Manager will be the main contact for internal stakeholders. Communication and engagement items will be included in the weekly

team meeting to ensure a timely response to stakeholder complaints, feedback, or disengagement. Stakeholder issues raised during the meeting will be documented in the meeting minutes and their response time will be monitored in subsequent meetings.

Stakeholder satisfaction and ownership of the project outputs are critical to the project's success. Therefore, the Project Manager will provide monthly updates to the relevant stakeholders on the project progress and promptly escalate any issues that arise which can negatively impact the project performance or sustainability or represent a reputational risk for Rotary. The communication management plan will be a key management tool to support adequate stakeholder engagement.

4.10.4 Monitor Stakeholder Engagement

This stakeholder engagement plan will be reviewed at least once a month to monitor:

- New stakeholders
- Issues with existing stakeholders (resistance, unavailability, indifference, etc.)
- Changes to subsidiary management plans or project baselines that directly impact stakeholders and require new engagement strategies or timelines
- Gaps between the current versus the desired stakeholder engagement level
- Engagement channels and resources required for upcoming activities

Additional items may be added to this list based on the needs of the project and discussed during the weekly team meeting. If a matter is pressing a special meeting can be convened by the project team to discuss and agree on a solution or escalate for a formal decision by the project sponsors.

5 CONCLUSIONS

1. The project charter presents high-level information to secure project approval and includes general and specific objectives, purpose, deliverables, assumptions, constraints, preliminary risks, budget, milestones and dates, historical information, and project stakeholders. In subsequent project phases, approval from the designated authority allows changes in these preliminary items.

2. The scope management plan establishes what is and is not included in the project in close coordination with the project stakeholders to ensure sustainability and meaningful impact of project deliverables. Tools including the requirements traceability matrix, the project scope statement, the work breakdown structure (WBS), and WBS dictionary detail how to plan, define, validate, and control the project scope and how to collect requirements.

3. The schedule management plan lists the project activities; describes and illustrates their dependencies and duration; explains how the schedule will be controlled; and includes the milestone schedule. These tools serve to identify discrepancies between planned and actual project deadlines to prevent delays and ensure project completion within schedule.

4. The cost management plan has significant savings considering that the project team is entirely voluntary and that most project communication is virtual and does not require a budget for office or administrative expenses. Project budget and estimated costs are assigned to the largest deliverables. Contingency and management reserves are allocated to counter unforeseen changes in costs.

5. The quality standard for Rotary-funded projects is high and includes compliance with local and international standards listed in the quality management plan. Quality objectives, metrics, expected outcomes, frequency and owner determine the project’s quality baseline. The quality activities matrix

specifies requirements and activities to manage and control each project deliverable and the person responsible.

6. The resource management plan displays the project's internal resources in the organizational breakdown structure, the responsibility assignment matrix, and the resource breakdown structure. Resource acquisition is limited to assigning the team members, as they are all volunteers and do not require a hiring process. Team development and management, and project resource control are described in detail to ensure timely resource availability.

7. The communication strategy developed in the communication management plan responds to project stakeholder interests and needs. The communication matrix details how the strategy will be implemented and by whom and the escalation matrix was developed to support monitoring and management of the strategy.

8. The risk management plan introduces the risk breakdown structure and risk register to identify project risks, their impact and probability and the proposed strategy. The probability and impact scales and the resulting probability and impact matrix provide the project team with risk levels to conduct the qualitative risk analysis to implement or adjust the corresponding risk response plan. The quantitative risk analysis is outside the scope of the project.

9. Only two of the project deliverables require procurement in the School Sanitation project, therefore the procurement management plan is a compact plan. It determines the roles and responsibilities of the internal stakeholders, the procurement policy, method, contract type, procurement document, constraints, assumptions and risks related to the two procurement processes. The evaluation criteria and bidding process for selecting the contractor are detailed, along with actions to control project procurement.

10. The stakeholder engagement plan identifies and classifies all project stakeholders through the implementation of the stakeholder register and power/interest matrix. The stakeholder engagement assessment matrix presents the gap, if any, that the project team must close between the current and desired level of engagement. The plan also identifies the project team's responsibilities and necessary actions to manage and monitor effective stakeholder engagement.

6 RECOMMENDATIONS

1. The project team should update the subsidiary management plans and project documents as frequently as necessary once approval is granted through the change control process. Updates should be implemented at least monthly.

2. The scope statement template provided should be revised by the Project Manager and Portfolio Manager when preparing grant proposals for future projects to incorporate or adjust fields to align with Rotary grant requirements more closely.

3. The Project Manager should verify that the technical specialist and monitoring and evaluation specialist have access to and are knowledgeable in MS project to monitor and update the project scope, schedule, and cost baselines in a timely manner. While the recommended software is MS project, if the project team members or international sponsors use an alternative software with similar attributes, the Project Manager should ensure her team receives the necessary training to input and update project information.

4. The Club Treasurer should be informed promptly about any agreed or foreseeable changes in the payment amount or payment schedule for the contractor and the printing supplier. Similarly, if the funds allocated for evaluations and trainings are not used in full, these must be reallocated or returned to the sponsor following the relevant guidelines.

5. The Monitoring and Evaluation Specialist should closely monitor the compliance of all quality requirements to secure stakeholder trust and satisfaction in the project’s performance. Any deviations should be reported immediately and addressed promptly to ensure project targets are achieved.

6. During the weekly team meetings, the Project Manager should inquire about any challenges, changes or risks which the project team has identified that impact the

availability or quality of project resources and these should be addressed or escalated promptly to prevent delays or cost overruns.

7. The Communications Specialist should support the Project Manager with the weekly review of communication tools and any issues raised by the team members or stakeholders. Internal and external communication must be aligned to disseminate accurate and transparent messages to all project stakeholders. Reporting formats and channels should be updated to provide clear and objective updates and reports.

8. The Monitoring and Evaluation Specialist should support the Project Manager with the regular review of the risk register to confirm all project risks are included and to update the risk levels and risk response plans accordingly. They should also maintain close communication with each risk owner to ensure the preventative or corrective response is taken in a timely manner.

9. The Portfolio Manager should consider the implementation of a standard risk breakdown structure for the host sponsor to facilitate risk identification for future Rotary projects.

10. The lack of an internal procurement policy and formal procurement process should be addressed by the host sponsor for future projects. The Project Manager and Portfolio Manager should seek the support of international sponsors and experts in procurement to draft a procurement policy and process manual.

11. The Technical Specialist should initiate an internal register of pre-qualified contractors to serve as a reference for other projects that will require similar procurement processes for construction contractors.

12. The Communications Specialist should regularly verify that the stakeholder register and power/interest matrix are accurate and that changes are incorporated promptly. This verification should also include a review of the communications management plan, as these plans must always be aligned.

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8 APPENDICES

Appendix A

FGP Charter

PROJECT CHARTER	
Date	**Project Name:**
November 15, 2021	Project Management Plan for School Sanitation Project
Knowledge Areas / Processes	**Applicacion Area (Sector / Activity)**
Knowledge Areas: Project Integration Management Project Scope Management Project Schedule Management Project Cost Management Project Quality Managrement Project Resource Management Project Communications Management Project Risk Management Project Procurement Management Project Stakeholder Management **PM Process Groups:** Initiating Planning	Water, sanitation, and hygiene Construction
Start date	**Finish date**
November 15, 2021	June 7, 2022
Project Objectives (general and specific)	
General Objective: To develop a Project Management Plan, according to the standards of the Project Management Institute, to manage the construction of sanitation facilities in primary schools in Belize and implement the related health and hygiene education. **Specific Objectives:** 1. To develop a Project Charter to present the Final Graduation Project (FGP) for authorization and document the Project Manager's commitment to the project. 2. To create a sustainable scope management plan to establish the project deliverables and exclusions. 3. To prepare a schedule management plan to ensure completion of the project within a realistic and agreed timeframe. 4. To generate a cost management plan to ensure efficient use of project budget and the incorporation of all project costs. 5. To produce a quality management plan to define the quality standards for the sanitation facilities. 6. To prepare a resource management plan to ensure the required resources are available at the right time. 7. To develop a communications management plan to identify the project's communication strategy based on stakeholder needs.	

8. To produce a risk management plan to determine the project's risk strategy and risk identification approach.
9. To create a procurement management plan to identify the goods and services that must be acquired to achieve the project goals.
10. To generate a stakeholder engagement plan to identify the project stakeholders and define the approach to engage them effectively in project decisions and activities.

Project purpose or justification (merit and expected results)

Only a third of schools in Belize meet international standards for school sanitation facilities. The lack of adequate sanitation facilities and proper hygiene practices contribute to poor student attendance, lower school completion rates, and increased water-borne diseases. Female students stay home when they are menstruating. Schools with sanitation facilities rarely provide infrastructure that meets the needs of students with physical disabilities.

The School Sanitation Project will build toilet blocks with hand washing stations in schools in Belize. The construction includes toilets and urinals for boys; toilets for girls and an area that provides privacy when they are menstruating; and handicap accesible facilities. The project will meet World Health Organization (WHO) water, sanitation and hygiene standards for schools including safe drinking water, separate facilities for boys and girls, basic hygiene products (soap, toilet paper, menstrual products, trash cans), and hygiene education for students, staff and parents.

The Project Management Plan to be developed through the Final Graduation Project (FGP) will guide the School Sanitation Project during its planning process by establishing the guidelines and standards related to each knowledge area of the Project Management Body Of Knowledge (PMBOK) Guide (PMI, 2017). The Project Management Plan is intended to serve as the basis for the construction of sanitation facilities in schools in Belize, based on community needs, available funds and the sustainability plan in each school.

Description of Product or Service to be generated by the Project – Project final deliverables

The Final Graduation Project is expected to deliver the Project Management Plan for the School Sanitation Project. The plan will consist of the following ten deliverables, including nine subsidiary management plans, each aligned with one of the project's specific objectives:

1) Project Charter; 2) Scope Management Plan; 3) Schedule Management Plan; 4) Cost Management Plan; 5) Quality Management Plan; 6) Resource Management Plan; 7) Communications Management Plan; 8) Risk Management Plan; 9) Procurement Management Plan; and 10) Stakeholder Engagement Plan.

Assumptions

1. The Project Management Plan can be completed, reviewed and approved in four months.
2. The project inputs and information will be available when required and will not impede completion of the project deliverables.
3. The estimated cost of the Final Graduation Project is within the available budget.
4. Feedback throughout the FGP process is provided and can be addressed within the established deadlines.
5. Deliverables prepared during Graduation Seminar are accepted by tutor so original scope and time do not require significant changes.

Constraints

1. Internet connection is unreliable during rainy/hurricane season.
2. Limited availability of philologists in Belize.
3. Moodle platform is not user-friendly and course material can be difficult to find and access. Links frequently don't work. Platform is unaccesible sometimes.
4. Difficulties understanding project expectations, instructions and documentation based on possible language barriers, unclear and seemingly contradictory guidance and material.
5. Project Manager works full-time and the end of the year is a busy time requiring extra hours at work.

Preliminary risks

If the project topic is not accepted, editing of the topic and related deliverables will be necessary, negatively impacting the project schedule.
If COVID-19 restrictions and curfews become more stringent, it would limit interaction with project stakeholders, impacting schedule and resources.
If project manager, seminar facilitator or tutor have health/family emergency related to COVID-19, they may not be available for several days or weeks, severely impacting the project schedule and achievement of milestones.
If a severe weather event impacts Belize, the electricity and internet may be unavailable for several hours or days, potentially impacting timely submission of project deliverables within required deadlines.

Budget

The anticipated expenses for the FGP include the following:
1. Hiring philologist to review FGP
2. Printing and binding of FGP
3. Cost of shipping final document via DHL from Belize to Costa Rica.

As the length and weight of the final document is unknown, the exact budget cannot be estimated at this time.

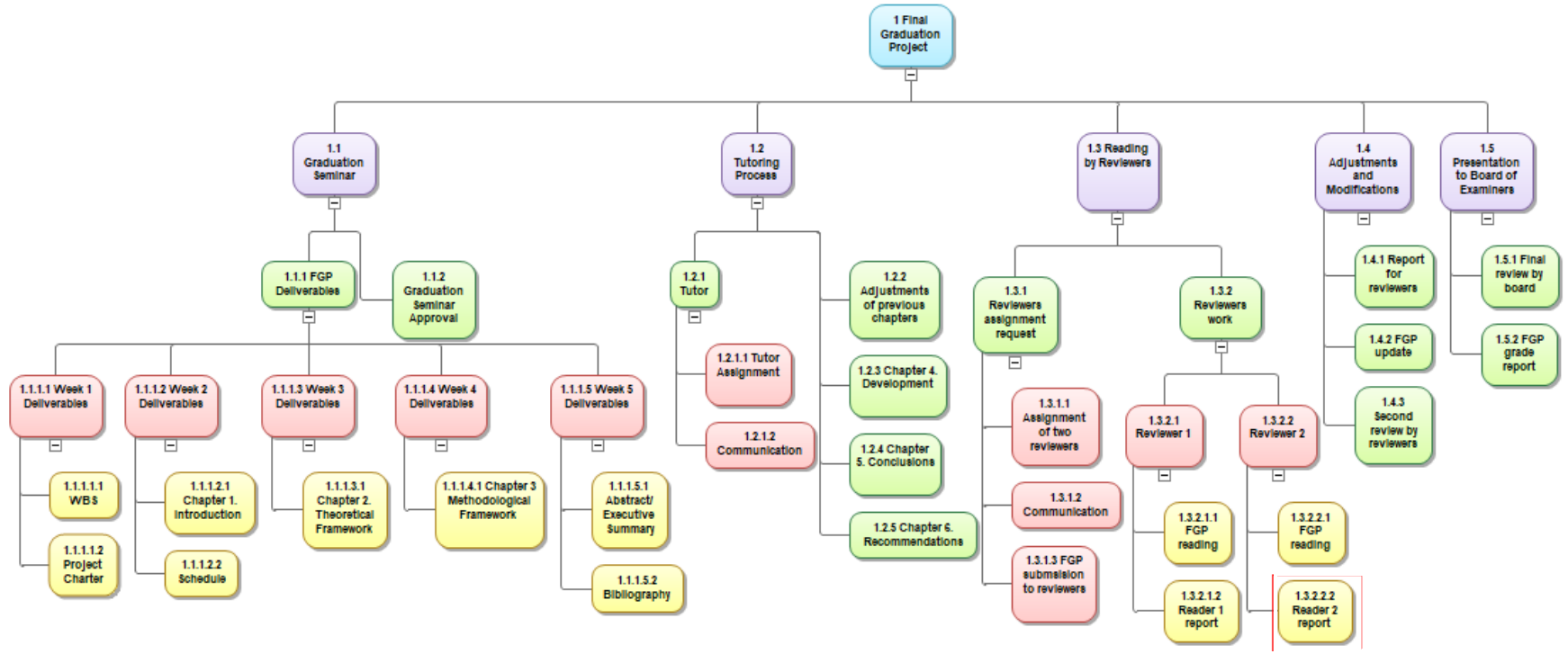
Milestones and dates

Milestone	Start date	End date
Graduation Seminar Start	November 8, 2021	November 8, 2021
Project Charter	November 8, 2021	November 14, 2021
WBS	November 8, 2021	November 14, 2021
Chapter I Introduction	November 15, 2021	November 21, 2021
FGP Schedule	November 15, 2021	November 21, 2021
Chapter II Theoretical framework	November 22, 2021	November 28, 2021
Chapter III Methodological framework	November 29, 2021	December 5, 2021
Abstract/Executive Summary	December 5, 2021	December 12, 2021
Bibliography	December 5, 2021	December 12, 2021
Graduation Seminar Finish	December 12, 2021	December 12, 2021
Graduation Seminar Approval	December 19, 2021	December 19, 2021
Tutor Approval	April 29, 2022	April 29, 2022
First Review Approval	May 13, 2022	May 13, 2022
Second Review Approval	May 27, 2022	May 27, 2022
Final Graduation Project End	June 7, 2022	June 7, 2022

Relevant historical information	
Adequate sanitation facilities in Belizean schools respond to the United Nations' Sustainable Development Goal (SDG) 6: Ensure availability and sustainable management of water and sanitation for all. While some progress has been made, two thirds of schools in Belize have yet to achieve this goal. Given the global and national commitment to achieving the SDGs, private, public, local and international sponsors have provided funding to build proper sanitation facilities in schools around the country. However, these efforts and resources have been isolated. Through the development of a Project Management Plan for the School Sanitation Project, the aim is to provide a project charter and subsidiary management plans that can be easily adopted by local organizations and schools to secure funding for their schools to benefit from the construction of sanitation facilities.	
Stakeholders	
Direct stakeholders: students, school administration, teachers, funding agencies/organizations; contractors **Indirect stakeholders:** parents, communities, Ministry of Education, Ministry of Health, Ministry of Economic Development	
Project Manager: Elizabeth Ayala	**Signature:** 
Authorized by: Carlos Brenes	**Signature:**

Appendix B

FGP WBS

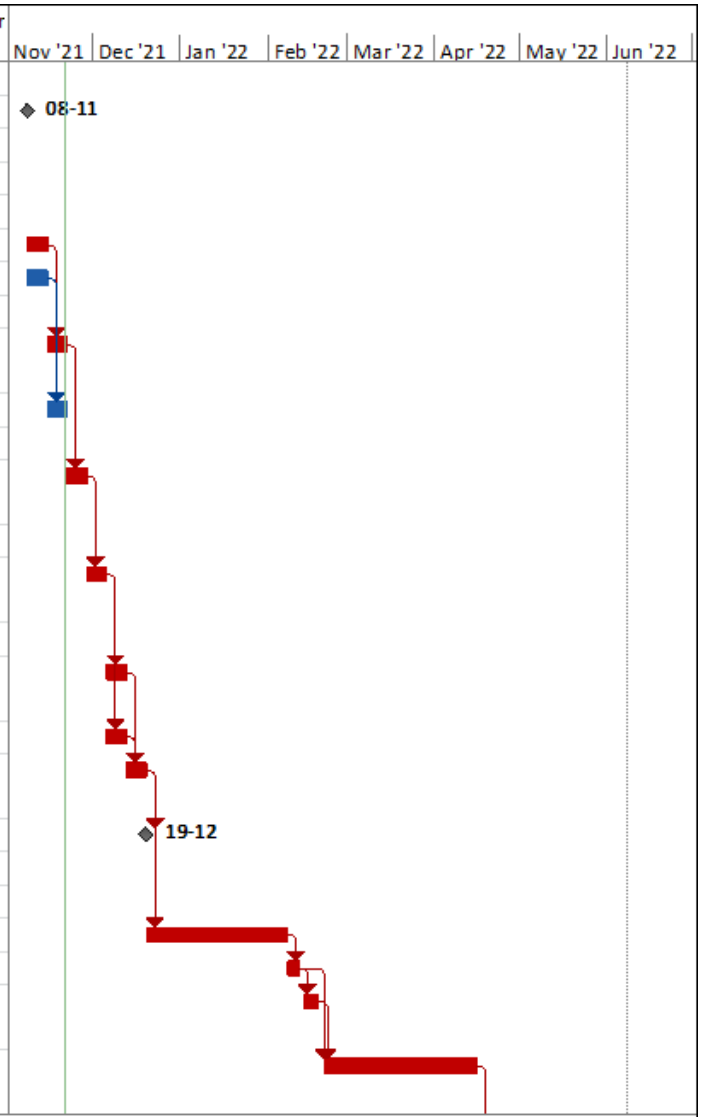


LEGEND

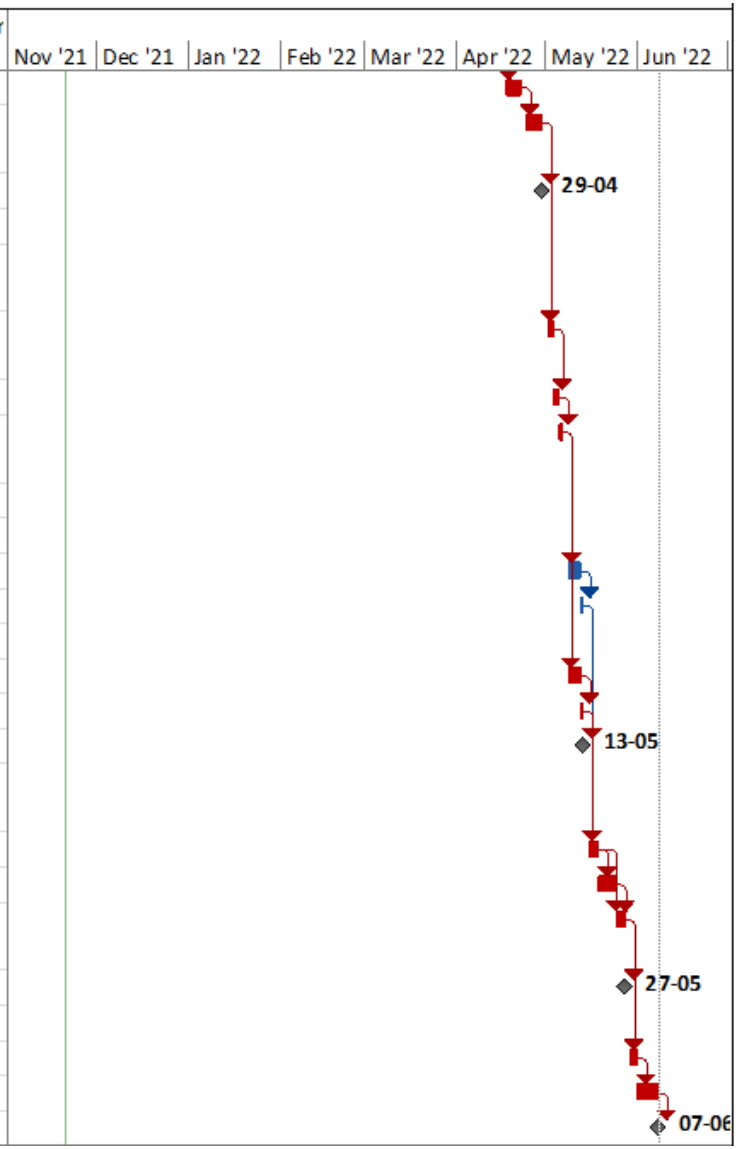
Appendix C

FGP Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessor
1		**1. Final Graduation Project**	**153 days**	**Mon 08-11-21**	**Tue 07-06-22**	
2		FGP Start	0 days	Mon 08-11-21	Mon 08-11-21	
3		**1.1 Graduation Seminar**	**31 days**	**Mon 08-11-21**	**Sun 19-12-21**	
4		**1.1.1 FGP Deliverables**	**26 days**	**Mon 08-11-21**	**Sun 12-12-21**	
5		**1.1.1.1 Week 1 Deliverables**	**5 days**	**Mon 08-11-21**	**Sun 14-11-21**	
6		1.1.1.1.1 Project Charter	5 days	Mon 08-11-21	Sun 14-11-21	
7		1.1.1.1.2 WBS	5 days	Mon 08-11-21	Sun 14-11-21	
8		**1.1.1.2 Week 2 Deliverables**	**6 days**	**Mon 15-11-21**	**Sun 21-11-21**	
9		1.1.1.2.1 Chapter 1. Introduction	6 days	Mon 15-11-21	Sun 21-11-21	6
10		1.1.1.2.2 Schedule	6 days	Mon 15-11-21	Sun 21-11-21	7
11		**1.1.1.3 Week 3 Deliverables**	**5 days**	**Mon 22-11-21**	**Sun 28-11-21**	
12		1.1.1.3.1 Chapter 2. Theoretical framework	5 days	Mon 22-11-21	Sun 28-11-21	9
13		**1.1.1.4 Week 4 Deliverables**	**5 days**	**Mon 29-11-21**	**Sun 05-12-21**	
14		1.1.1.4.1 Chapter III. Methodological	5 days	Mon 29-11-21	Sun 05-12-21	12
15		**1.1.1.5 Week 5 Deliverables**	**5 days**	**Mon 06-12-21**	**Sun 12-12-21**	
16		1.1.1.5.1 Abstract & Executive Summary	5 days	Mon 06-12-21	Sun 12-12-21	14
17		1.1.1.5.2 Bibliography	5 days	Mon 06-12-21	Sun 12-12-21	14
18		1.1.2 Graduation Seminar approval	5 days	Mon 13-12-21	Sun 19-12-21	16,17
19		FGP Seminar End	0 days	Sun 19-12-21	Sun 19-12-21	18
20		**1.2 Tutoring process**	**95 days**	**Mon 20-12-21**	**Fri 29-04-22**	
21		**1.2.1 Tutor**	**40 days**	**Mon 20-12-21**	**Fri 11-02-22**	
22		1.2.1.1 Tutor assigment	36 days	Mon 20-12-21	Mon 07-02-22	18
23		1.2.1.2 Communication	4 days	Tue 08-02-22	Fri 11-02-22	22
24		1.2.2 Adjustments of previous chapters (If needed)	5 days	Mon 14-02-22	Fri 18-02-22	23
25		1.2.3 Charter 4. Development (Results)	40 days	Mon 21-02-22	Fri 15-04-22	24,23



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessor
26		1.2.4 Chapter 5. Conclusions	5 days	Mon 18-04-22	Fri 22-04-22	25
27		1.2.5 Chapter 6. Recommendations	5 days	Mon 25-04-22	Fri 29-04-22	26
28		FGP Tutor approval	0 days	Fri 29-04-22	Fri 29-04-22	27
29		**1.3 Reading by reviewers**	**10 days**	**Mon 02-05-22**	**Fri 13-05-22**	
30		**1.3.1 Reviewers assigment request**	**5 days**	**Mon 02-05-22**	**Fri 06-05-22**	
31		1.3.1.1 Assigment of two reviewers	2 days	Mon 02-05-22	Tue 03-05-22	27
32		1.3.1.2 Communication	2 days	Wed 04-05-22	Thu 05-05-22	31
33		1.3.1.3 FGP submission to reviewers	1 day	Fri 06-05-22	Fri 06-05-22	32
34		**1.3.2 Reviewers work**	**5 days**	**Mon 09-05-22**	**Fri 13-05-22**	
35		**1.3.2.1 Reviewer 1**	**5 days**	**Mon 09-05-22**	**Fri 13-05-22**	
36		1.3.2.1.1 FGP reading	4 days	Mon 09-05-22	Thu 12-05-22	33
37		1.3.2.1.2 Reader 1 report	1 day	Fri 13-05-22	Fri 13-05-22	36
38		**1.3.2.2 Reviewer 2**	**5 days**	**Mon 09-05-22**	**Fri 13-05-22**	
39		1.3.2.2.1 FGP reading	4 days	Mon 09-05-22	Thu 12-05-22	33
40		1.3.2.2.2 Reader 2 report	1 day	Fri 13-05-22	Fri 13-05-22	39
41		FGP First review approval	0 days	Fri 13-05-22	Fri 13-05-22	37,40
42		**1.4 Adjustments and Modifications**	**10 days**	**Mon 16-05-22**	**Fri 27-05-22**	
43		1.4.1 Report for reviewers	3 days	Mon 16-05-22	Wed 18-05-22	40
44		1.4.2 FGP update	4 days	Thu 19-05-22	Tue 24-05-22	43
45		1.4.3 Second review by reviewers	3 days	Wed 25-05-22	Fri 27-05-22	43,44
46		FGP Second Review approval	0 days	Fri 27-05-22	Fri 27-05-22	45
47		**1.5 Presentation to Board of Exam**	**7 days**	**Mon 30-05-22**	**Tue 07-06-22**	
48		1.5.1 Final review by Board	2 days	Mon 30-05-22	Tue 31-05-22	45
49		1.5.2 FGP grade report	5 days	Wed 01-06-22	Tue 07-06-22	48
50		FGP End	0 days	Tue 07-06-22	Tue 07-06-22	49



Appendix D

Earned Value Methodology Calculation Template

FGP EVM
calculations 202205

Appendix E

Philological Dictum

University of Belize

Department of Languages & Literature
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Tel: 501- 822-3680
ub.edu.bz

1st May 2022

Universidad Para La Cooperación Internacional
Avenida 15, Calle 35
Barrio Escalante, San José 10101
Costa Rica

To Whom it May Concern:

RE: Philological Review of Elizabeth Ayala's Thesis Submission

I have read and reviewed the Final Graduation Project entitled "Project Management Plan for School Sanitation Project" prepared by Ms Elizabeth Ayala and submitted in partial fulfilment of the requirements for the Master's in Project Management (MPM) Degree at UCI.

I have considered the standard of academic writing and the use of English in the document. I find the language and expression therein to be lucid and precise. Syntax is sophisticated and correct throughout. Spelling is accurate and the register appropriate for work at this level. Overall, the fluency of writing is proficient, precise, and mature. The scholarly apparatus is accurate, consistent, and well-judged. The document appears complete and logically organised.

I have included comments on the draft document in the form of suggestions and tracked minor corrections for the consideration of the writer and tutors.

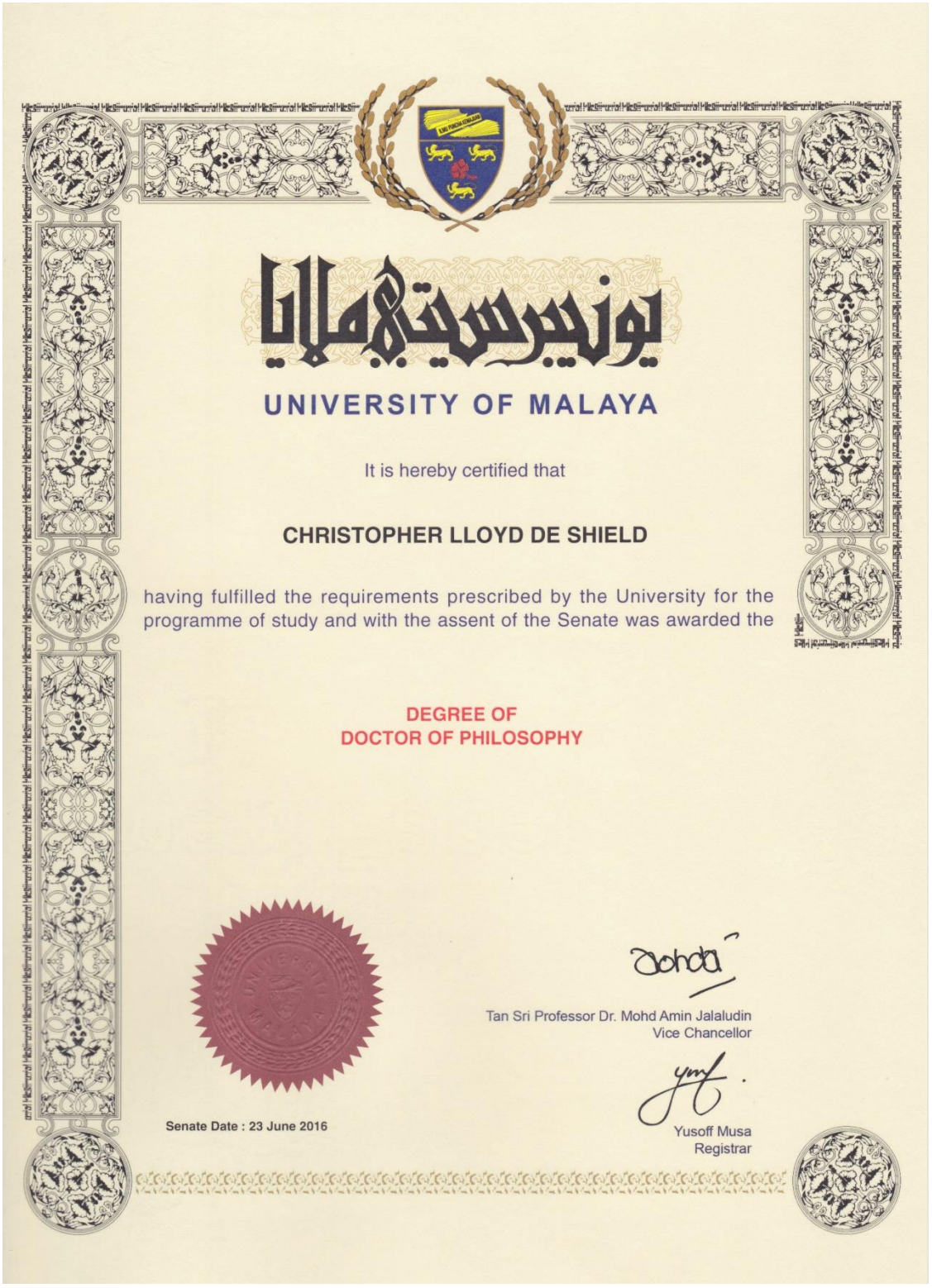
Should any further information regarding these comments be required or should the thesis committee wish to discuss any aspect of my evaluation, I would be pleased to assist.

Sincerely,

Christopher L. De Shield, Ph.D.
Assistant Professor of English
Department of Languages & Literature
Faculty of Education & Arts
University of Belize
cdeshield@ub.edu.bz
+(501) 672 5034

Appendix F

Philologist's Credentials



يونيورسيتي ملايا

UNIVERSITY OF MALAYA

It is hereby certified that

CHRISTOPHER LLOYD DE SHIELD

having fulfilled the requirements prescribed by the University for the programme of study and with the assent of the Senate was awarded the

DEGREE OF
DOCTOR OF PHILOSOPHY

Tan Sri Professor Dr. Mohd Amin Jalaludin
Vice Chancellor

Yusoff Musa
Registrar

Senate Date : 23 June 2016