

UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN TO EXPAND WIRELESS
TELECOMMUNICATION SERVICES TO UNDERSERVED COMMUNITIES IN
BELIZE

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DEDICATION

I dedicate this project to my beloved children who are my perpetual inspiration and the bedrock of my strength on this journey. To my loving spouse for providing enduring encouragement and unwavering support. To my wonderful niece, whose lively and contagious enthusiasm never fails to kindle a spark within me. To my parents, for their boundless love and support. This work is dedicated to each of you with heartfelt gratitude.

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Finally, I express my profound gratitude to my family for their constant encouragement and understanding. I also acknowledge my dedicated colleagues and friends, for their motivation and support which made a significant impact on this journey.

ABSTRACT

The objective of this document is to create a project management plan to expand affordable wireless telecommunication access to underserved communities in Belize. These communities currently face limited or no access to essential services, hindering their progress. The project management plan aims to address the digital divide by providing affordable wireless telecommunication access to the underserved communities to bridge the gap in digital connectivity for education, healthcare, and economic growth.

The final product of this project consists of a project management plan document to implement affordable wireless telecommunication access to underserved communities in Belize. The plan consists of the final deliverables of the project which correspond to the management plans: integration, scope, schedule, cost, quality, resources, communications, risk, procurement and stakeholder management, and the sustainable development plan. A combination of analytical, qualitative, and quantitative research methodologies, and the guide provided by the Project Management Institute are used.

The conclusions establishes that the Project Management Plan effectively emphasizes the applicability of project management standards for the Expansion of Wireless Telecommunication Services in Underserved Communities in Belize Project. The plan seamlessly integrates the ten project management knowledge areas along with the Sustainable Development Plan. It is recommended to employ the Project Management Plan throughout the project lifecycle incorporating various recommendations for project success.

Key Words: Project Management Plan, Wireless Telecommunication, Sustainable Development.

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ABBREVIATIONS AND ACRONYMS

| | |
|---------------------|------------------------------------------------------------------|
| CV | Cost Variance |
| CPI | Cost Performance Index |
| CPM | Critical Path Method |
| FGP | Final Graduation Project |
| GDP | Gross Domestic Product |
| GPM | Green Project Management |
| KPI | Key Performance Indicator |
| LTE | Long Term Evolution |
| P5IA | People, Planet, Prosperity, Process and Products Impact Analysis |
| PMBOK® Guide | Project Management Body of Knowledge Guide |
| PMI | Project Management Institute |
| PMIS | Project Management Information System |
| RBS | Resource Breakdown Structure |
| SDG | Sustainable Development Goals |
| SPI | Schedule Performance Index |
| SV | Schedule Variance |
| UAT | User Acceptance Testing |
| USD | United States Dollars |
| WBS | Work Breakdown Structure |

EXECUTIVE SUMMARY

Founded in 1987, Digi is Belize's largest telecom provider serving over 200,000 customers through 150+ mobile cell sites offering a wide range of services. Although urban and rural expansion has been significant, underserved remote communities lack access to affordable wireless telecommunications. These challenges, including limited resources, high operational costs, and geographic barriers hinder their access to education, healthcare, and economic opportunities. The COVID-19 crisis has highlighted the critical role of telecommunication access in addressing the digital divide.

Thus, this transformative initiative relied on a comprehensive project management plan designed at expanding wireless telecommunication services in Belize's underserved communities. This plan was developed to serve as the guiding compass for the project, providing a structured framework for project managers and teams. It comprises twelve detailed documents, adhering to industry best practices, ensuring seamless integration, consistency, and coordinated management of various project knowledge areas throughout the project's lifecycle. These were instrumental in securing reliable telecommunication access providing an array of benefits including clear project direction, efficient resource allocation, proactive risk management, quality assurance, effective communication, stakeholder engagement, timely execution, cost control, comprehensive documentation, and sustainable, regenerative practices for long-term environmental and community benefits.

The general objective of the Final Graduation Project (FGP) was to create a project management plan to expand affordable wireless telecommunication access to underserved communities in Belize. The specific objectives were: to develop a project charter that defines the project's scope, objectives and milestones to create the project management plan; to develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success; to develop the scope management plan that includes the scope of works required for successful completion of the project; to create a schedule management plan that ensures the timely completion of the project; to create a cost management plan for effective management of the budget in order to complete the project within budget; to create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project; to create a resource management plan to identify and allocate necessary resources for the successful implementation of the project; to develop a communication plan to identify stakeholders and communication channels to facilitate effective information distribution and stakeholder management; to create a risk management plan to identify potential project risks, assess and manage risks to enhance project resilience; to develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully; to produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence and potential impact on the project and to develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development.

The FGP employed a combination of analytical, qualitative, and quantitative methodologies. It integrated a variety of primary and secondary information in its plan. Primary sources encompassed relevant company documents, interviews, meetings, and correspondence. Secondary sources included the PMBOK Guides as key references, and online publications were also vital contributors. Various project management tools and techniques supported the research.

The FGP adhered to sustainability and regenerative development principles through practices such as using sourced materials, reducing habitat disruption, and promoting community engagement. It aligned with multiple Sustainable Development Goals (SDGs) including poverty reduction, improved healthcare and education and economic growth with support from the P5 framework.

It was concluded that the project management plan developed for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project demonstrated effectiveness of project management standards in overcoming the complexities with expanding connectivity. The project management plan aligned with the established PMI (2017) standards and sustainable development principles and emphasized the applicability of project management methodologies in driving transformative initiatives. A holistic project management framework was successfully produced that integrated the ten knowledge areas and sustainable measures including the Project Charter, Integration, Scope, Schedule, Cost, Quality, Resource, Communication, Risk, Procurement, Stakeholder Management, and the Sustainable Development Plan. The FGP is poised to contribute to regenerative and sustainable development and addresses the unique needs of underserved communities in Belize.

It is recommended that Digi utilizes the Project Management Plan throughout the project lifecycle, integrates it into the overall project governance framework, and makes it accessible to all relevant stakeholders. It is essential that the project team treats it as a living document by regularly revisiting and updating the plan to accommodate changes in the project dynamics, emerging from risks and evolving stakeholder expectations. Continuous monitoring and adaptation will ensure that the project seizes opportunities and ultimately achieves its objectives. Finally, it is recommended to establish a sustainability review board and foster partnerships with environmental organizations for effective sustainable development.

1 INTRODUCTION

Chapter 1 offers a thorough overview of the Final Graduation Project (FGP). It begins with the background of the organization and the solution proposed. Then, it identifies the problem statement detailing the main issue the project aims to resolve. Next, it outlines the FGP's purpose and anticipated benefits on its successful accomplishment. Moreover, it provides the project's general objective and outlines the twelve (12) specific objectives of the FGP.

1.1. Background

Digi, formally known as Belize Telemedia Ltd, is the largest leading telecommunications company in Belize. It was established in 1987 and was rebranded as Digi in 2019 (Digi, 2019). Digi has been at the forefront in providing telecommunication services and expanding wireless communications networks across the country. It is the primary provider of landline, mobile voice and data, broadband internet, television, and other services in Belize. It currently has over 150 mobile cell sites across Belize with over 200,000 customers.

Digi has gradually been expanding its network coverage and improved data connectivity, significantly driving economic growth and enabling individuals and businesses to participate in the digital economy, supporting education and bridging the digital divide.

Whilst Digi has made substantial progress in urban and in some rural areas, there remains a need to extend their services to underserved and remote communities. The project aims to address this issue with the development of a project management plan to expand wireless telecommunications services to underserved communities in Belize. Its goal is to leverage

innovative technologies and strategies to extend telecommunication access to these remote areas.

Studies in the telecommunication and project management field across the world have addressed similar challenges. The FGP develops upon the knowledge and insights acquired from previous research and concepts and adapts these findings to the specific context of Belize and operations of Digi. Through both academic research and practical experience within Digi, the project aims to deliver a strong and actionable project management plan tailored to the unique needs and challenges faced in Belize's underserved communities.

The process involves a comprehensive study of the current telecommunication infrastructure, identifying these underserved communities, and developing applicable strategies to expand telecommunication coverage. It requires collaboration with local stakeholders, thorough planning, resource allocation, and the implementation of sustainable and regenerative practices to ensure long-term benefits for both the environment and the communities.

1.2. Statement of the problem

The problem is that although Belize has seen considerable growth in recent years in the telecommunications sector, there are underserved and remote communities with limited or no access to affordable wireless telecommunication services. Telecommunication access is a key enabler for economic development, access to education, healthcare, and overall quality of life for these residents. Without access to these services, it hinders the overall development of the country.

The Government, along with Digi, has recognized the need to address this issue. After partnering with Huawei Technologies in 2016, Digi has been engaged in expanding its wired and wireless network infrastructure to connect customers, improve lives, and develop communities. There have been barriers in limited resources, high cost of doing business, technology/regulatory requirements, and geographical hurdles which have made it challenging to reach these communities.

The COVID-19 pandemic highlighted the need to prioritize telecommunication access, including mobile voice and data, broadband internet, and digital services, which increases the efforts to bridge the digital divide. There is a demand for telecommunication services in underserved communities despite the challenges of Belize's geography, low population density, and high cost of services.

The problem statement emphasizes the crucial need to develop a project management plan that extends wireless telecommunications services to underserved communities. A project management plan is defined as the document that describes how the project will be executed, monitored, and controlled (PMI, 2017, p. 34). Digi, as the leading telecommunications provider, has a unique opportunity to drive positive change in the country. These challenges present meaningful opportunities for growth and the FGP through its integrated project management plan is an essential step towards realizing the project effectively.

1.3. Purpose

The purpose of the project is to use project management standards to develop a well-structured strategy/plan for implementing innovative wireless technologies to significantly

expand affordable telecommunication access to underserved communities in Belize. Belize is undergoing a revolutionary growth and emphasizing the importance of digital connectivity for education, healthcare, public safety, and economic growth. However, there is a digital divide where underserved communities and low-income households have limited access and opportunities to essential services and consequently are not progressing. There is a significant need for affordable wireless telecommunication access in these underserved communities.

According to a study by the World Bank, it is estimated that a 10% increase in telecommunication penetration would result in a Gross Domestic Product (GDP) growth of 1.38% in developing countries. By quantitatively bridging the divide, the project has the potential to positively stimulate economic growth in underserved communities, creating jobs, boosting economic development, reducing the digital divide, improving public safety, expanding health care, and enhancing their overall well-being.

The success of this transformation centers on the project management plan to expand wireless telecommunication services to underserved communities in Belize which will serve as the roadmap for the project. It will provide a structured approach to guide the project managers and project team in their efforts to expand affordable wireless telecommunication access. The project management plan includes twelve (12) comprehensive documents which will be presented following best practices to guarantee proper integration, consistency, and coordination of the project management knowledge areas throughout the project lifecycle. These are vital to guarantee that the telecommunication access provided to the underserved communities is both reliable and meets the needs effectively. The benefits of the implementation of the project management plan include:

- Clear project direction with the defined project's scope, objectives, and deliverables, providing a clear roadmap for the entire project team;
- Efficient resource allocation including human, financial, and telecommunication equipment/material ensuring efficient resource utilization and minimizing waste;
- Risk management helps the project team identify potential issues early and develop strategies to address them, reducing the likelihood of costly delays and disruptions;
- Quality assurance ensuring high-quality telecommunication services to improve service reliability and customer satisfaction;
- Effective communication to reduce misunderstandings and enhance collaboration;
- Stakeholder engagement to provide support, manage the interests of all project stakeholders, foster collaboration and community involvement and contribute to project success;
- Timely execution to meet project milestones and deadlines;
- Cost control to prevent budget overruns and ensure cost-effectiveness; and
- Documentation to assist in accountability and providing historical record of the project.

1.4. General objective

To create a Project Management Plan to expand affordable wireless telecommunication access to underserved communities in Belize.

1.5. Specific objectives

1. To develop a project charter that defines the project's scope, objectives, and milestones to create the project management plan.
2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success.
3. To develop the scope management plan that includes the scope of works required for successful completion of the project.
4. To create a schedule management plan that ensures the timely completion of the project.
5. To create a cost management plan for effective management of the budget in order to complete the project within budget.
6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project.
7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project.
8. To develop a communication plan to identify stakeholders and communication channels to facilitate effective information distribution and stakeholder management.
9. To create a risk management plan to identify potential project risks, assess, and manage risks to enhance project resilience.

10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully.
11. To produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence, and potential impact on the project.
12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development.

2 THEORETICAL FRAMEWORK

Chapter 2 defines the company framework, project management concepts, and other applicable theory/concepts related to the Final Graduation Project (FGP). It comprises of the company background, its mission and vision, organizational structure, and products offered. It elaborates on the project management concepts/theories, principles of project management, project performance domains, characteristics of predictive, adaptive and hybrid projects, project management, knowledge areas and processes, project life cycle, company strategy, portfolio, programs, and projects. Lastly, other applicable concepts related to the project theme and context are presented.

2.1 Company/Enterprise framework

2.1.1 Company/Enterprise background

Digi, formally known as Belize Telemedia Ltd, is the largest leading telecommunications company in Belize. It was established in 1987 and was rebranded as Digi in 2019 (Digi, 2019). Digi has been at the forefront in providing telecommunication services and expanding wireless communications networks across the country. It is the primary provider of landline, mobile voice and data, broadband internet, television, and other services in Belize. It currently has over 150 mobile cell sites across Belize with over 200,000 customers.

Its contribution to the community includes enabling individuals and businesses to stay connected, access information, and engage in e-commerce and digital services. Digi makes a meaningful contribution to the economy being one of the largest employers in Belize. It invests every year in infrastructure and services. Digi has gradually been expanding its

network coverage and improved data connectivity significantly. In addition to its economic contribution, the company makes substantial contributions to the community. Digi supports initiatives in education such as offering annual scholarships to students and providing free internet to schools. It immensely aided to support online connectivity during the pandemic. It helps in sports through monetary donations or other forms of assistance to athletes for participation in tournaments.

Whilst Digi has made substantial progress in urban and in some rural areas, there remains a need to extend their services to underserved and remote communities.

2.1.2 Mission and vision statements

Digi is committed to developing the country and its mission and vision statements reflect its dedication to delivering high-quality communication solutions and services.

The mission, “Be fast and efficient in providing communication solutions, enriching the quality of life of customers, keeping them connected anytime, anywhere” (Digi, 2019), emphasizes several positive key aspects of Digi’s purpose in making a meaningful transformation in the communities it serves. Digi aims to be efficient in providing its services quickly and efficiently. With the application of the project management plan to expand wireless telecommunication services to underserved communities, it encourages the project team and the project to progress swiftly, ensuring that communities gain access to connectivity. Resources, time, and effort are optimized building efficiencies which contribute to the timely availability of connectivity, enhancing the lives of the community members and enhancing the company’s reputation for delivering in its mission. The

efficiency the project brings benefits the communities with faster essential services and positively impacts Digi's reputation in delivering on its mission. Its network infrastructure ensures that customers can rely on rapid connectivity and solutions which are crucial in the fast-paced world of telecommunications. Its focus on enriching the quality of life of customers demonstrates Digi's commitment to meeting its customer needs and improving their experience, which are vital for building trust and loyalty. The project management plan prioritizes the needs and preferences of the underserved communities. This customer-centric approach involves active engagement with the stakeholders in the communities to capture their unique requirements and challenges. The project aligns with the mission by reinforcing its commitment to its core values and purpose. With Digi successfully developing and implementing the project management plan to expand wireless telecommunication services to underserved communities, it demonstrates to stakeholders (customers and investors) that it is a corporate citizen dedicated to making a positive impact in the country. In turn, it enhances the company's reputation, fosters customer loyalty, and can lead to an increase in its market share.

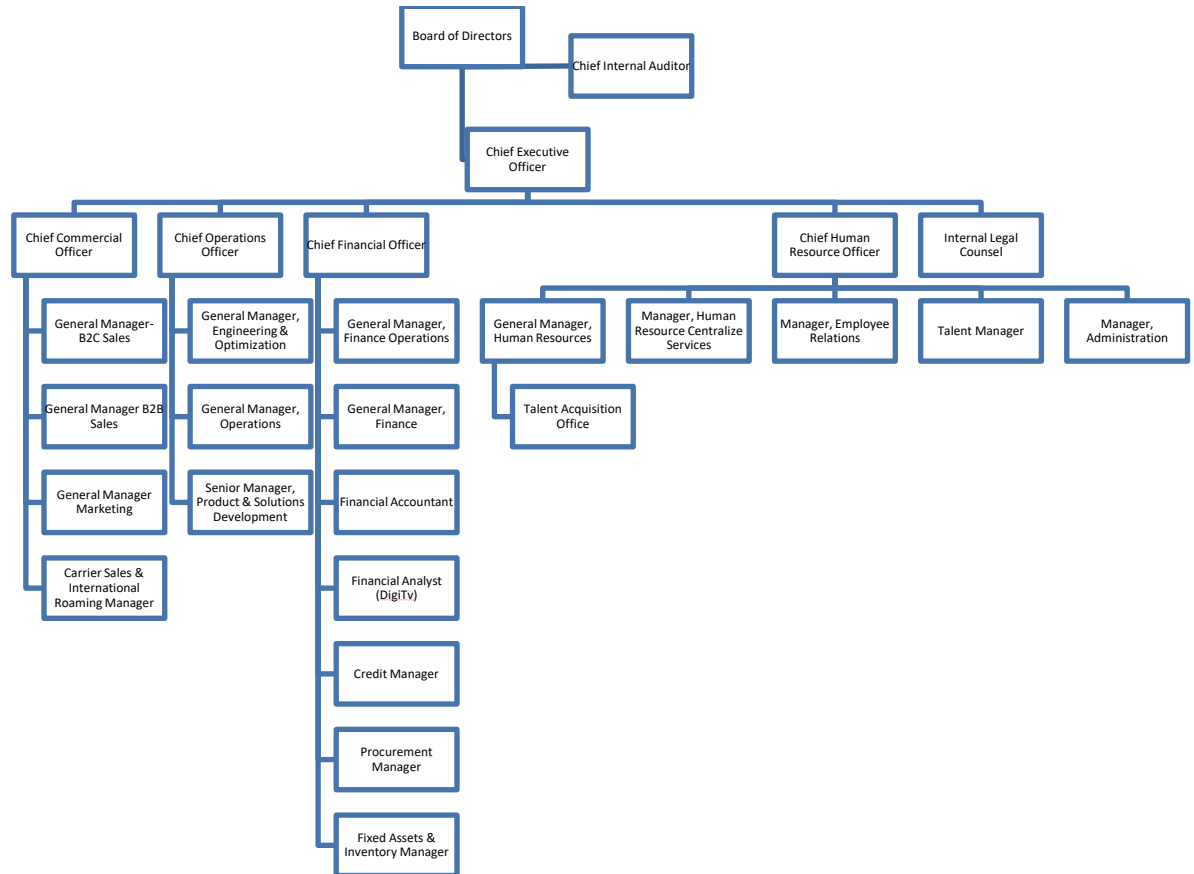
Digi's vision, "A highly proficient, customer-driven, strategy focused, best-in-class solutions provider, outstanding in everything we do" (Digi, 2019), impacts on the development of the project management plan to expand wireless telecommunication services to underserved communities in Belize. Its vision of "highly proficient" requires a high level of expertise, precision, and competence in every aspect of the project. These proficiencies include project planning, resource allocation, technical implementation, and monitoring which all ensure that the project is well-prepared and executed efficiently and,

most importantly, that it delivers the proposed project outcomes effectively. The vision emphasizes “customer-driven” which supports the project where the communities’ needs and preferences are prioritized. Active engagement with the communities to capture their unique requirements ensures that the project delivers solutions that will benefit them, strengthening Digi’s position as a customer focused company. Digi’s vision of “outstanding in everything we do,” sets a high standard for performance which demands that the project management plan be of excellence at every phase, from planning to implementation and continuing support. With outstanding performance, Digi positions itself to making a positive impact as the best-in-class provider committed to enhancing its brand image and attracting more customers.

2.1.3 Organizational structure

Digi has aligned its organizational structure in an effort to realize its fiscal year 2023/2024 corporate goals. The structure comprises of the C-level leadership which leads the Commercial, Finance, Human Resources, Operations, and Corporate Divisions. Figure 1 illustrates the organizational structure of the company.

Figure 1: Organizational Structure



Note: Adapted from Organizational structure, by Digi, 2023. Copyright 2023 by Digi.

Digi follows a hierarchical organizational structure where the Board of Directors is the highest governing body providing strategic direction and ensuring the organizational goals are met. The Chief Internal Auditor reports directly to the Board of Directors. This unit is responsible for the internal audit functions which includes evaluating and improving the risk management, control and governance processes. The Chief Executive Officer (CEO) is the central point of executive leadership and decision-making. The CEO is supported by

four C-level executives and the Internal Legal Counsel who oversees the company's legal affairs. The Executive Divisions are described below along with their business units.

- The Chief Commercial Office (CCO) is responsible for overseeing the commercial aspects of the company including sales, marketing and customer service.

Business Units:

- General Manager, Business-to-Consumer Sales: The unit is responsible for sales strategies targeting individual consumers.
 - General Manager, Business-to-Business Sales: The unit manages sales activities directed at businesses and corporate clients.
 - GM Marketing: This unit is responsible for promoting the company's products or services.
 - Carrier Sales and International Roaming: The unit focuses on partnerships with other carriers and international roaming services.
- The Chief Operating Officer (COO) is responsible for overseeing the day-to-day operations of the company to ensure its efficiency and implementing strategic plans.

Business Units:

- General Manager, Engineering & Optimization: The unit is responsible for managing engineering projects, optimizing processes, and ensuring the technical aspects of the company's operations are efficient and aligned with the strategic goals.
- General Manager, Operations: The unit is responsible for overseeing the various operational aspects of the business. It manages the daily operations, streamlining

processes, and ensuring that resources are utilized effectively to meet organizational objectives.

- Senior Manager, Product and Solutions Development: The unit is led by a senior manager who oversees the development of new products and solutions. The product development team contributes to the creation of new solutions that align with market needs.
- The Chief Financial Officer is responsible for managing the financial activities of the company, providing strategic financial guidance, and ensuring financial stability.

Business Units:

- General Manager, Finance Operations: The unit focuses on the efficient execution of financial processes which includes managing the day-to-day financial operations, optimizing financial processes, and ensuring compliance with financial regulations.
- General Manager, Finance: This unit oversees the overall financial health of the company. It is responsible for strategic financial planning, budgeting, financial analysis, and providing financial insights to support decision-making.
- Financial Accountant: The unit is responsible for managing and maintaining financial records including recording financial transactions, preparing financial statements, and financial reporting.
- Financial Analyst (DigiTV): The unit focuses on financial analysis related to the television (over-the-top) segment of the business.
- Credit Manager: The unit manages credit-related activities to ensure sound credit policies and minimize financial risks.

- **Procurement Manager:** The unit is responsible for the procurement function, overseeing the acquisition of goods and services. It involves developing procurement strategies, negotiating contracts, and ensuring cost-effective procurement processes.
- **Fixed Assets & Inventory Manager:** The unit is responsible for tracking fixed assets, managing inventory levels, and ensuring accurate accounting for these assets.
- **Chief Human Resources Officer** is responsible for overseeing all aspects of human resources management and ensuring the development and implementation of Human Resource (HR) strategies aligned with the company's goals.

Business Units:

- **General Manager, Human Resources:** The unit is responsible for the human resources function, focusing on talent management, workforce planning, and employee engagement.
- **Manager Human Resource Centralized Services:** The unit manages centralized HR services across the country which includes handling HR administration, benefits administration, and providing support for HR-related inquiries.
- **Manager Employee Relations:** The unit focuses on fostering positive employee relations and resolving workplace issues.
- **Talent Manager:** The unit is responsible for talent acquisition and development initiatives. The functions include implementing talent development programs and supporting succession planning.

- **Manager Administration:** The unit oversees the administrative processes, managing HR documentation, and supporting the day-to-day HR operations in Digi.

2.1.4 Products offered

Digi is the industry leader in Belize positioning itself as the National Telecom offering extensive products and services. These telecommunication services are in wireline, mobile, data, internet, and value-added features. The full range of products and services include fixed line telephone services, fixed wireless, national and international mobile services, high speed data services, national and international data networks, and innovative business solutions. These services are described below.

- **Mobile Voice, SMS, and Data Services via a 4G Long Term Evolution (LTE) Advanced Mobile Network**
 - **International Voice, Text, and Data Roaming Services**
 - **Residential and Business Fixed Line Telephony and Voice over Broadband (VoBB) Services**
 - **Residential and Business Broadband Services via Fibre to the Home (FTTH) Network**
 - **National and International Data Networks**
 - **Digi Business Solutions**
 - **Financial Technology (FinTech) Services through its digital mobile payment platform**
- Mobile service is one of the core products for Digi and the expansion of the service into underserved communities aligns with the objective of enriching the quality of life for customers by keeping them connected anytime, anywhere. The mobile service product

provides voice and data connectivity via its mobile/cellular networks. The expansion of this product to the underserved communities in Belize means that residents in these communities will have access to reliable mobile communication. It will enable them to make calls, send messages, and access the internet in these remote communities.

The expansion of wireless internet and voice services to underserved communities offers high speed internet and voice access without the need for physical fiber cables. Through the project management plan, Digi will bring wireless internet and voice to underserved communities allowing residents to gain access to online education, e-commerce, and information sharing, improving their overall quality of life and furthermore connecting them to the digital world.

2.2 Project Management concepts

2.2.1 Project management principles

The Project Management Institute (PMI) outlines twelve (12) key principles of project management which provide a framework for effective project management. These principles are aligned with the values identified in the PMI code of Ethics and Professional Conduct (PMI, 2021) and which assists to complement the principles. It aids in decision making and guiding the team for the successful delivery of the project. By employing these principles, the FGP is well structured, adaptable, and responsive to the needs of the organization and the underserved communities it intends to serve. Figure 2 depicts the twelve (12) project management principles and are explained as follows:

Figure 2: 12 Principles of Project Management



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- **Stewardship- Be a diligent, respectful and caring steward**

This principle emphasizes the importance of responsibilities both within and external to the organization (PMI, 2021, p. 25). Stewards act responsibly to carry out activities with integrity, care, trustworthiness, and compliance with the internal and external guidelines. A broad commitment to the financial, social, and environmental impacts of the project they support is demonstrated through stewardship. Project managers must be accountable to their stakeholders to ensure that the project's resources are used in the best way to achieve the project's goals.

- **Team- Create a collaborative project team environment**

Project teams are made up of individuals who employ diverse skills, knowledge, and experience (PMI, 2021, p28). The principle focuses on effective delegation of tasks and responsibilities while encouraging collaboration and communication among the team members. Team agreements, structures and processes are some of the many contributing factors in which collaboration is achieved. According to the Project Management Institute (2021), it ensures that:

- Projects are delivered by project teams.
- Project teams work within organizational and professional cultures and guidelines, often establishing their own “local” culture.
- A collaborative project team environment facilitates alignment with other organizational cultures and guidelines, individual and team learning and development, and optimal contributions to deliver desired outcomes.

- **Stakeholders- Effectively engage with stakeholders**

Stakeholders are individuals, groups, or organizations who have an interest in the project or who may be affected by it. The stakeholders’ principle points out that stakeholders influence projects, performance, and outcomes; project teams serve other stakeholders by engaging with them and that through proactive stakeholder engagement, value delivery improves. Project managers must understand the needs and expectations of their stakeholders and ensure that their interests are considered in the project’s decision-making process.

- **Value- Focus on value**

The focus is on delivering value to the project stakeholders. This requires understanding the needs of the stakeholders and developing a project management plan that meets these needs. Concurrently, project managers must be mindful of the constraints such as budget and schedule. This principle further describes value as:

- The ultimate indicator of project success.
 - Can be realized throughout the project, at the end of the project, or after the project is complete.
 - Can be defined in quantitative and/or qualitative terms, including the benefits that contribute to value.
 - The intended benefits leading to value creation are supported by the project team through a focus on the outcomes.
 - Project teams evaluate progress and adapt to maximize the expected value.
 - **Systems Thinking- recognize, evaluate and respond to system interactions**
- System thinking is a way of viewing the project as a whole and understanding how the different parts of the project interact with each other. According to PMI (2021), a project works within other larger systems, and a project deliverable may become part of a larger system in order to realize benefits. For instance, projects can be part of a program, which in turn may also be part of a portfolio. A diverse project team is engaged with a project system working for a common objective and bringing value to project teams. This principle helps the FGP (project managers) to identify and mitigate potential project risks and formulate the mitigation/risk strategies and adjust the project plan as needed.

- **Leadership- Demonstrate leadership behaviors**

Leadership comprises the attitude, talent, character, and behaviors to influence individuals within and outside the project team toward the desired outcome (PMI, 2021). The FGP, through the project management plan framework aims to provide leadership to the project teams and stakeholders. Through effective leadership, the project team focuses on delivering the project results when a common vision is shared, and everyone works towards the same outcome. This principle entails building trust with the stakeholders including motivating and inspiring the team. In addition, it means empowering the project managers and project team to make decisions and take action under pressure.

- **Tailoring- Tailor-based on context**

Tailoring is the deliberate adaptation of approach, governance, and processes to make them more suitable for the given environment and the work at hand (PMI, 2021). It further encourages the project teams to communicate the tailoring decisions to those working on these decisions such as stakeholders. The purpose of the FGP is to tailor the project management plan to the specific needs of the project presented. It considers elements such as the project's scope, complexity, and risks. Varied project management tools and techniques are selected and employed that are more suitable for the project presented.

- **Quality- Build quality into processed and deliverables**

The principle focuses on delivering a high-quality project requiring the project's requirements and expectations to be met and delivering the project on time and within

budget. Quality is defined as the degree to which a set of inherent characteristics of a product, service, or result fulfills the requirements (PMI, 2021). The project deliverables are measured for quality in conformance to acceptance criteria and practicality. The quality management plan defines quality in different dimensions such as sustainability, performance, conformity etc. The objective is to meet the needs of the customers and stakeholders while minimizing resource wastage and maximizing the probability of achieving the desired outcomes.

- **Complexity- Navigate complexity**

Complexity is a characteristic of a project or its environment that is difficult to manage due to human behavior, system behavior, and ambiguity (PMI, 2021). This principle addresses technical, complexity, regulatory compliance, and community engagement challenges in the FGP. It further explains that complexity cannot be controlled and may emerge and impact the project at any moment in the project lifecycle. However, the FGP plans to manage complexity in its careful planning, monitoring, and risk management process.

- **Risk- Optimize risk responses**

A risk is an uncertain event or condition that, if it occurs, can have a positive or negative effect on one or more objectives (PMI, 2021). This principle aids in identifying, assessing, and mitigating potential project risks to reduce the likelihood of the project failing. Inversely, positive risks (opportunities) are maximized.

Contingency plans are essential to mitigate any risks. The FGP seeks to employ risk evaluation, planning, and proactive risk implementation.

- **Adaptability and Resiliency- Embrace adaptability and resiliency**

Both adaptability and resiliency are necessary to be exercised in a project. Adaptability refers to the ability to respond to changing conditions whilst resiliency consists of two complementary traits: the ability to absorb impacts and the ability to recover quickly from a setback or failure (PMI, 2021). Opportunities can be encountered from unexpected changes and circumstances in the project which can bring optimization in value delivery. The project management plan allows for the project managers and project team to adapt the project plan as needed. This may be required due to changes in project scope, schedule, or budget. The project manager can rebound from failures or setbacks and keep the project moving ahead.

- **Change- Enable change to achieve the envisioned future state**

The project is expected to have changes and the FGP provides guidance on managing change throughout the project lifecycle. These changes can be internal or external and may be implemented by and have consequences for stakeholders. Processes are set in the FGP for managing changes to the project such as the scope, schedule, or budget. At the same time, project managers and the project team are encouraged to be flexible and adaptable to change.

2.2.2 Project management domains

The Project Management Institute (2021) lists eight domains and defines a project performance domain as a group of related activities that are critical for the effective delivery of project outcomes. These domains are relevant to the main project of creating a

project management plan to expand wireless telecommunication services to underserved communities in Belize to increase the probability of successfully creating the project management plan resulting in the successful expansion of wireless telecommunication services to underserved communities. These domains are explained below along with their relation to the FGP.

- **Stakeholders-** This domain focuses on identifying and managing the needs and expectations of all stakeholders involved in the project. It entails working with stakeholders to maintain alignment and engaging with them to foster positive relationships and satisfaction (PMI, 2021). The Stakeholders domain will be addressed in objective 11 of the FGP which is to produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence, and potential impact on the project. The project manager must identify and engage all relevant stakeholders in the project, including the underserved communities that will be benefiting from the expansion of wireless telecommunication services. The project also seeks to understand the needs and expectations of these stakeholders and ensure that their interests are considered in the project's decision-making process.
- **Team-** This domain focuses on building and leading a high-performing team capable of delivering the project's objectives. To accomplish this, a culture and environment must be created that enables a diversity of individuals to grow into a high performing project team. The project manager must build and lead a high-performing team capable of delivering the project's objectives. The team comprises individuals with the necessary

skills and experience to successfully implement the project plan. In the FGP, the team performance domain will be followed on how the project team collaborates to develop the project management plan which requires a cross functional team with varied expertise such as in telecommunications, finance, and community engagement to achieve the project goals.

- **Development Approach and Life Cycle-** This domain focuses on selecting and implementing the appropriate project development approach and life cycle for the project. The project development approach should be tailored to the project's scope, complexity, and risks. The project development approach will be determined in the FGP; thus, this performance domain will be employed.
- **Planning-** The Planning Performance Domain addresses activities and functions associated with the initial, ongoing, and evolving organization and coordination necessary for delivering project deliverables and outcomes (PMI, 2021). It focuses on developing a comprehensive and realistic project plan that outlines the project's scope, schedule, budget, resources, risks, and communication plan. This performance domain is fundamental to ensure that the FGP is well structured. Planning will support in organizing the strategy for expanding telecommunication services to underserved communities and be used to guide the execution of the project and to track the project's progress.
- **Project Work-** The Project Work Performance Domain addresses activities and functions associated with establishing project processes, managing physical resources,

and fostering a learning environment (PMI, 2021). This domain focuses on executing the project plan and delivering the project's deliverables. The project manager must execute the project plan, deliver the project's deliverables, monitor the project's progress and make necessary adjustments to the project plan as needed. This performance domain will be used in the development of the FGP to ensure that tasks are carried out according to the plan.

- **Delivery-** The Delivery Performance Domain addresses activities and functions associated with delivering the scope and quality that the project was undertaken to achieve (PMI, 2021). This domain focuses on delivering the project's deliverables to the customer or client in a way that meets their needs and expectations. The project manager must deliver the project's deliverables to the underserved communities in a way that meets their needs and expectations at the same time ensuring that the project's deliverables are of high quality and that they meet the project's requirements. This performance domain relates to objective 3 and 6 of the FGP for the scope management plan and quality management plan respectively.
- **Measurement-** The Measurement Performance Domain addresses activities and functions associated with assessing project performance and taking appropriate actions to maintain acceptable performance (PMI, 2021). This domain focuses on measuring the project's performance and making necessary adjustments to the project plan as needed to maintain optimal performance. This includes tracking the project's progress against the project plan, identifying any potential risks or issues, and developing

contingency plans to address them. This performance domain will be utilized in the FGP to analyze the project's performance against predefined metrics.

- **Uncertainty and Ambiguity-** The Uncertainty Performance Domain addresses activities and functions associated with risk and uncertainty (PMI, 2021). This domain focuses on managing uncertainty and ambiguity throughout the project life cycle. This includes developing contingency plans to address potential risks and issues and being flexible and adaptable to change. The FGP will employ this performance domain in objective 9 which is to create a risk management plan to identify potential project risks, assess and manage risks to enhance project resilience.

2.2.3 Predictive, adaptative and hybrid projects

Predictive Projects

Predictive project management, often associated with the Waterfall methodology, is characterized by a sequential and linear approach. The project team typically follows a sequential process, with each phase of the project completed before moving on to the next phase. It relies on detailed early planning, with a well-defined scope, schedule, and budget. Predictive projects are often used for projects with a high degree of certainty. Project changes to the requirements are discouraged once the project begins, and progress is measured against the initial plan.

Adaptive Projects

Adaptive project management is associated with Agile methodologies like Scrum and Kanban. It is characterized by flexibility and iterative development where projects have a high degree of uncertainty and the requirements are not fully known at the start of the project, such as research and development projects. Adaptive projects accommodate changing requirements and priorities throughout the project. The project scope, schedule, and budget may change frequently as the project team learns more about the project and as the project environment changes. Teams work collaboratively in short cycles (sprints) to deliver increments of the product, with regular feedback and adaptation.

Hybrid Projects

Hybrid projects combine elements of both predictive and adaptive project management. Hybrid projects are often used for projects that have a mix of well-defined and uncertain requirements. The project team typically has a general plan for the project, but they are also flexible and adaptable to change. Hybrid projects empower organizations to tailor their project management approach to the specific needs of the project. For example, a project might use a predictive approach for certain phases (e.g., planning) and an adaptive approach for others (e.g., development and testing).

The FGP indicates characteristics of a hybrid approach. It incorporates elements of both predictive and adaptive methodologies. There are aspects, like regulatory compliance and budget management, which align with a more predictive approach, while other aspects, like wireless technology implementation and community engagement, may align with an

adaptive approach. There are many uncertainties associated with the project, for example, the project team may not fully understand the needs of the underserved communities, or there may be unexpected technical challenges. The project team should also regularly review the project management plan and make adjustments as needed. This blended approach seeks to maximize the chances of project success.

2.2.4 Project management

Project management is “the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements” (PMI, 2017, p10). Project management, as described by PMI, is a systematic approach involving the application of knowledge and techniques to manage project activities effectively. It highlights the importance of methods of tailoring to meet the unique requirements of each project.

According to the Association for Project Management (APM) (2022), Project Management is “the application of processes, methods, skills, knowledge and experience to achieve specific project objectives according to the project acceptance criteria within agreed parameters.” The APM’s definition emphasizes the importance of planning, executing, monitoring, and control in project management. It highlights the importance of meeting the project's objectives within the agreed parameters of scope, schedule, and budget.

Harold Kerzner defines project management as “planning, organizing, directing, and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives” (Rabuzin, 2023). Project management, as per Kerzner, is about the big picture approach which involves the strategic planning,

organization, leadership, and monitoring of resources to fulfill specific short-term objectives efficiently. It is about understanding the interaction of the different parts of the project with each other and aligning resources with goals and controlling processes to achieve desired outcomes.

2.2.5 Project management knowledge areas and processes

2.2.5.1 Project Management Knowledge Areas

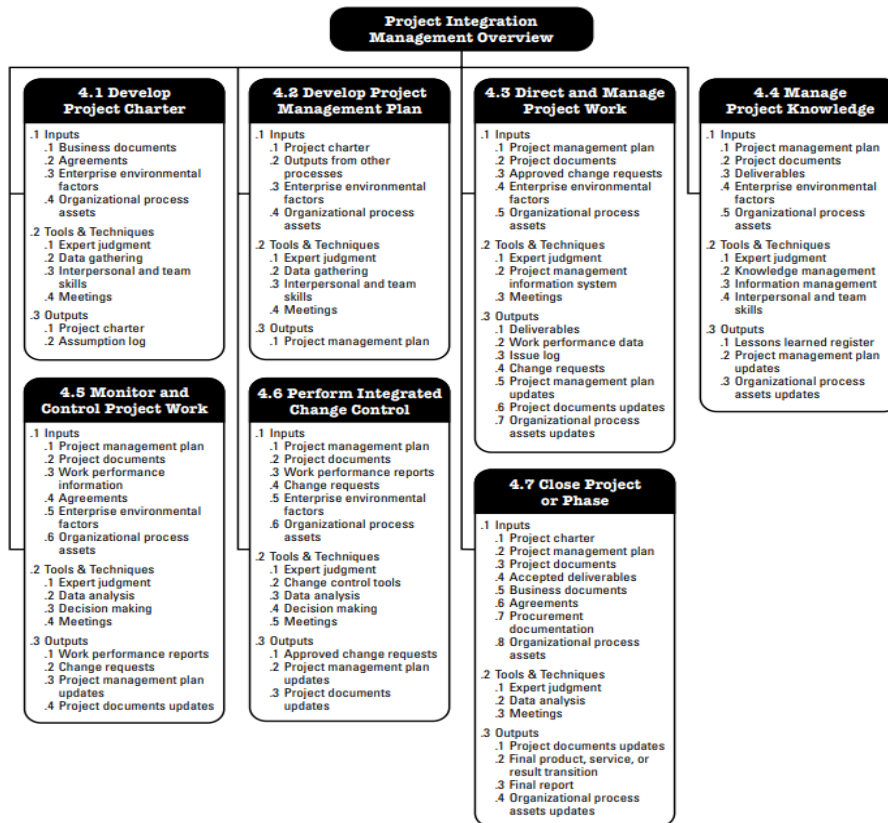
Project management encompasses various areas of knowledge and processes that collectively guide the successful planning, execution, monitoring, and completion of projects. According to the Project Management Institute (2017), a knowledge area is an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques. There are ten (10) areas of knowledge of project management. These knowledge areas will be employed for the FGP.

1) Project Integration Management focuses on the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups (PMI, 2017, p.69). The six (6) processes included in this knowledge area are the following:

- Develop Project Charter
- Develop Project Management Plan
- Direct and Manage Project Execution
- Monitor and Control Project Work

- Perform Integrated Change Control
- Close Project or Phase

Figure 3: Project Integration Management Overview

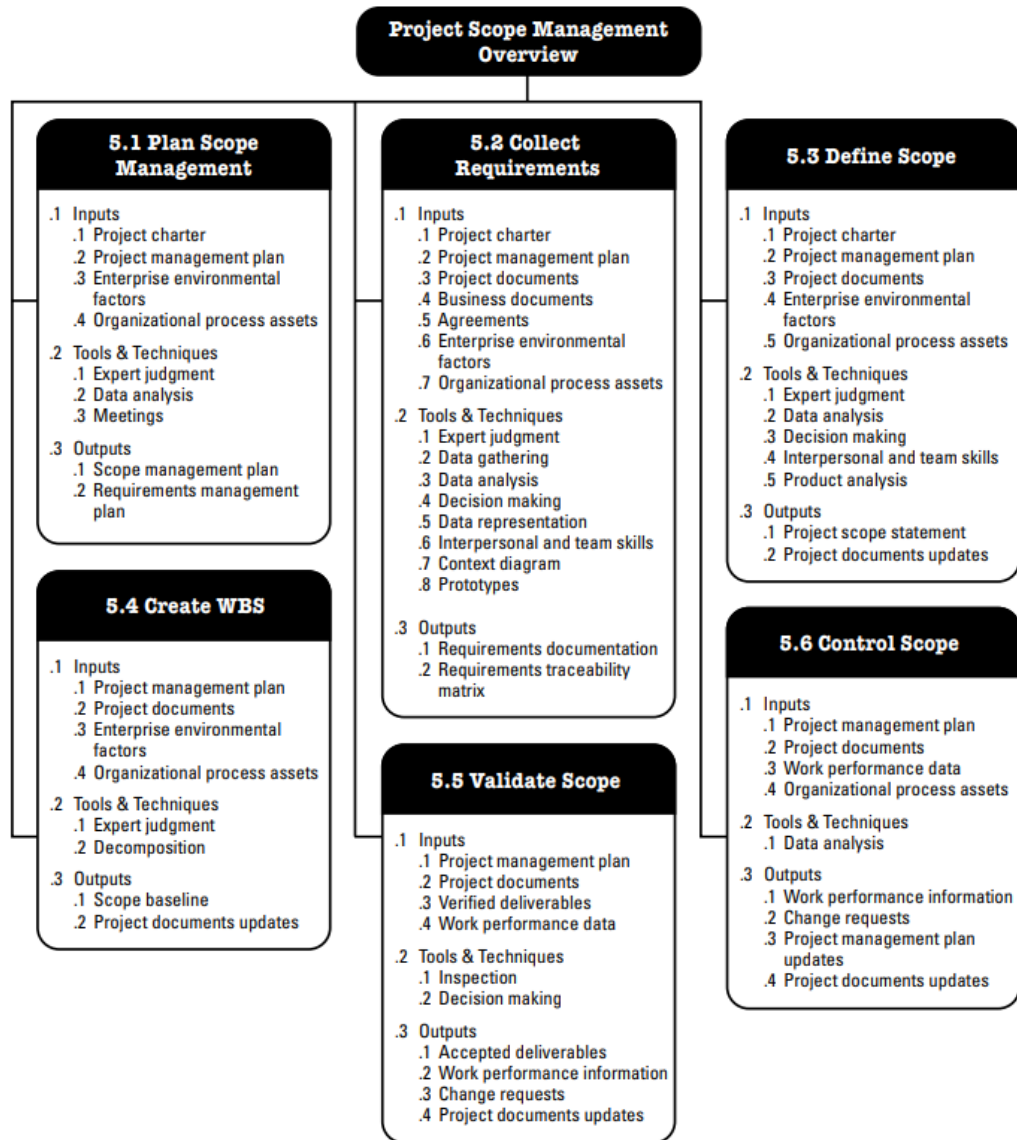


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- 2) **Project Scope Management** includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully (PMI, 2017, p. 129). There are six (6) processes in this knowledge area.

- Plan Scope Management
- Collect Requirements
- Define Scope
- Create WBS (Work Breakdown Structure)
- Validate Scope
- Control Scope

Figure 4: Project Scope Management Overview

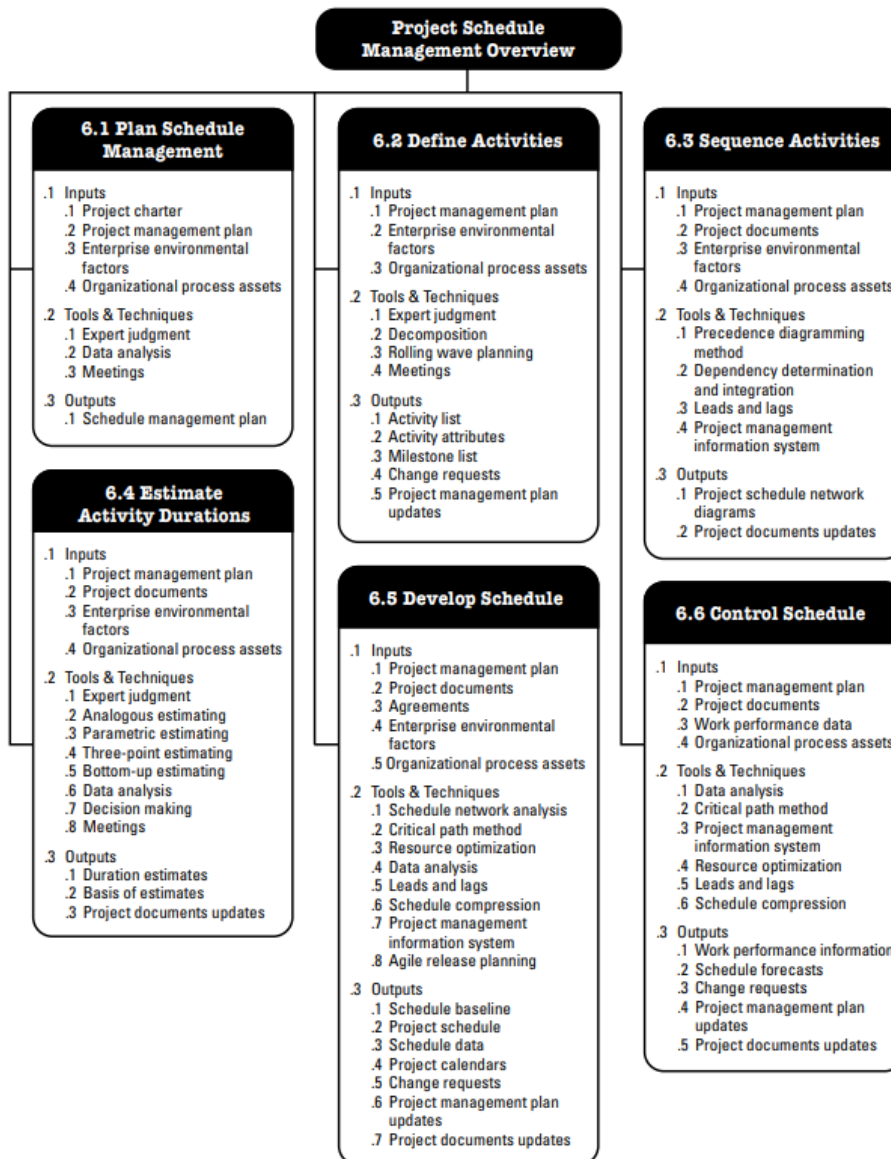


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3) Project Schedule Management includes the processes required to manage the timely completion of the project (PMI, 2017, p. 173). There are six (6) processes in this knowledge area.

- Plan Schedule Management
- Define Activities
- Sequence Activities
- Estimate Activity Durations
- Develop Schedule
- Control Schedule

Figure 5: Project Schedule Management Overview

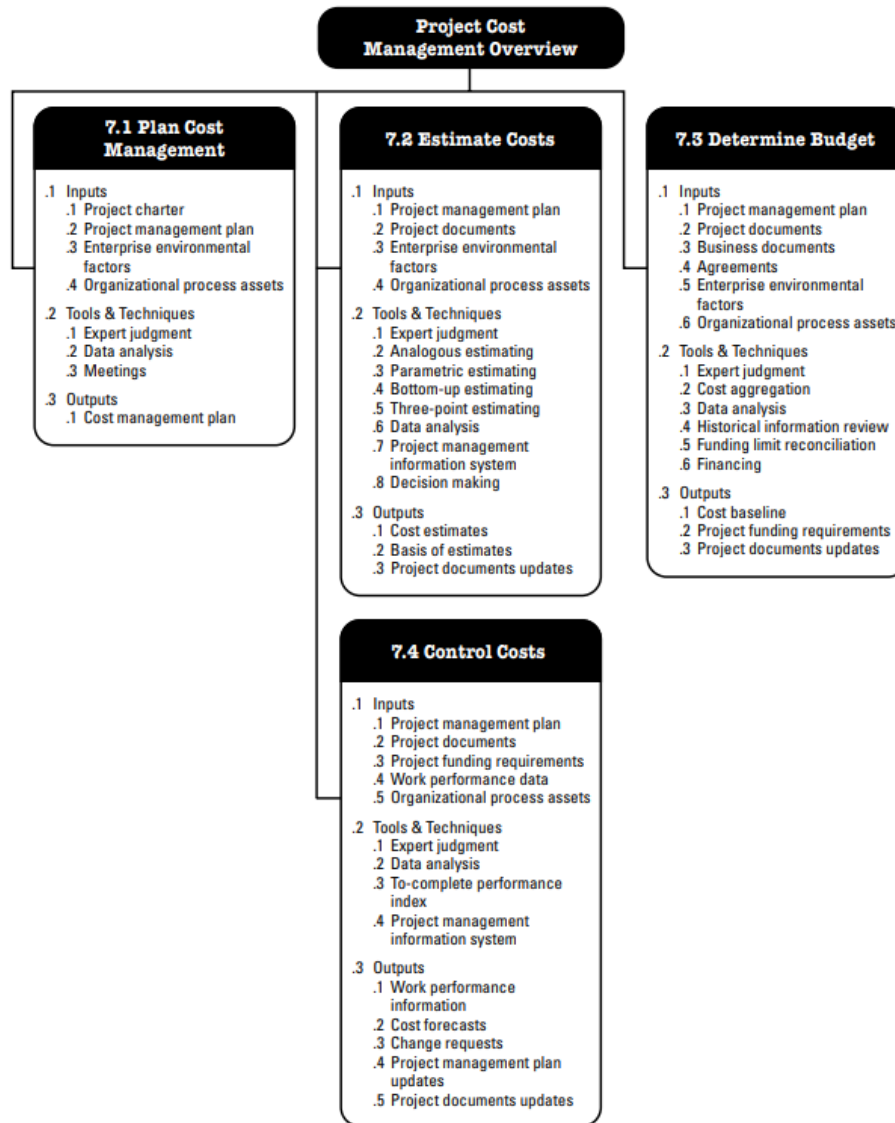


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4) **Project Cost Management** includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved Budget (PMI, 2017, p. 231). There are four (4) processes in this knowledge area.

- Plan Cost Management
- Estimate Costs
- Determine Budget
- Control Costs

Figure 6: Project Cost Management Overview

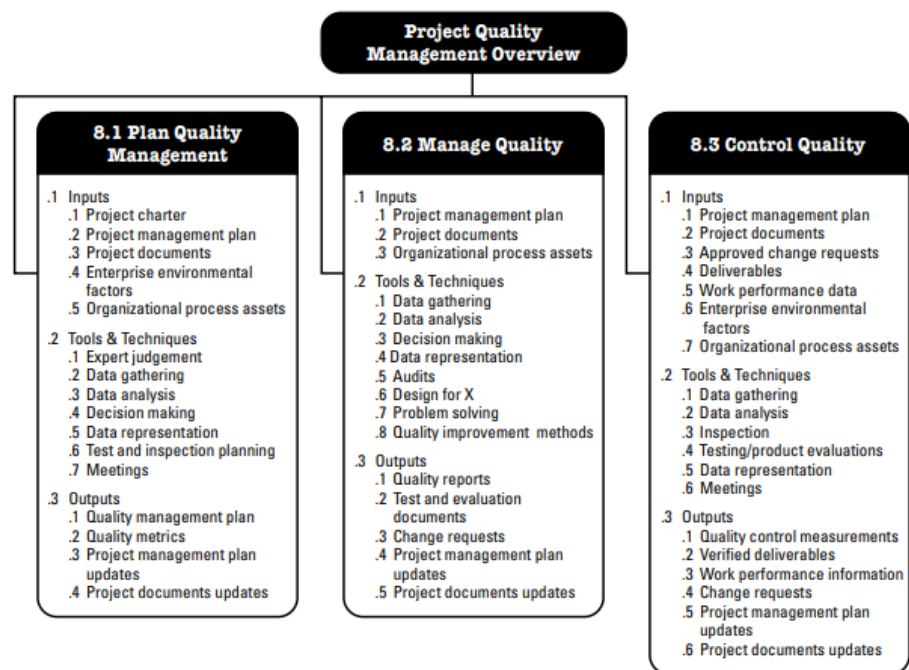


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5) **Project Quality Management** includes the processes for incorporating the organization's quality policy regarding planning, managing, and controlling project and product quality requirements in order to meet stakeholders' objectives (PMI, 2017, p. 271). There are three (3) processes in this knowledge area.

- Plan Quality Management
- Manage Quality
- Control Quality

Figure 7: Project Quality Management Overview



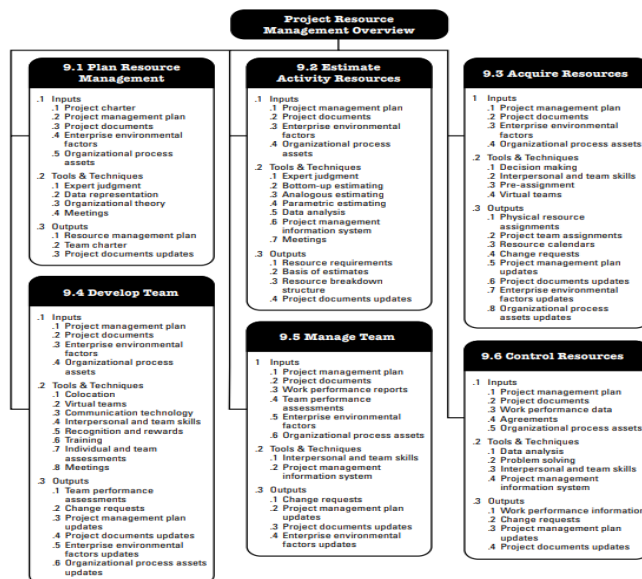
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6) **Project Resource Management** includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project (PMI, 2017, p. 307).

There are six (6) processes in this knowledge area.

- Plan Resource Management
- Estimate Activity Resources
- Acquire Resources
- Develop Team
- Manage Team
- Control Resources

Figure 8: Project Resource Management Overview

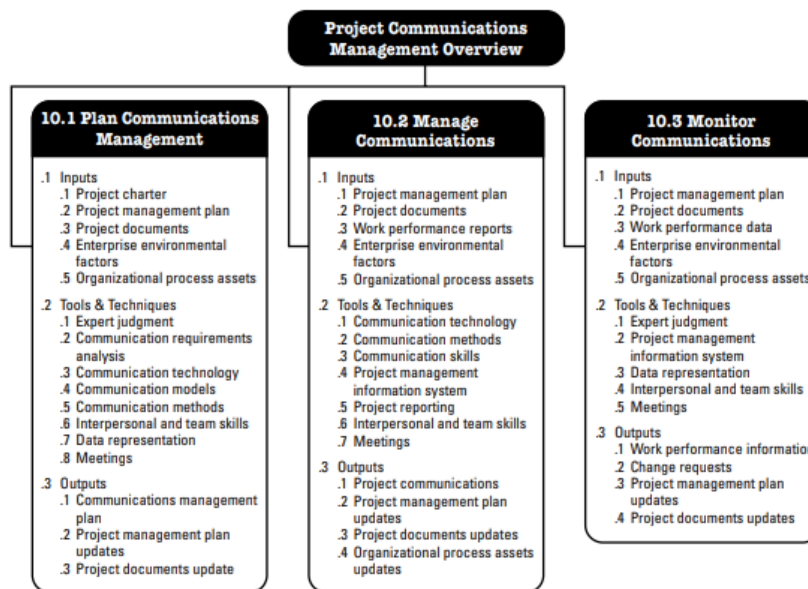


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7) **Project Communications Management** includes the processes necessary to ensure that the information needs of the project and its stakeholders are met through development of artifacts and implementation of activities designed to achieve effective information Exchange (PMI, 2017, p. 359). There are three (3) processes in this knowledge area.

- Plan Communications Management
- Manage Communications
- Monitor Communications

Figure 9: Project Communications Management Overview

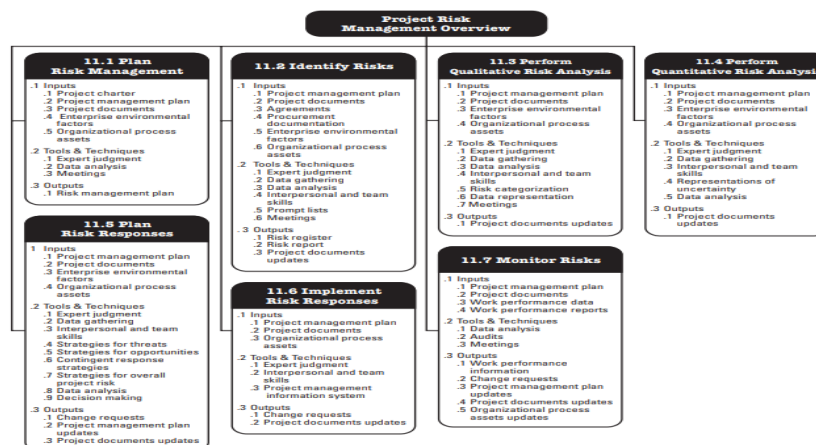


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8) **Project Risk Management** includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project (PMI, 2017, p. 395). There are seven (7) processes in this knowledge area.

- Plan Risk Management
- Identify Risks
- Perform Qualitative Risk Analysis
- Perform Quantitative Risk Analysis
- Plan Risk Responses
- Implement Risk Responses
- Monitor Risks

Figure 10: Project Risk Management Overview

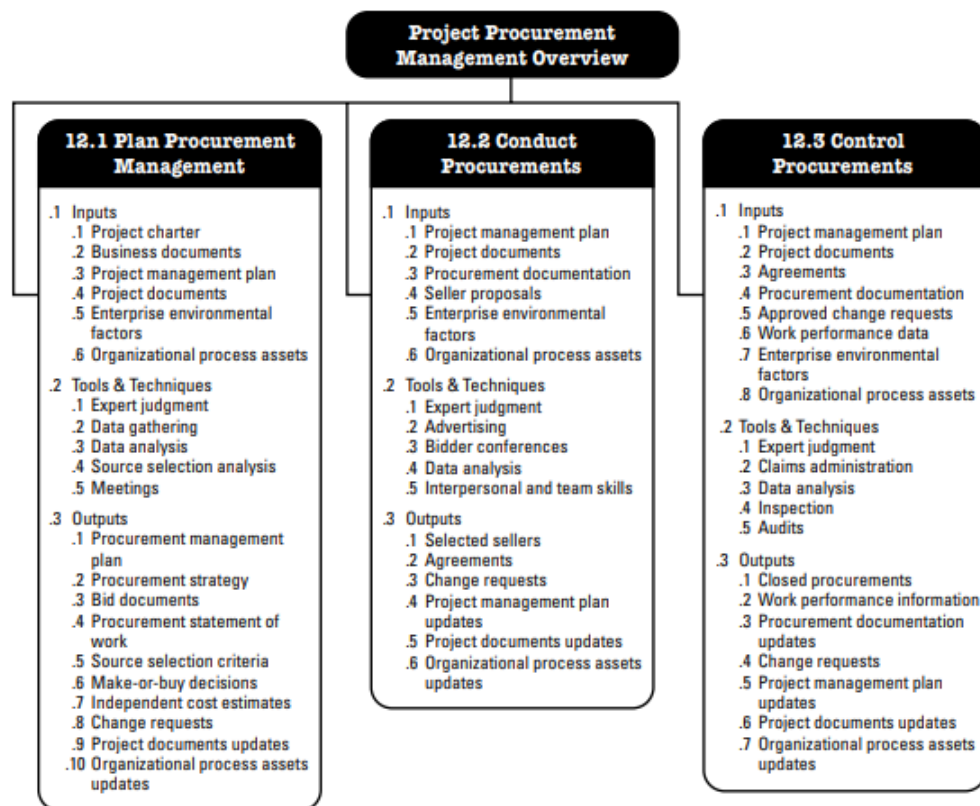


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9) **Project Procurement Management** includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team (PMI, 2017, p. 459). There are three (3) processes in this knowledge area.

- Plan Procurement Management
- Conduct Procurements
- Control Procurements

Figure 11: Project Procurement Management Overview

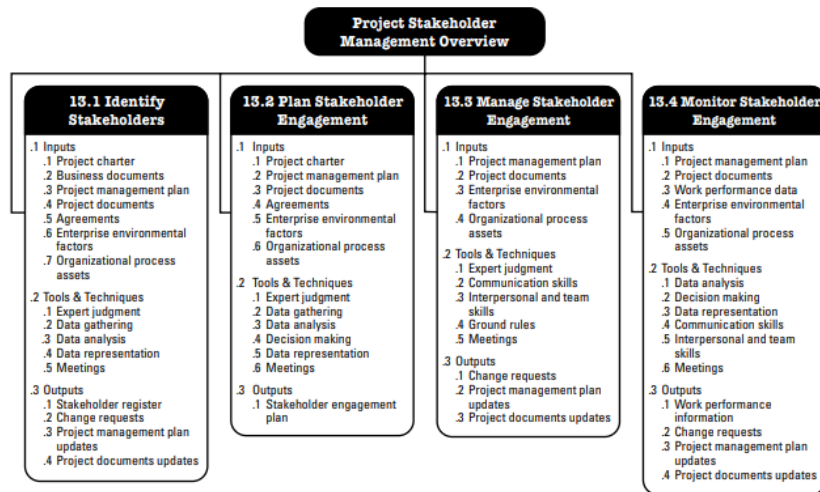


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10) Project Stakeholder Management includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution. (PMI, 2017, p. 503). There are four (4) processes in this knowledge area.

- Identify Stakeholders
- Plan Stakeholder Engagement
- Manage Stakeholder Engagement
- Monitor Stakeholder Engagement

Figure 12: Project Stakeholder Management Overview



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2.2.5.2 Project Management Tools Processes

PMI defines processes that fall into five process groups which are Initiating, Planning, Executing, Monitoring and Controlling, and Closing. Process groups are a logical grouping of project management inputs, tools and techniques, and outputs (PMI, 2017, p.18). PMI further reiterates that the project management process groups are not the project phases. The five process groups are explained below.

- **Initiating Process Group:** This process group involves the processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase (PMI 2017, p 23).

- **Planning Process Group:** This process group includes the processes that are required to establish the scope of the project, refine the objectives, and define the course of action required to attain the objectives that the project was undertaken to achieve (PMI 2017, p 23).
- **Executing Process Group:** This process group includes those processes performed to complete the work defined in the project management plan to satisfy the project requirements (PMI 2017, p 23).
- **Monitoring and Controlling Process Group:** This process group includes those processes required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes (PMI 2017, p 23).
- **Closing Process Group:** This process group includes those processes performed to formally complete or close the project, phase, or contract (PMI 2017, p 23).

Figure 13: Project Management Process Groups 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 | |

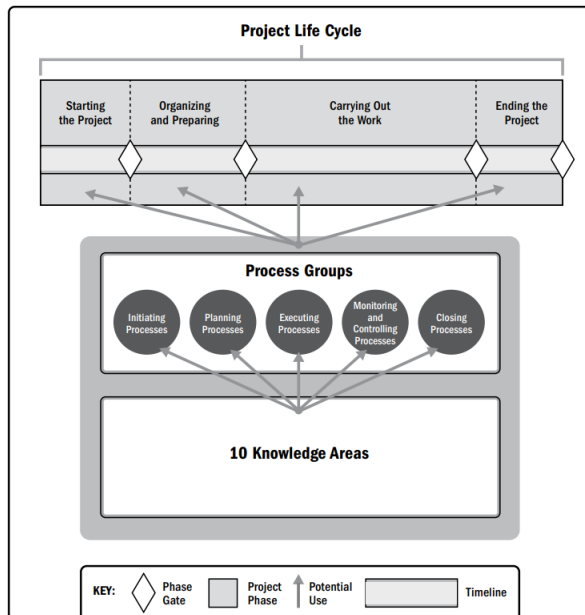
Note: Reprinted from A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition. Project Management Institute (PMI), 2017 Table 1- 4, p. 25

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2.2.6 Project life cycle

The Project Management Institute (2017) defines the project life cycle as “the series of phases that a project passes through from its initiation to its closure.” PMI illustrates the project life cycle in phases: starting the project, organizing and preparing, carrying out the work and closing the project. This general life cycle can be used to map all projects as shown in Figure 14. The phases can be sequential, iterative, or overlapping. PMI explains that the project lifecycle is managed through the execution of the project management processes.

Figure 14: Interrelationship of Project Management Concepts

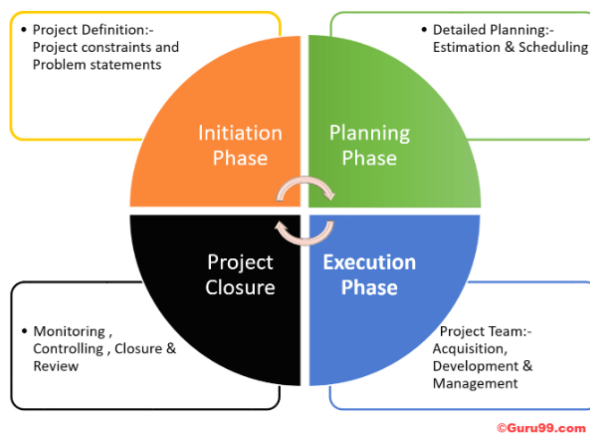


Note: Reprinted from A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition. Project Management Institute (PMI), 2017 Figure 1- 5, p. 18

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The Association for Project Management (2022) defines project management life cycle as a framework comprising a set of distinct high-level stages required to transform an idea of concept into reality in an orderly and efficient manner. According to Martin (2023), a project life cycle is a series of essential activities for accomplishing project objectives or targets. It consists of four main parts: Initiation, Planning, Execution, and Closure as shown in Figure 15.

Figure 15: Project Management Life Cycle Phases



Note: Reprinted from Martin, M. (2023). Project Management Life Cycle Phases: What are the stages? by Guru99. <https://www.guru99.com/initiation-phase-project-management-life-cycle.html>. Permission not sought.

The FGP will follow a similar representation of the project management life cycle, which is apt for a telecommunications project, using the following phases: Initiation, Planning, Execution, and Project Closure.

2.2.7 Company strategy, portfolios, programs and projects

Company Strategy

PMI explains that additional criteria for project success are linked to the organizational strategy and to delivery of business results. It details that in order to facilitate effective governance and management, portfolio components are grouped which supports in achieving organizational strategies and priorities.

According to Boyles (2022), business strategy is the strategic initiatives a company pursues to create value for the organization and its stakeholders and gain a competitive advantage in the market. He further elaborates on the importance of business strategy as the foundation of a company's success. Leaders set organizational goals and give companies a competitive edge. It determines various business factors, including:

- Price: Pricing of goods and services based on customer satisfaction and cost of raw materials
- Suppliers: Sourcing of materials sustainably and identifying which suppliers
- Employee recruitment: Attracting and maintaining talent
- Resource allocation: Effective allocation of resources

If a company does not have a clear business strategy, it cannot create value and is unlikely to succeed.

Portfolio

According to PMI (2017), a portfolio is defined as projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives. Portfolio is important in an organization in helping to ensure that the organization is investing in the appropriate areas and utilizes resources efficiently. Portfolio Management asserts that there is consistency in portfolios and their alignment with organizational strategies.

Programs

A program is defined as a group of related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits not available from managing them individually (PMI, 2017, p14). The optimal approach to managing projects is determined by focusing on interdependencies within a project and between Projects and program level. According to PMI (2017, p14), the actions related to these program and project-level interdependencies may include:

- Aligning with the organizational or strategic direction that affects program and project goals and objectives;
- Allocating the program scope into program components;
- Managing interdependencies among the components of the program to best serve the program;
- Managing program risks that may impact multiple projects in the program;
- Resolving constraints and conflicts that affect multiple projects within the program;
- Resolving issues between component projects and the program level;

- Managing change requests within a shared governance framework;
- Allocating budgets across multiple projects within the program; and
- Assuring benefits realization from the program and component projects.

Projects

A project is a temporary endeavor undertaken to create a unique product, service, or result (PMI, 2017, p. 4). Siles (2022) provides the definition of a project as a group of inter-related activities, constrained by time, cost, and scope, designed to deliver a unique purpose. There are key characteristics that define a project and make it unique from most ordinary work. The characteristics of a project are:

- Has a beginning and an end;
- Has limited resources;
- Follows a planned, organized method to meet its objectives with specific goals of quality and performance; and
- Every project is unique.

Both programs and projects are important because they are the medium through which the organization implements its business strategy. A comparative overview of Portfolios, Programs, and Projects is presented in Figure 16. From an organizational perspective of project, program, and portfolio management: Program and project management focus on doing programs and projects the “right” way; and Portfolio management focuses on doing the “right” programs and Projects (PMI, 2017, p. 12).

Figure 16: Comparative Overview of Portfolios, Programs and Projects

| Organizational Project Management | | | |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Projects | Programs | Portfolios |
| Definition | A project is a temporary endeavor undertaken to create a unique product, service, or result. | A program is a group of related projects, subsidiary programs, and program activities that are managed in a coordinated manner to obtain benefits not available from managing them individually. | A portfolio is a collection of projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives. |
| Scope | Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle. | Programs have a scope that encompasses the scopes of its program components. Programs produce benefits to an organization by ensuring that the outputs and outcomes of program components are delivered in a coordinated and complementary manner. | Portfolios have an organizational scope that changes with the strategic objectives of the organization. |
| Change | Project managers expect change and implement processes to keep change managed and controlled. | Programs are managed in a manner that accepts and adapts to change as necessary to optimize the delivery of benefits as the program's components deliver outcomes and/or outputs. | Portfolio managers continuously monitor changes in the broader internal and external environments. |
| Planning | Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle. | Programs are managed using high-level plans that track the interdependencies and progress of program components. Program plans are also used to guide planning at the component level. | Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio. |
| Management | Project managers manage the project team to meet the project objectives. | Programs are managed by program managers who ensure that program benefits are delivered as expected, by coordinating the activities of a program's components. | Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio. |
| Monitoring | Project managers monitor and control the work of producing the products, services, or results that the project was undertaken to produce. | Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits of the program will be met. | Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio. |
| Success | Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction. | A program's success is measured by the program's ability to deliver its intended benefits to an organization, and by the program's efficiency and effectiveness in delivering those benefits. | Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio. |

Note: Reprinted from A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition. Project Management Institute (PMI), 2017 Table 1-2, p. 13 Copyright 2017 by Project Management Institute, Inc.

The FGP to create a project management plan for expanding wireless telecommunication services to underserved communities in Belize belongs to “Projects.” This project has a specific scope, objectives, deliverables, occurring once which aims at defining the project

management plan and framework for the broader initiative of expanding services to underserved communities in Belize.

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

2.3.1 Current situation of the problem or opportunity in study

Belize has seen considerable growth in recent years in the telecommunications sector, but there are underserved and remote communities with limited or no access to affordable wireless telecommunication services. Telecommunication access is a key enabler for economic development, access to education, healthcare, and overall quality of life for these residents. Without access to these services, it hinders the overall development of the country. The Government, along with Digi, has recognized the need to address this issue. After partnering with Huawei Technologies in 2016, Digi has been engaged in expanding its wired and wireless network infrastructure to connect customers, improving lives, and developing communities. There have been barriers in limited resources, high cost of doing business, technology/regulatory requirements, and geographical hurdles which have made it challenging to reach these communities.

Digi continues to invest annually in gradually expanding its network infrastructure. Through its Engineering/Optimization Department, research and development is conducted to investigate affordable wireless technologies to reach remote locations. Proposed improvements involve considerations for construction of low-cost towers and wireless equipment in these remote locations. Partnership with local businesses has been an area that

Digi has explored and which has resulted in the implementation of telecommunication services in some areas of the country. The Marketing Department at Digi continually focuses on researching and strategizing on affordable or special pricing structures to make services more accessible to the Belizean population. Feasibility studies are carried out annually to assess economic solutions to reach some areas. However, some of these studies have not been viable.

Through its annual strategic goals, Digi has made it possible to expand telecommunication access to previously unconnected communities. It faced challenges such as hurricanes which damaged the infrastructure and affected limitations to funding.

The COVID-19 pandemic highlighted the need to prioritize telecommunication access which increases the efforts to bridge the digital divide. There is a demand for telecommunication services in underserved communities despite the challenges of Belize's geography, low population density, and high cost of services. These challenges present meaningful opportunities for growth and the FGP through its integrated project management plan is an essential step towards realizing the project effectively.

2.3.2 Previous research done for the topic in study

The current work has been on addressing individual projects, but there has not been one to uniquely address the overall problem of expanding affordable wireless telecommunication access to underserved communities in Belize with the application of a Project Management Plan. Nonetheless, these individual projects provide valuable knowledge for developing a

comprehensive project management plan to specifically address the problem of expanding affordable wireless telecommunication access to underserved communities in Belize.

There are initiatives by the Inter-American Telecommunication Commission (CITEL) to expand telecommunications in rural, unserved, or underserved areas observing regulatory provisions applicable in each country (Davalos, 2023). CITEL offers potential solutions to the main challenges such as promoting the use of a universal service fund modeled towards connectivity projects of this nature aimed at remote or underserved areas, provision for incentives by the government to small and community operators, promoting specific incentives for rural areas (investment, rates, contributions) and considerations of implementing new technologies among others.

Another research conducted is related to analyzing the situation in Belize focusing on connectivity for internet services and digital inclusion (ISP.Page, 2023). This study emphasizes the challenges in Belize such as the lack of infrastructure in rural areas and high cost of services. It concludes with the recommendation for the government and private sector companies to invest in infrastructure and expand coverage.

2.3.3 Other theory related to the topic in study

2.3.3.1 Sustainability

Green Project Management (2023) advises that to further support sustainability, it can be incorporated into all of project activities by identifying ways to mitigate any negative impacts of the project. Sustainability can be applied to ensure that the expansion of telecommunication services is one that benefits current and future generations in Belize. It

encourages consideration of the environmental impact when deploying telecommunication infrastructure. Sustainability involves exploring energy-efficient technologies or minimizing the ecological footprint of telecommunication Infrastructure.

From the social perspective, sustainability promotes inclusivity and equity. It will ensure that the benefits of telecommunication access are distributed equitably among different demographic groups within the underserved communities. From the economic dimension, it considers the long-term financial viability of the project and that it generates economic value for the communities.

2.3.3.2 Diffusion of Innovations

Diffusion of Innovations explains how new ideas, products, technologies, or innovations are adopted within a society (Vaidya, 2023). This theory was developed by Everett Rogers, an American sociologist in 1962. There are five (5) stages which describe the process of diffusion and highlight the different groups involved. The steps are as follows:

- **Knowledge:** At this stage, individuals or groups become aware of the existence of an innovation and gain knowledge about its features, benefits, and potential applications (Vaidya, 2023).
- **Persuasion:** In this stage, individuals or groups actively seek information and evaluate the innovation's advantages and disadvantages (Vaidya, 2023).
- **Decision:** This stage involves individuals deciding to adopt or reject the innovation (Vaidya, 2023).

- **Implementation:** This stage occurs when individuals or groups put the innovation into practice (Vaidya, 2023).
- **Confirmation:** This last stage, individuals evaluate their experience with the innovation and determine whether to continue using or adopting it (Vaidya, 2023).

This is a relevant theory for the FGP because it can help to explain how community members are likely to adopt the new telecommunication services and form the basis of the requirements and assist in the scope and risk management plan. The project management plan can consider the factors that influence the implementation of new innovations/technologies and develop strategies to address these factors.

3 METHODOLOGICAL FRAMEWORK

The methodological framework provides a comprehensive guide on how the FGP research is conducted, guides the process, techniques and approaches used to gather, analyze, and interpret the data. The FGP incorporates the information sources which are the primary and secondary sources. Secondly, the research methods utilized are defined and explained which consists of the analytical research method, qualitative research method and quantitative research method. It follows with a brief description and outline of the tools employed in the development of the FGP. Next, the assumptions and constraints for the FGP are described. Lastly, each of the twelve (12) specific objectives are presented with their respective deliverable and a brief description of their content.

3.1 Information sources

According to IGI Global (2023) an information source is “a person, thing, or place from which information comes, arises, or is obtained.” Sources of information support research, analysis or any form of information gathering. These sources range from physical (print, analog) versus online (electronic, digital), text versus audio-video, and book versus journal. Information sources can be classified into three main categories: primary, secondary, and tertiary sources.

The FGP will utilize both primary and secondary sources of information for the development of specific objectives.

3.1.1 Primary sources

Primary sources of information are “first hand accounts of research or an event including original scholarly research results, raw data, testimony, speeches, historic objects or other evidence that provides unique and original information about a person or an event”

University of Wisconsin-Stevens Point (2023). It was created at the point in time when the observation or event takes place. An eyewitness account is also considered as a primary source as it provides direct evidence or information. Primary sources of information enable researchers to directly access original ideas, events, and data. Examples of this type of source include interviews, government documents, speeches, technical reports, original journal research articles and eyewitness accounts.

The FGP will use primary sources of information which include Digi’s PMO Project management templates, personal interviews with Digi’s technical managers and executives, project documents from similar past Projects, meetings, email communication, personal interviews with Digi’s technical managers and executives, and Digi’s High-level costing for wireless network expansions.

3.1.2 Secondary sources

According to the University of Fort Hare (2021), secondary sources are “generally written at a later date and provide some discussion, analysis, or interpretation of the original primary source.” Thus, they are based on primary sources and are created after an event has occurred and are written by someone who was not present to experience or observe the event first-hand. It is emphasized that secondary sources are not evidence but rather

comment on and discuss past evidence. Some examples of secondary sources include textbooks, media documentaries, essays or reviews, and bibliographies.

The FGP will use the following secondary sources: PMBOK Guide 7th Edition, PMBOK Guide 6th Edition, Project Management Institute (PMI) online database, Government publications, case studies, Internet, Online Project Management communities, Internet and the Sustainable Project Management: The GPM Reference Guide.

Chart 1: Information Sources

| Objectives | Information sources | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Primary | Secondary |
| 1. To develop a project charter that defines the project's scope, objectives, and milestones to create the project management plan. | <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's technical managers and executives. • Project documents from similar past projects | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Case Studies • Internet |
| 2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success. | <ul style="list-style-type: none"> • Meetings • Email communication • Project documents from similar past projects | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |

| Objectives | Information sources | |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Primary | Secondary |
| <p>3. To develop the scope management plan that includes the scope of works required for successful completion of the project.</p> | <ul style="list-style-type: none"> • Personal interviews with Digi's technical managers and executives. • Meetings • Reports and other relevant company documents • Regulations | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |
| <p>4. To create a schedule management plan that ensures the timely completion of the project.</p> | <ul style="list-style-type: none"> • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication • Reports and other relevant company documents | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |

| Objectives | Information sources | |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Primary | Secondary |
| 5. To create a cost management plan for effective management of the budget in order to complete the project within budget. | <ul style="list-style-type: none"> • Digi's High-level costing for wireless network expansions • Personal interviews with Digi's technical managers and executives. | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |
| 6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project. | <ul style="list-style-type: none"> • Personal interviews with Digi's technical managers and quality managers, and executives. • Meetings • Email communication • Reports and other relevant company documents • Regulations | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Books • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |

| Objectives | Information sources | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Primary | Secondary |
| 7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project. | <ul style="list-style-type: none"> • Personal interviews with Digi's technical and resource managers and executives. • Meetings • Email communication • Reports and other relevant company documents | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |
| 8. To develop a communication plan to identify stakeholders and communication channels to facilitate effective information distribution and stakeholder management. | <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication • Reports and other relevant company documents | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |

| Objectives | Information sources | |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Primary | Secondary |
| 9. To create a risk management plan to identify potential project risks, assess and manage risks to enhance project resilience. | <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication • Reports and other relevant company documents | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |
| 10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully. | <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication • Reports and other relevant company documents | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |

| Objectives | Information sources | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Primary | Secondary |
| 11. To produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence, and potential impact on the project. | <ul style="list-style-type: none"> • Digi’s PMO Project management templates • Personal interviews with Digi’s technical managers and executives. • Meetings • Email communication • Reports and other relevant company documents | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet |
| 12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development. | <ul style="list-style-type: none"> • Personal interviews with Digi’s technical managers and executives. • Meetings • Email communication • Reports and other relevant company documents | <ul style="list-style-type: none"> • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Sustainable Project Management: The GPM Reference Guide • Internet |

Note: Own work

3.2 Research methods

The University of Newcastle (2023) defines research methods as “the strategies, processes or techniques utilized in the collection of data or evidence for analysis in order to uncover

new information or create better understanding of a topic.” These methods are the instrument through which researchers seek to answer the research questions, test hypothesis, or explore interesting occurrences. Research methods vary depending on the research and the objectives. To accomplish the objectives of the Project Management Plan within this FGP, three types of research methods will be employed. These include Analytical Research Method, Qualitative Research Method, and Quantitative Research Method. Chart 2 outlines the twelve (12) objectives and an explanation of the research methods for each objective.

3.2.1 Analytical Research Method

According to Mohanlal Sukhadia University (n.d), analytical research is “a specific type of research that involves critical thinking skills and the evaluation of facts and information relative to the research being conducted.” Thus, it focuses on interpretation of data and information. It exposes underlying patterns, relationships and insights within data or other sources of information.

3.2.2 Qualitative Research Method

Qualitative research “gathers data about lived experiences, emotions or behaviours, and the meanings individuals attach to them. It assists in enabling researchers to gain a better understanding of complex concepts, social interactions, or cultural phenomena. This type of research is useful in the exploration of how or why things have occurred, interpreting events and describing actions” (University of Newcastle, 2023). Qualitative techniques or tools include interviews, focus groups, observations, and document analysis.

3.2.3 Quantitative Research Method

Quantitative research “gathers numerical data which can be ranked, measured or categorized through statistical analysis. It assists with uncovering patterns or relationships, and for generalizing. This type of research is useful for finding out how many, how much, how often, or to what extent” (University of Newcastle, 2023). Common quantitative methods include surveys or questionnaires, observation, experiments, content analysis and statistical analysis.

Chart 2: Research Methods

| Objectives | Research methods | | |
|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| 1. To develop a project charter that defines the project’s scope, objectives, and milestones to create the project management plan. | The analytical method will be used to develop the project charter utilizing the primary and secondary sources identified in Chart 1. It will involve examining and analyzing past project charters, relevant company documents and information. | The qualitative method will be used to conduct interviews with project stakeholders and collect reports/accounts and qualitative data from these interviews. Insights and feedback will be gathered from stakeholders to | |

| Objectives | Research methods | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| | | develop the project charter. | |
| 2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success. | The analytical method will involve the analysis of historical integration management plans, the evaluation of best practices in integration. It will aim to identify key integration success factors to develop the Integration Management Plan. | The qualitative method will be utilized to conduct interviews with the project team members and facilitate focus group discussions. It will focus on gathering qualitative data about integration challenges and determine concepts and insights from these interactions to develop the Integration Management Plan. | The quantitative method will aim to collect numerical data related to integration activities to assess the effectiveness of integration to develop the Integration Management Plan. |
| 3. To develop the scope management plan that includes the scope of works required for | The analytical method will involve the analysis of historical project scope documents, the | The qualitative method will gather qualitative data about project scope challenges and | |

| Objectives | Research methods | | |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| successful completion of the project. | examination of information from the primary and secondary sources described in Chart 1. It will review project scope, change history, where available, to identify scope definition, common pitfalls and historical trends related to project scope to develop the Scope Management Plan. | extract key concepts and insights from the interactions with sources of information to develop the Scope Management Plan. | |
| 4. To create a schedule management plan that ensures the timely completion of the project. | The analytical method will analyze and examine the information from the primary and secondary sources identified in Chart 1. It will identify common scheduling bottlenecks, pitfalls, and historical trends related to project schedules to create the | The qualitative method will facilitate the gathering of qualitative insights into scheduling issues, challenges, and best practices. Qualitative data in key sections of this knowledge area will be collected | The quantitative method will collect numerical data on various schedule parameters, including task durations, dependencies, |

| Objectives | Research methods | | |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| | Schedule Management Plan. | and analyzed to create the Schedule Management Plan. | and risks. Statistical measures will be calculated to assess the schedule-related data quantitatively to create the Schedule Management Plan. |
| 5. To create a cost management plan for effective management of the budget in order to complete the project within budget. | The analytical method will involve the analysis of historical project cost data, evaluation of industry benchmarks, and review of cost estimation methods as identified from sources in Chart1. This method will identify common cost management issues, historical cost trends, and industry | The qualitative method will gather qualitative insight into cost management, challenges, potential improvements, and best practices to create the Cost Management Plan. | The quantitative method will collect numerical data on cost-related parameters, such as cost estimates, budgets, and project expenses to create the |

| Objectives | Research methods | | |
|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| | best practices to create the Cost Management Plan. | | Cost Management Plan. |
| 6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project. | The analytical method will be employed for the analysis of historical project quality data, the evaluation of industry quality standards and best practices, and the review of quality management tools and methodologies from the primary and secondary sources identified in Chart 1. It will identify common quality management issues, historical quality trends, and industry best practices to assist in creating the Quality Management Plan. | The qualitative method will be utilized to gather qualitative insights into quality issues, challenges, and potential improvements. Qualitative data will be collected and analyzed for key quality concepts insights to create the Quality Management Plan | |

| Objectives | Research methods | | |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| 7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project. | The analytical method will be employed for the analysis of historical resource allocation and utilization data, evaluation of industry best practices from sources indicated in Chart 1, for resource management, and the review of resource management tools and methodologies. This method will identify common resource management issues, historical resource trends, and industry best practices to create the Resource Management Plan. | The qualitative method will be utilized to gather qualitative insights into resource management challenges, potential improvements, and best practices. Qualitative data will be collected and analyzed for key quality concepts and insights to create the Resource Management Plan. | |
| 8. To develop a communication plan to identify stakeholders and | The analytical method will be employed for the analysis of historical project | The qualitative method will be utilized to gather qualitative insights | |

| Objectives | Research methods | | |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| communication channels to facilitate effective information distribution and stakeholder management. | communication records, the evaluation of industry best practices for communication planning, and the review of communication tools and methodologies from sources indicated in Chart 1. This method will identify common communication bottlenecks, historical communication trends, and industry best practices to develop the Communication Management Plan. | into communication issues, challenges, and potential improvements. Qualitative data will be collected and analyzed for key communication concepts and insights to create the Communication Management Plan. | |
| 9. To create a risk management plan to identify potential project risks, assess and manage risks to | The analytical method will be employed for the analysis of historical project risk data, the evaluation of industry best practices | The qualitative method will be utilized to conduct risk identification workshops with project stakeholders | |

| Objectives | Research methods | | |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| enhance project resilience. | for risk management, and the review of risk management tools and methodologies from sources indicated in Chart 1. This method will identify common risk management issues, historical risk trends, and industry best practices to create the Risk Management Plan. | and interviews to gather qualitative insights on project risks. Qualitative data will be collected and analyzed for key risk management concepts and insights to create the Risk Management Plan. | |
| 10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully. | The analytical method will be employed for the analysis of historical project procurement data, the evaluation of industry best practices for procurement management, and the review of procurement management tools and methodologies from sources indicated in | The qualitative method will be utilized to gather qualitative insights into procurement issues, challenges, and potential improvements. Qualitative data will be collected and analyzed for key procurement concepts and | |

| Objectives | Research methods | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| | Chart 1. This method will identify common procurement management issues, historical procurement trends, and industry best practices to develop the Procurement Management Plan. | insights to develop the Procurement Management Plan. | |
| 11. To produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence and potential impact on the project. | The analytical method will be employed for the analysis of historical stakeholder engagement and feedback data, the evaluation of industry best practices for stakeholder management, and the review of stakeholder management tools and methodologies from sources indicated in Chart 1. This method will identify common | The qualitative method will be utilized to gather qualitative insights into stakeholder needs, concerns, and expectations. Qualitative data will be collected and analyzed for key stakeholder concepts and insights to develop the Stakeholder Management Plan. | |

| Objectives | Research methods | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| | stakeholder management issues, historical stakeholder engagement trends, and industry best practices to develop the Stakeholder Management Plan. | | |
| 12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development. | The analytical method will be employed for the analysis of historical project data, including environmental and social impact data. It also includes the evaluation of industry best practices for sustainable development and the review of sustainability frameworks and methodologies from sources indicated in Chart 1. This method | The qualitative method will be utilized to gather qualitative insights into sustainability aspects, impacts, and potential improvements. Qualitative data will be collected and analyzed for key sustainability concepts and insights to develop the Sustainable Development Plan. | |

| Objectives | Research methods | | |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|
| | Analytical Research Method | Qualitative Research Method | Quantitative Research Method |
| | will identify common sustainability challenges, historical sustainability trends, and industry best practices to develop the Sustainable Development Plan. | | |

Note: Own work

3.3 Tools

A tool is defined as “something tangible, such as a template or software program, used in performing an activity to produce a product or result” (Project Management Institute, 2017, p. 725). Project management tools serve a unique purpose and assist project managers and project teams in planning, executing, monitoring, controlling, and closing of projects. These tools facilitate the work in project management such as in scheduling, resource allocation, risk assessment and communication.

Tools utilized for the development of the FGP include the following:

1. Project Charter Template – The document outlines the key aims and benefits of the project.

2. **Expert judgement-** Expert judgment is when an expert is called in with a specific area of expertise to get a skilled opinion (Raeburn, 2023). The FGP will rely on the insights, opinions, and experience of experts to make informed decisions and assessments.
3. **Data Gathering Techniques-** This refers to the methods and processes used to collect, capture, and obtain relevant information and data about various aspects of a project. The main techniques used are brainstorming, interviews, focus groups, and surveys.
4. **Data Analysis-** It is the process of examining, cleaning, transforming, and interpreting project-related data to obtain meaningful insights, draw conclusions, and make informed decisions. The FGP employs techniques such as document analysis, alternative and cost-benefit analysis accordingly in the context of the various knowledge areas.
5. **Meetings-** It facilitates communication, collaboration, and coordination among team members and Stakeholders in the project. It will be used accordingly in the context of the various knowledge areas.
6. **Project Management Information System (PMIS)-** The PMIS provides access to information technology (IT) software tools, such as scheduling software tools, work authorization systems, configuration management systems, information collection and distribution systems, including interfaces to other online automated systems such as corporate knowledge base repositories (Project Management Institute, 2017, p. 95).
7. **Interpersonal and Team Skills-** The set of abilities employed to engage and communicate with others in the context of the various knowledge areas to develop the FGP.

8. Decomposition- This consists of the process of breaking a large, complex project into smaller, more manageable parts. It will be primarily used in the scope and schedule management areas.
9. Critical Path Method- This technique involves identifying the tasks that are necessary for project completion and determining flexibility in the scheduling.
10. Estimating- The estimating process involves predicting or approximating various project-related factors, such as time, cost, resources, and scope. The main ones used in the FGP are analogous, parametric, and bottom-up estimating methods.
11. Historical Information Review- This tool is used in the cost management area to assist in developing the estimates.
12. Data representation- It consists of visual and graphical techniques used to present project-related information and data in a clear, concise, and understandable manner. It will be used accordingly in the context of the various knowledge areas.
13. Benchmarking- It involves the process of comparing project-related practices, processes, performance metrics, and outcomes against established standards or best practices. The primary goal of benchmarking in the FGP is to identify areas where the project can improve by learning from the successes and failures of similar projects or industry standards.
14. Inspection- An inspection is defined as “the examination of a work product to determine if it conforms to documented standards” (Project Management Institute, 2017, p. 303). Inspection is employed in the quality management area.

15. Testing- Testing is defined as “an organized and constructed investigation conducted to provide objective information about the quality of the product or service under test in accordance with the project requirements” (Project Management Institute, 2017, p. 303). This tool is utilized in the quality management area.
16. Communication requirements analysis- This tool determines the information that the stakeholder needs. It is obtained through interviews and the lessons learned from the previous projects.
17. Communication technology- It is employed in the communication management knowledge area as a tool to transfer different information among project stakeholders using email, shared portal among others.
18. Communication models- It is employed in the communication management knowledge area as a tool to facilitate the explanation of processes and people involved in transmitting information. Some types to be used in the FGP are verbal, written, and visual.
19. Communication methods- This tool involves several methods used to share information among project stakeholders. It is employed in the communication management knowledge area and different approaches are applied to meet the communication defined in the communication management plan.
20. Strategies- This consists of threat response, opportunity response, contingent response and overall project risk responses.
21. Communication Skills- This consists of applying communication to express the project goals and expectations to team members clearly.

Chart 3: Tools

| Objectives | Tools |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. To develop a project charter that defines the project's scope, objectives and milestones to create the project management plan. | <ul style="list-style-type: none"> • Project Charter Template • Expert Judgment • Data Gathering Techniques including Brainstorming, Focus groups, and Interviews • Meetings |
| 2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success. | <ul style="list-style-type: none"> • Expert Judgement • Data gathering Techniques including Brainstorming, Focus groups and Interviews • Data analysis • Meetings • Interpersonal and team skills including active listening • Project Management Information System |
| 3. To develop the scope management plan that includes the scope of works required for successful completion of the project. | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering Techniques including Brainstorming and Interviews • Data Analysis • Meetings • Decomposition |
| 4. To create a schedule management plan that ensures the timely completion of the project. | <ul style="list-style-type: none"> • Project management information system (MS Project) • Critical Path Method • Expert Judgment |

| Objectives | Tools |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> • Data Analysis • Meetings • Decomposition • Parametric Estimating • Analogous Estimating • Bottom-up Estimating |
| <p>5. To create a cost management plan for effective management of the budget in order to complete the project within budget.</p> | <ul style="list-style-type: none"> • Expert judgment • Data Analysis • Meetings • Analogous estimating • Parametric estimating • Bottom-up estimating |
| <p>6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project.</p> | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering including Brainstorming and Interviews • Data Analysis • Meetings • Benchmarking • Data Representation • Inspection • Testing |
| <p>7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project.</p> | <ul style="list-style-type: none"> • Expert Judgment • Data Representation • Analogous estimating • Parametric estimating • Bottom-up estimating |

| Objectives | Tools |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> • Project management information system (MS Project) • Meetings • Data Gathering Techniques |
| <p>8. To develop a communication plan to identify stakeholders and communication channels to facilitate effective information distribution and stakeholder management.</p> | <ul style="list-style-type: none"> • Expert Judgment • Communication requirements analysis • Communication technology • Communication models • Communication methods • Interpersonal and team skills • Data representation • Meetings |
| <p>9. To create a risk management plan to identify potential project risks, assess and manage risks to enhance project resilience.</p> | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering including Brainstorming and Interviews • Data Analysis • Meetings • Strategies |
| <p>10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully.</p> | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering including Brainstorming and Interviews • Data Analysis • Meetings • Inspection • Audits |
| <p>11. To produce a stakeholder management plan to identify and analyze project stakeholders to</p> | <ul style="list-style-type: none"> • Expert Judgment |

| Objectives | Tools |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| manage their interests, influence, and potential impact on the project. | <ul style="list-style-type: none"> • Data Gathering including Brainstorming and Interviews • Data Analysis including Stakeholder Analysis • Data Representation including Stakeholder Engagement assessment matrix • Meetings • Interpersonal and team skills including active listening • Communication Skills |
| 12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development. | <ul style="list-style-type: none"> • Expert Judgment • Interviews • Meetings • Data Gathering • Data Analysis • P5 Impact Analysis |

Note: Own work

3.4 Assumptions and constraints

An assumption is defined as “a factor in the planning process that is considered to be true, real, or certain, without proof or demonstration” (Project Management Institute, 2017, p. 699). According to Malik (2022), project assumptions are events or circumstances that are expected to occur during the lifecycle of a project. A constraint is defined by PMI (2017, p.701) as “a limiting factor which affects the execution of a project, program, portfolio or process.”

In the context of the FGP, assumptions may include factors such as the availability of specific resources and regulatory/government permits or approvals to deploy the new telecommunication services in underserved communities. It is important to consider these assumptions because if it turns out to be incorrect, it can delay the project timeline, budgets, and the objectives. Constraints in the FGP may include factors such as budget limitations, time constraints, regulatory requirements, and resource availability. Constraints influence how the project management plan is developed and executed for the FGP. They can impact resource allocation, and the overall project strategy.

Chart 4 outlines the assumptions and constraints in the development of the FGP.

Chart 4: Assumptions and Constraints

| Objectives | Assumptions | Constraints |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1. To develop a project charter that defines the project's scope, objectives, and milestones to create the project management plan. | The project charter will be the first document created. | There is limited time available to create the project charter document. |
| 2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success. | It is assumed that all necessary integration tasks, activities, and processes will ensure the project is synchronized and creates cohesion. | There may be complexities in recognizing all tasks, activities, and processes within the allocated time frame. |

| Objectives | Assumptions | Constraints |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| | It is assumed that there is effective communication channels and tools available for project integration and coordination. | There is limited time for which integration activities can be completed. |
| 3. To develop the scope management plan that includes the scope of works required for successful completion of the project. | It is assumed that the project information to define the scope is readily available. It is assumed that stakeholders in Digi are helpful in the development of the scope. | The time allocated for the development of the scope plan is limited. |
| 4. To create a schedule management plan that ensures the timely completion of the project. | It is assumed that the project schedule is practical for completing the project. It is assumed that adverse weather conditions will not significantly impact the project schedule. | The availability of specialized resources in the underserved communities is limited. |
| 5. To create a cost management plan for effective management of the budget in order to complete the project within budget. | It is assumed that material and resource costs will remain stable throughout the project. | The budget constraints may limit the procurement options. |

| Objectives | Assumptions | Constraints |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project. | It is assumed that the wireless technologies selected will meet the required quality standards. | The budget constraints may compromise the quality standards. |
| 7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project. | It is assumed that necessary resources such as skilled personnel and equipment are available. | There are limited project resources to execute the project. There are competing projects within Digi. |
| 8. To develop a communication plan to identify stakeholders and communication channels to facilitate effective information distribution and stakeholder management. | It is assumed that stakeholders will actively support and promote the project. | There is insufficient response from stakeholders. Tools used in communication are not readily available or are unstable which may affect engagement of stakeholders. |
| 9. To create a risk management plan to identify potential project risks, assess and manage risks to enhance project resilience. | It is assumed that all possible risks are identified in the risk management plan. | There is limited historical data which may constrain risk assessment and mitigation planning. |

| Objectives | Assumptions | Constraints |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully. | It is assumed that local suppliers can meet the procurements requirements. | The budget constraint may limit procurement options. There may be shipping delays with foreign shipments. |
| 11. To produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence, and potential impact on the project. | It is assumed that stakeholder interests align with the project's objectives. It is assumed that stakeholders identified will provide timely feedback. | The stakeholder attitudes and interests can change over time and create dynamic constraints. |
| 12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development. | It is assumed that the project activities align with the sustainable goals of the country. It is assumed that adequate resources (financial, human, and technological) are available to support the sustainable development initiatives. | There may be environmental regulations and permits which may hinder sustainable development practices. The development of the sustainable development plan can be constrained by the project timeline. |

Note: Own work

3.5 Deliverables

A deliverable is defined as “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” (Project Management Institute, 2017, p. 704). Miller (2023) states that “project deliverables refer to the specific project outputs that you strive to generate within a given timeframe and budget.” Examples include a project document, business report, website, product, and more. Deliverables in the FGP serve as the tangible outputs that result from the efforts of project management planning. It helps in defining and structuring the FGP, verifying alignment with the specific objectives. Deliverables are used to measure the project’s success. They are clearly identified and documented in the project management plan to guide the execution of the project and provide a basis for evaluation and reporting.

The FGP consists of the deliverables defined in Chart 5. The deliverables to be produced are:

1. Project Charter
2. Integration Management Plan
3. Scope Management Plan
4. Schedule Management Plan
5. Cost Management Plan
6. Quality Management Plan
7. Resource Management Plan
8. Communications Management Plan
9. Risk Management Plan
10. Procurement Management Plan
11. Stakeholder Management Plan
12. Sustainable Development Plan

Chart 5: Deliverables

| Objectives | Deliverables |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. To develop a project charter that defines the project's scope, objectives, and milestones to create the project management plan.</p> | <p>Project Charter</p> <p>The project charter outlines the scope, objectives, stakeholders, and overall purpose of the project. It is a document issued by the project sponsor that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities (PMI, 2017, p.34).</p> |
| <p>2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success.</p> | <p>Integration Management Plan</p> <p>The integration management plan outlines the different project management processes and activities for integration and coordination. It is a key deliverable which provides the framework for managing the overall project.</p> |
| <p>3. To develop the scope management plan that includes the scope of works required for successful completion of the project.</p> | <p>Scope Management Plan</p> <p>The scope management plan defines how the project scope will be defined, validated, and controlled throughout the project. The deliverable ensures clarity regarding what is included in the scope and what is out of scope.</p> |
| <p>4. To create a schedule management plan that ensures the timely completion of the project.</p> | <p>Schedule Management Plan</p> <p>The schedule management plan defines the criteria and activities on how the project</p> |

| Objectives | Deliverables |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | schedules will be developed, monitored and controlled. This deliverable ensures that the project stays on track. |
| 5. To create a cost management plan for effective management of the budget in order to complete the project within budget. | <p>Cost Management Plan</p> <p>The cost management plan outlines how project costs will be estimated, budgeted, and controlled. This deliverable helps to manage the project finances.</p> |
| 6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project. | <p>Quality Management Plan</p> <p>The quality management plan is a component of the project management plan that describes how applicable policies, procedures, and guidelines will be implemented to achieve the quality objectives (PMI, 2017, p. 286). The activities and resources necessary are described for the project management team to achieve the quality objectives defined for the project.</p> |
| 7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project. | <p>Resource Management Plan</p> <p>The resource management plan details how the project resources, including personnel, equipment, and materials are categorized, allocated, managed, and released.</p> |
| 8. To develop a communication plan to identify stakeholders and communication channels to | <p>Communication Management Plan</p> <p>The communication management plan outlines how project communications will be</p> |

| Objectives | Deliverables |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| facilitate effective information distribution and stakeholder management. | planned, structured, implemented, and monitored, including who will receive what information and when. |
| 9. To create a risk management plan to identify potential project risks, assess and manage risks to enhance project resilience. | <p>Risk Management Plan</p> <p>The risk management plan details how project risks will be identified, assessed, mitigated, and monitored, supporting to minimize potential project disruptions.</p> |
| 10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully. | <p>Procurement Management Plan</p> <p>The procurement management plan involves procuring goods or services from external vendors, the plan for managing these procurements.</p> |
| 11. To produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence, and potential impact on the project. | <p>Stakeholder Management Plan</p> <p>The stakeholder management plan outlines the strategies and actions on how stakeholders will be identified, categorized, engaged, and managed throughout the project. This deliverable promotes productive involvement of stakeholders in decision making and execution (PMI, 2017, p.522)</p> |
| 12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end | <p>Sustainable Development Plan</p> <p>The sustainable development plan outlines strategies, actions, and metrics to evaluate the relationship and impact of the project's</p> |

| Objectives | Deliverables |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| product in the regenerative and sustainable development. | implementation and its end product on regenerative and sustainable development. This deliverable will focus on how the project aligns with environmental, social, and economic sustainability goals. |

Note: Own work

4 RESULTS

Chapter 4 presents the findings and results of each deliverable of the FGP. It includes the Project Charter, Integration Management Plan, Scope Management Plan, Schedule Management Plan, Cost Management Plan, Quality Management Plan, Resource Management Plan, Communications Management Plan, Risk Management Plan, Procurement Management Plan, Stakeholder Management Plan and Sustainable Development Plan.

4.1. Project Charter

The primary sources of information for the project charter are past project charter documents, and insights gained through interviews with Digi's technical managers, designers, and wireless engineers. Secondary sources include the PMBOK Guide 6th Edition and organizational process assets such as historical data from past wireless projects. Key tools and techniques utilized involve expert judgement derived from the technical knowledge within the wireless telecommunication industry obtained within the organization. The data gathering process includes interviews and meetings with key project stakeholders. The output of the develop project charter process is the creation of the project charter outlined in Chart 6.

Chart 6: Project Charter

| PROJECT CHARTER | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Date | Project Name |
| November 11, 2023 | Expansion of Wireless Telecommunication Services to Underserved Communities in Belize |
| Knowledge Areas / Processes | Application Area (Sector / Activity) |
| <p>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 and Project Stakeholder Management.</p> <p>Process groups: Initiating, Planning, Executing, Monitoring and Controlling</p> | Telecommunications |
| Start Date | Finish Date |
| November 11, 2023 | December 31, 2024 |
| Project Objectives (General and Specific) | |
| <p>General Objective: To expand wireless telecommunication services to underserved communities in Belize, fostering sustainable and regenerative practices to bridge the digital divide and enhance overall community development.</p> <p>Specific Objectives:</p> <ol style="list-style-type: none"> 1. To conduct a comprehensive analysis to identify specific communities in Belize lacking adequate wireless telecommunication services. 2. To evaluate the existing telecommunication infrastructure in underserved communities to determine the specific telecommunications requirements and challenges. | |

| |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 3. To undertake a detailed feasibility study including economic, technical, and environmental aspects to assess the viability and potential challenges of deploying wireless telecommunication services. 4. To explore and assess innovative wireless telecommunication technologies to determine the most effective and sustainable solutions for extending telecommunication services. 5. To integrate sustainable and regenerative practices in project execution to minimize environmental impact and contribute positively to community well-being. 6. To deploy innovative wireless technologies to extend telecommunication access for improved connectivity in the targeted underserved communities. |
| <p>Project Purpose or Justification (Merit and Expected Results)</p> <p>The project aims to expand wireless telecommunication services to underserved communities in Belize. This project is driven by the need to bridge the digital divide, enhance economic opportunities, and improve overall quality of life in these communities in Belize.</p> |
| <p>Description of Product or Service to be generated by the Project – Project Final Deliverables</p> <p>The project will provide the following deliverables:</p> <ol style="list-style-type: none"> 1. A detailed requirements assessment report will be generated, gathering findings from community surveys and interviews to provide insights into the identified needs and challenges within these underserved areas. 2. Documentation on technological solutions and innovations, outlining the available wireless telecommunication technologies and considerations for implementing innovative solutions. 3. A comprehensive Feasibility Study Report presenting economic, technical, and environmental feasibility assessments along with recommendations for project viability. 4. The implementation of sustainable and regenerative practices will be integrated into the project plan. 5. The installation of new wireless network infrastructure to provide affordable and accessible telecommunication services to residents in underserved communities, including voice, data, broadband internet, and other related services. |
| <p>Assumptions</p> <ol style="list-style-type: none"> 1. The project will receive support and cooperation from Digi and regulatory authorities. 2. The budget allocated for the project is sufficient for its successful completion. 3. The residents in the underserved communities will actively engage and collaborate throughout the project. 4. The selected wireless technologies align with the regulatory policies in Belize. |
| <p>Constraints</p> <ol style="list-style-type: none"> 1. The project will not exceed its allocated budget of USD \$300K. 2. Limited availability of skilled personnel, materials, and equipment may pose challenges to the timely and efficient implementation of the project. |

3. The geographic landscape of Belize, including remote and underserved areas, presents challenges in terms of accessibility, logistics, and the installation of telecommunication infrastructure.
4. Adherence to regulatory requirements and compliance with telecommunications and environmental standards may pose constraints on project activities.
5. The project may face constraints related to the availability and compatibility of innovative wireless technologies suitable for the expansion of telecommunication services.

Preliminary Risks

1. Technical challenges may arise during the implementation of wireless technologies.
2. Regulatory changes may impact the project timeline and budget.
3. Inclement weather may delay the deployment of the wireless equipment.
4. Environmental factors may affect the sustainability initiatives.
5. Community resistance or misunderstanding could hinder project success.

Budget

The total estimated Project Cost: USD \$ 300, 000

Milestones and Dates

| Milestones | Start Date | End Date |
|---------------------------------------------------------------------|-------------------|-------------------|
| Project Start | November 11, 2023 | November 11, 2023 |
| Analysis of identified specific communities | November 12, 2023 | November 30, 2023 |
| Submission of an Infrastructure Assessment Report | December 1, 2023 | December 15, 2023 |
| Development & Integration of Sustainable and Regenerative practices | December 18, 2023 | January 5, 2024 |
| Network Design of Wireless Solution | January 5, 2024 | January 31, 2024 |
| Deployment of Wireless Technology by Districts | February 1, 2024 | November 29, 2024 |
| Testing and Optimization of Solution | December 2, 2024 | December 20, 2024 |
| Community Awareness and Training | December 2, 2024 | December 13, 2024 |
| Monitoring and Final Acceptance | December 9, 2024 | December 20, 2024 |
| Full Network Commercial Launch | December 23, 2024 | December 31, 2024 |
| Project End | December 31, 2024 | December 31, 2024 |

Relevant Historical Information

Belize has seen considerable growth in recent years in the telecommunications sector but there are underserved and remote communities with limited or no access to affordable wireless telecommunication services. Telecommunication access is a key enabler for economic development, access to education, healthcare, and overall quality of life for these residents. Without access to these services, it hinders the overall development of the country.

The Government along with Digi have recognized the need to address this issue. After partnering with Huawei Technologies in 2016, Digi has been engaged in expanding its wired and wireless network infrastructure to connect customers, improving lives, and developing communities. There have been barriers in limited resources, high cost of doing business, technology/regulatory requirements and geographical hurdles which have made it challenging to reach these communities.

Digi continues to invest annually in gradually expanding its network infrastructure. Through its Engineering/Optimization Department, research and development is being conducted to investigate affordable wireless technologies to reach remote locations. Proposed improvements involve considerations for construction of low-cost towers and wireless equipment in these remote locations.

The COVID-19 pandemic highlighted the need to prioritize telecommunication access which increases the efforts to bridge the digital divide. There is a demand for telecommunication services in underserved communities despite the challenges of Belize's geography, low population density, and high cost of services. These challenges present meaningful opportunities for growth.

Stakeholders

Direct Stakeholders:

1. Project Sponsor: Chief Operations Officer
2. Project Manager
3. Chief Financial Officer
4. Project Team members: Technical Leads, Wireless Designers, Radio Telecommunication Engineers, PMO Manager, Resource Managers, Operations Team, Field Technicians
5. Project Steering Committee
6. Community Residents
7. Technology Partners
8. Contractors

Indirect Stakeholders:

1. Public Utilities Regulator
2. Department of the Environment
3. Community/Village Councils
4. Non-Government Organizations
5. Belize Tourism Industry
6. Small Businesses and Entrepreneurs
7. Belize Electricity Limited
8. Funding Agencies
9. Suppliers

| | |
|--------------------------------------|-------------------|
| Project Manager: Heidi Cruz | Signature: |
| Authorized by: John Fernandez | Signature: |

Note: Own Work

4.2. Integration Management Plan

Project Integration Management includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups (PMI, 2017, p. 69). Project integration management is crucial as it serves to align all the project components, ensuring a unified approach towards achieving the expansion of wireless telecommunication services to underserved communities in Belize.

The first process is to develop the project charter which is presented in section 4.1. The subsequent outlined processes will be incorporated into the Project Integration Management Plan.

4.2.1 Integrated Change Control Process

It is vital to follow the Perform Integrated Change Control process to maintain control of the project and ensure that changes are managed in an organized manner. This process helps prevent scope creep, controls project baselines, and ensures that changes align with the project's objectives. For any change requests in the Expansion of Wireless Telecommunication Services to Underserved Communities in Belize Project, it will be initiated and managed with a change request form. This form was developed using the existing template format from the Digi Project Management Office with a few modifications.

Change Control Request Document

Expansion of Wireless Telecommunication Services to Underserved Communities in Belize

Document Information

This section provides general document information.

| | |
|-----------------------------------------------|-------------------------------|
| Change Control Request Document Number | CR-001 |
| Date | Click or tap to enter a date. |
| Project Phase | |
| Requested By | |
| Category of Change | Choose an item. |

Project Information

This section provides a brief overview of key information related to the project.

| | |
|------------------------------------------------|---------------------------------------------------------------------------------------|
| Project # | |
| Project Name | Expansion of Wireless Telecommunication Services to Underserved Communities in Belize |
| Approved Budget Value | |
| Current Project Estimated Cost | |
| Actual Planned Project Start Date | |
| Current Planned Project Completion Date | |
| Current Project Status | |
| Project / Program Sponsor(s) | |
| Project Manager | |

Type of Change

This section highlights the major project area that will be impacted due to the proposed change.

- | | | |
|----------------------------------|-----------------------------------|-----------------------------------------|
| <input type="checkbox"/> Cost | <input type="checkbox"/> Resource | <input type="checkbox"/> Scope |
| <input type="checkbox"/> Quality | <input type="checkbox"/> Schedule | <input type="checkbox"/> Project Status |

Change Description

This section provides a detailed description of the proposed change.

Change Justification / Reason

This section provides the reason/justification for the proposed change.

Impact of Change

The table below summarizes the impact the proposed change will have on the various project areas.

| Category | Change Impact | Description |
|----------|-----------------------------------------|--------------------------------------------------------------------------|
| Cost | <input type="checkbox"/> Increase | From: To: |
| | <input type="checkbox"/> Decrease | |
| | <input type="checkbox"/> Modify | |
| | <input type="checkbox"/> Not Applicable | |
| Quality | <input type="checkbox"/> Increase | |
| | <input type="checkbox"/> Decrease | |
| | <input type="checkbox"/> Modify | |
| | <input type="checkbox"/> Not Applicable | |
| Resource | <input type="checkbox"/> Increase | |
| | <input type="checkbox"/> Decrease | |
| | <input type="checkbox"/> Modify | |
| | <input type="checkbox"/> Not Applicable | |
| Schedule | <input type="checkbox"/> Increase | From: Click or tap to enter a date. To: Click or tap to enter a date. |
| | <input type="checkbox"/> Decrease | |
| | <input type="checkbox"/> Modify | |
| | <input type="checkbox"/> Not Applicable | |
| Scope | <input type="checkbox"/> Increase | |
| | <input type="checkbox"/> Decrease | |
| | <input type="checkbox"/> Modify | |
| | <input type="checkbox"/> Not Applicable | |

| | | |
|----------------|-----------------------------------------|----------------------------------------------|
| Project Status | <input type="checkbox"/> Modify | From: Choose an item. To: Choose an item. |
| | <input type="checkbox"/> Not Applicable | |

Impact of Not Implementing the Change

This section provides the impact of not implementing the proposed change.

Proposed Action Plan

This section details the actions to be taken to implement the proposed change.

Items Not Approved

This section highlights the items that are not approved or are part of the change.

-

Documents to be Amended as a Result of the Change

This section lists all the documents that require amendment due to the proposed change.

-

Attachments

Below are all the supporting documents for this change request.

| Document Name | Link/Attachment |
|-------------------|-----------------|
| Presentation(s) | |
| Decision Paper(s) | |

Approval

- I have reviewed the above change request document and agree to the below recommendation which will be effective on [Click or tap to enter a date.](#)

Recommendation

| Approval | | Explanations and/or Conditions |
|----------|--------------------------|--------------------------------|
| Approve | <input type="checkbox"/> | |
| Defer | <input type="checkbox"/> | |

| | | |
|--------|--------------------------|--|
| Reject | <input type="checkbox"/> | |
|--------|--------------------------|--|

| Name | Role | Signature | Date |
|------|-------------------------------------------|-----------|------|
| | Project Manager | | |
| | Manager, Project Management Office | | |
| | General Manager (Executing Department) | | |
| | Project Sponsor(s) | | |
| | [Other Key Stakeholders] | | |

During the life of the project to view and track all the changes that will be generated with the Change Control Request Document, the change request log displayed in Chart 7 will be used. The log identifies the overall information and status of the changes.

Chart 7: Change Request Log

| Project Information | | | | | | | | | | | | |
|---------------------|----------------|-----------------|--------------|-------------|--------|----------|----------|--------|-------------|---------------------|----------|----------|
| Project Name: | | | | | | | | | | | | |
| Project #: | | | | | | | | | | | | |
| Project Manager: | | | | | | | | | | | | |
| Change Request Log | | | | | | | | | | | | |
| Change Number | Type of Change | Date Identified | Requested by | Description | Status | Priority | Assigned | Action | Impact Area | Escalation Required | Sign Off | Comments |
| CR-001 | | | | | | | | | | | | |
| CR-002 | | | | | | | | | | | | |
| CR-003 | | | | | | | | | | | | |
| CR-004 | | | | | | | | | | | | |
| CR-005 | | | | | | | | | | | | |
| CR-006 | | | | | | | | | | | | |
| CR-007 | | | | | | | | | | | | |
| CR-008 | | | | | | | | | | | | |
| CR-009 | | | | | | | | | | | | |
| CR-010 | | | | | | | | | | | | |

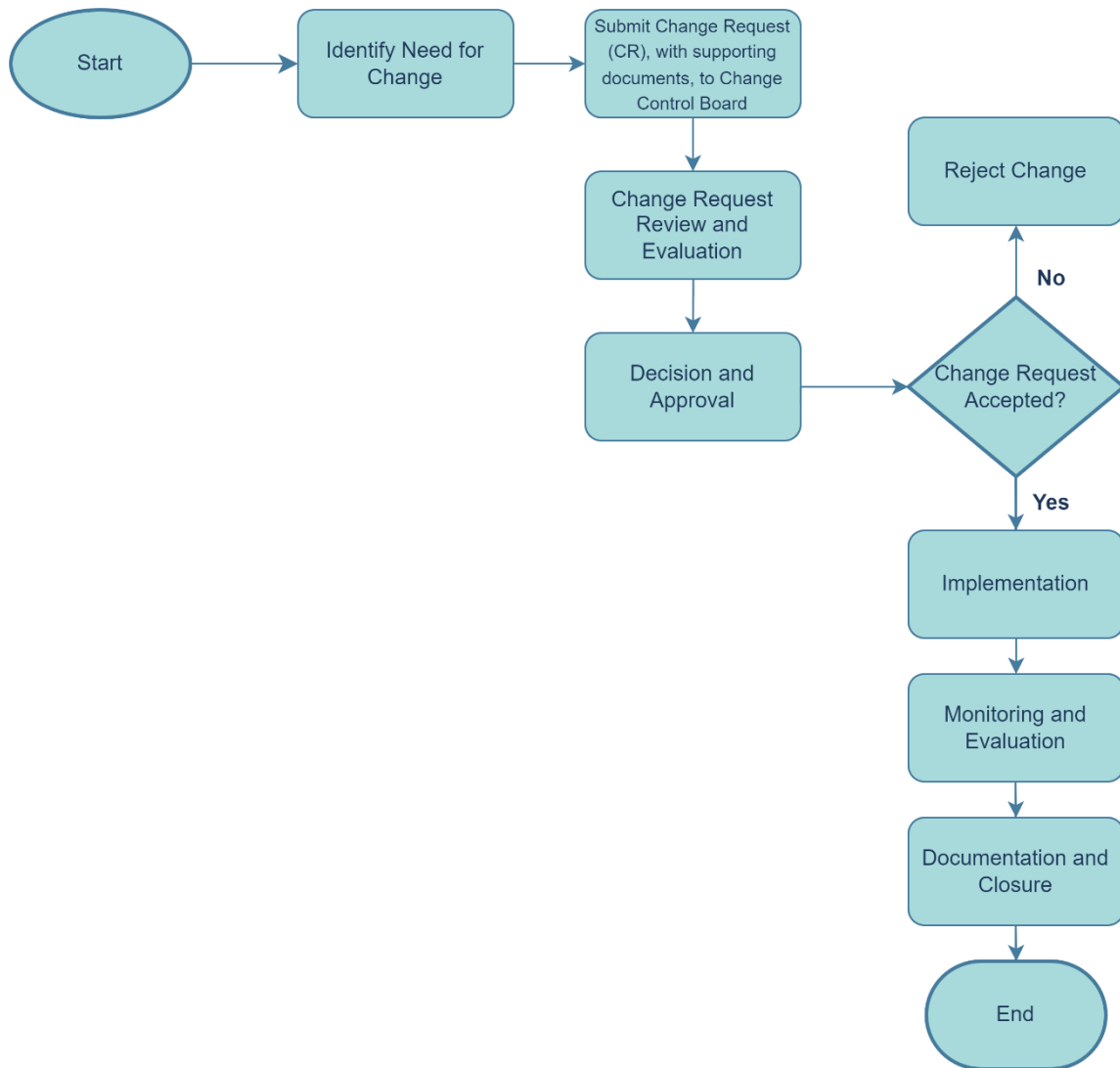
Note: Own Work

The change control process illustrated in Figure 17 will be in place to support the project manager and project teams to manage changes effectively and efficiently. The Change Control Board (CCB) will include representatives from various divisions, such as Digi executives, project management, engineering, and finance. Communication and transparency are crucial throughout the process to ensure stakeholder buy-in and manage stakeholder expectations. The phases of this process are:

1. Identify Need for Change: Identify problem, opportunity, or improvement related to scope, schedule, resources, cost, quality, schedule or project status.
2. Submit Change Request: Complete change request control document with required details.
3. Review and Evaluation: The Change Control Board (CCB) reviews the request, considering the following:
 - Alignment with project objectives and scope
 - Feasibility and technical soundness
 - Financial viability and potential cost impact
 - Legal and regulatory compliance
 - Impact on community engagement and social responsibility
 - May request additional information or clarification
4. Decision and Approval: The CCB decides to:
 - Approve the change: Define approval conditions and mitigation strategies. Update project documentation and communication plan.

- Reject the change: Provide clear rationale and feedback to the change requestor
 - Request modifications: Work with the change requestor to refine the change control request document.
5. Implementation: If approved, the change is developed and implemented as follows.
- Updates to project schedule, budget, and resource allocation
 - Communicate changes to stakeholders (e.g., project team, communities, regulatory agencies)
 - Implement mitigation strategies for potential risks and social impacts
 - Monitor and track progress of the change implementation
6. Monitoring and Evaluation: The CCB and project team will monitor the change for effectiveness and ongoing project performance as follows:
- Track progress against revised schedule and budget
 - Measure the impact on project objectives
 - Identify and address any issues or deviations from the approved change
 - Conduct regular reviews and evaluations
7. Closure:
- Document lessons learned from the change process
 - Update project documentation, reports to reflect final status
 - Close the change request and archive documentation

Figure 17: Change Control Process Flow



Note: Own Work

4.2.2 Project Closure

The Project Management Institute (2017) addresses finalizing all activities for the project and the formal closure of the project in the Close Project process. This process will confirm that all aspects of the Expansion of Wireless Telecommunication Services to Underserved

Communities in Belize Project are completed and documented appropriately. The activities which will be followed for the administrative closure of the project include the subsequent list.

1. Final inspection and wireless coverage footprint report of the underserved communities.
2. Final Acceptance documentation of project deliverables signed by Project Manager, Project Sponsor, Project Leads, and key stakeholders.
3. Financial Closure ensuring final payment of contract obligations and invoices are met.
4. Lessons learned will be conducted and documented along with the project team. These lessons learnt and best practices will be documented for future projects to improve processes and results.
5. Handover of the operational network to the functional operational teams.
6. Closure Report will be provided that summarizes the project achievements, challenges, key metrics, and recommendations. Formal Sign-off on the closure report will be obtained.
7. Archiving documents in a designated repository and establishing access permissions and controls for future use.

4.3. Scope Management Plan

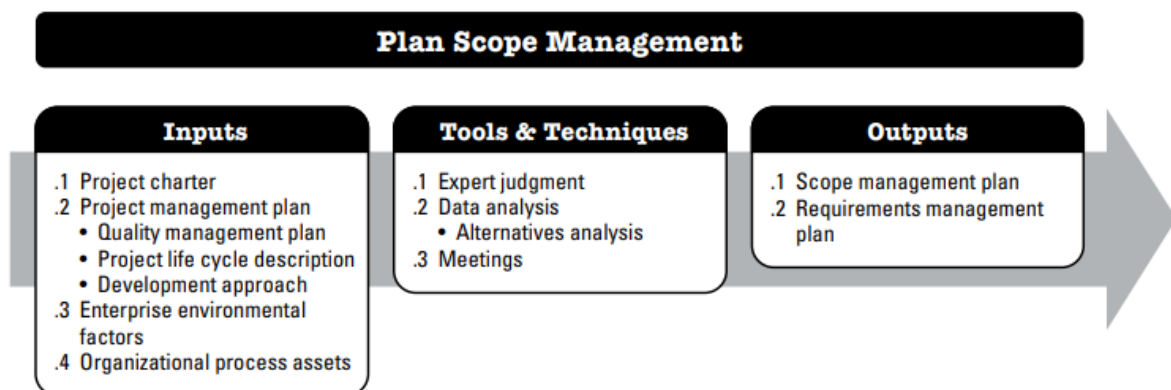
The third objective of the Final Graduation Project is the development of the scope management plan that includes the scope of works required for successful completion of the project. Project Scope Management includes the processes required to ensure that the project includes all the required, and only the work required, to complete the project successfully (PMI, 2017, p.129). The processes include plan scope management, collect

requirements, define scope, create work breakdown structure (WBS), validate scope and control scope.

4.3.1 Plan Scope Management

The Plan Scope Management process for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize provides a strategy to define, manage, and control the project's scope. This plan outlines how the project scope will be determined, validated, and controlled throughout the project lifecycle. Additionally, it establishes a framework for managing any changes to the project scope and ensures that the scope is clearly understood and agreed upon by all stakeholders. The Plan Scope Management serves as a guide to ensure the project stays on track and delivers the intended outcomes within the defined scope boundaries. Figure 18 depicts the Inputs, Tools & Techniques and Outputs for this process.

Figure 18: Plan Scope Management: Inputs, Tools & Techniques, and Outputs



Note: Reprinted from A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition. Project Management Institute (PMI), 2017 Figure 5-2, p. 134 Copyright 2017 by Project Management Institute, Inc.

The inputs used to develop the Scope Management Plan were the project charter, historical information from past wireless projects managed by the Project Management Office and the lessons learnt repository. The tools and techniques used to support the development of the scope management plan include expert judgement and meetings with the technical leads and resource managers. The output resulted in the Scope Management Plan.

4.3.2 Collect Requirements

The collect requirements process includes gathering and documenting stakeholder needs and expectations to define the project scope. The process involves identifying both the functional and non-functional requirements, documenting them in a clear and comprehensive manner, and gaining consensus among stakeholders on these requirements. The inputs employed for this process are the project charter, assumptions log, stakeholder register, and lessons learned register. Expert judgement, brainstorming, interviews, focus groups, observations/conversations supported the project team to obtain the project requirements effectively. The main output is the requirements traceability matrix which was utilized to aid in understanding the relationship between requirements and allowing the project manager to track the project requirements from their start to their implementation and validation. It ensures that no requirements are missed or left unresolved. The requirements traceability matrix serves as a reference guide throughout the project to help the project team maintain alignment with the needs of the stakeholders. Chart 8 presents the requirements traceability matrix for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project.

Chart 8: Requirements Traceability Matrix

| ID | Requirements Description | Goals/Objectives | Project Objectives | Verification | Priority |
|------|-----------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|----------------------------------------------|----------|
| REQ1 | Comprehensive analysis to identify communities lacking telecommunication services | Bridge the digital divide | Conduct analysis to identify underserved communities | Review analysis report | High |
| REQ2 | Evaluation of existing telecommunication infrastructure in underserved areas | Improve connectivity in the communities | Assess current infrastructure in targeted communities | Inspection report of existing infrastructure | High |
| REQ3 | Feasibility study encompassing economic, technical, and environmental aspects | Ensure Project viability | Conduct comprehensive feasibility study | Review feasibility study documentation | High |
| REQ4 | Exploration and assessment of innovative telecommunication technologies | Enhance effectiveness of the services | Assess effectiveness of innovative technologies | Evaluation report on explored technologies | Medium |
| REQ5 | Integration of sustainable practices in project execution | Minimize environmental impact | Implement sustainable practices | Compliance audit with sustainable guidelines | High |
| REQ6 | Deployment of innovative wireless technologies | Improve connectivity in the communities | Deploy innovative technologies in targeted communities | Implementation confirmation report | High |

Note: Own work

4.3.2.1 Scope Management Roles and Responsibilities

The roles and responsibilities of stakeholders for the project are defined in Chart 8. The key stakeholders such as the Sponsor, Project Manager and Project Steering Committee will help in monitoring and controlling the project scope. Stakeholders know whom to approach for specific scope-related queries or concerns and facilitate smoother communication flow. The clearly defined roles ensure everyone understands their tasks, minimizing confusion and preventing duplication of efforts. It also establishes accountability, ensuring that each stakeholder knows their contribution towards scope management.

Chart 9: Scope Management Roles and Responsibilities

| Role | Responsibilities |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sponsor(s) | <ul style="list-style-type: none"> • Provide guidance on the project’s strategic direction • Approve budget and resources • Approve project documents as required • Approve decisions on proposed scope changes as required |
| PMO Manager | <ul style="list-style-type: none"> • Accountable for the Project Manager’s Performance • First point of escalation for the Project Manager • Accountable for the adherence to PMI’s methodology and standards • Approve project documents as required • Approve decisions on proposed changes as required |
| Project Manager | <ul style="list-style-type: none"> • Develop the scope management plan • Collect and document project requirements • Oversee scope validation and control • Single point of contact for project |

| Role | Responsibilities |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> • Coordinate activities of consultants, contractors, and project team • Provide Sponsor and PMO feedback on approach, structure, priorities, and objectives • Recommend to Sponsor and PMO the budget and resources required • Ensure the operations and end users' interests are represented on the project • Accountable for project progress • Approve project team documents as required • Make decisions on proposed changes within their level of authority • Authorize expenditures from contingency funds changes within their level of authority |
| Project Steering Committee | <ul style="list-style-type: none"> • Review and approve the scope management plan • Resolve scope related issues and conflicts |
| Product Owner | <ul style="list-style-type: none"> • Defines and maintains product vision, goals, and objectives to ensure the vision is aligned with business objectives • Create and maintain product backlog • Coordinate activities of consultants, contractors, and project team during development • Project Manager feedback on approach, structure, priorities, and objectives • Recommend to Project Manager the budget and resources required • Ensure the operations and end users' interests are represented on the Project |

| Role | Responsibilities |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> • Accountable for each stage of the development process and the final product • Review and approve project team documents as required • Make decisions on proposed changes within their level of authority |
| Project Team Members | <ul style="list-style-type: none"> • Understand and adhere to the defined project scope and objectives. • Identify and report any scope-related issues or changes. • Participate in scope definition and validation. • Contribute to the scope management process. |
| Operations / End User | <ul style="list-style-type: none"> • Provide feedback on approach, structure, priorities, objectives, and requirements • Approve project documents as required • Approve decisions on proposed changes as required • Define and communicate their needs and expectations. • Participate in scope definition and validation. • Review and approve project deliverables and changes to scope. |
| Other Stakeholders | <ul style="list-style-type: none"> • Provide clear and concise requirements • Participate in requirement validation and acceptance |

Note: Own work

4.3.3 Define Scope

According to PMI (2017, p. 150), define scope is the process of developing a detailed description of the project and product. This process establishes a clear understanding of what the project aims to achieve, what it includes, and what does not, ensuring there is alignment with the project objectives and stakeholder expectations. The inputs used are the project charter, enterprise environmental factors and organizational process assets. The tool and technique used was expert judgement within Digi. The main output of this process is the development of the scope statement which resulted in outlining the project's scope, including deliverables, constraints, assumptions, and acceptance criteria.

Chart 10: Scope Statement

| Project Scope Statement | |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Information | |
| Project Phase: | Initiation |
| Project Name: | Expansion of wireless telecommunication services to underserved communities in Belize |
| Estimated Budget: | USD \$ 300, 000 |
| Estimated Project Start: | November 11, 2023 |
| Estimated Project End: | December 31, 2024 |
| Scope Definition | |
| Scope Description: | The project will focus on assessing, planning, and implementing wireless telecommunication services in identified underserved communities in Belize. This includes a comprehensive evaluation of existing infrastructure, feasibility studies, exploration of innovative technologies, and deployment of sustainable solutions to bridge the digital divide and enhance community development. |

| Project Scope Statement | |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Deliverables: | <ol style="list-style-type: none"> 1. Comprehensive analysis report identifying underserved communities. 2. Evaluation report outlining the current telecommunication infrastructure status in identified communities. 3. Feasibility study report covering economic, technical, and environmental assessments. 4. Assessment report on innovative wireless telecommunication technologies. 5. Project plan integrating sustainable practices for environmental and community well-being. 6. Implementation plan for deploying wireless technologies in underserved communities. |
| Scope Exclusions: | The project scope does not involve physical infrastructure development beyond telecommunication services. It excludes unrelated telecommunication services unrelated to the project objectives and areas outside the identified underserved communities in Belize. |
| Acceptance Criteria: | <ol style="list-style-type: none"> 1. Successful identification of communities lacking telecommunication services. 2. Completion of comprehensive evaluations and feasibility studies within the stipulated time frame. 3. Selection of viable and sustainable wireless technologies for deployment that meets the needs of residents in underserved communities. 4. Successful deployment of wireless telecommunication services in targeted communities which meets the established key performance indicators (KPI). 5. Adoption of sustainable practices resulting in positive environmental impact. 6. Enhanced community connectivity and well-being measured through improved access and utilization of telecommunication services. |
| Assumptions: | <ol style="list-style-type: none"> 1. It is assumed there is availability of necessary technological resources and expertise. 2. It is assumed that local stakeholders and community members support the project and will cooperate through the process. |

| Project Scope Statement | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 3. It is assumed that there will be unlimited access to relevant data and information required for assessments and planning. |
| Constraints: | <ol style="list-style-type: none"> 1. The budget will not exceed the allocated budget of USD \$300, 000. 2. The project will adhere to regulatory and legal frameworks governing telecommunications. 3. Geographical challenges and infrastructure limitations in certain communities. |
| Scope Statement Decision | |
| <input type="checkbox"/> Approved <input type="checkbox"/> Approved with modifications <input type="checkbox"/> Rejected <input type="checkbox"/> Deferred | |
| Approval Date: | |
| Project Manager: | Printed Name: Signature: |
| Project Sponsor | Printed Name: Signature: |

Note: Own work

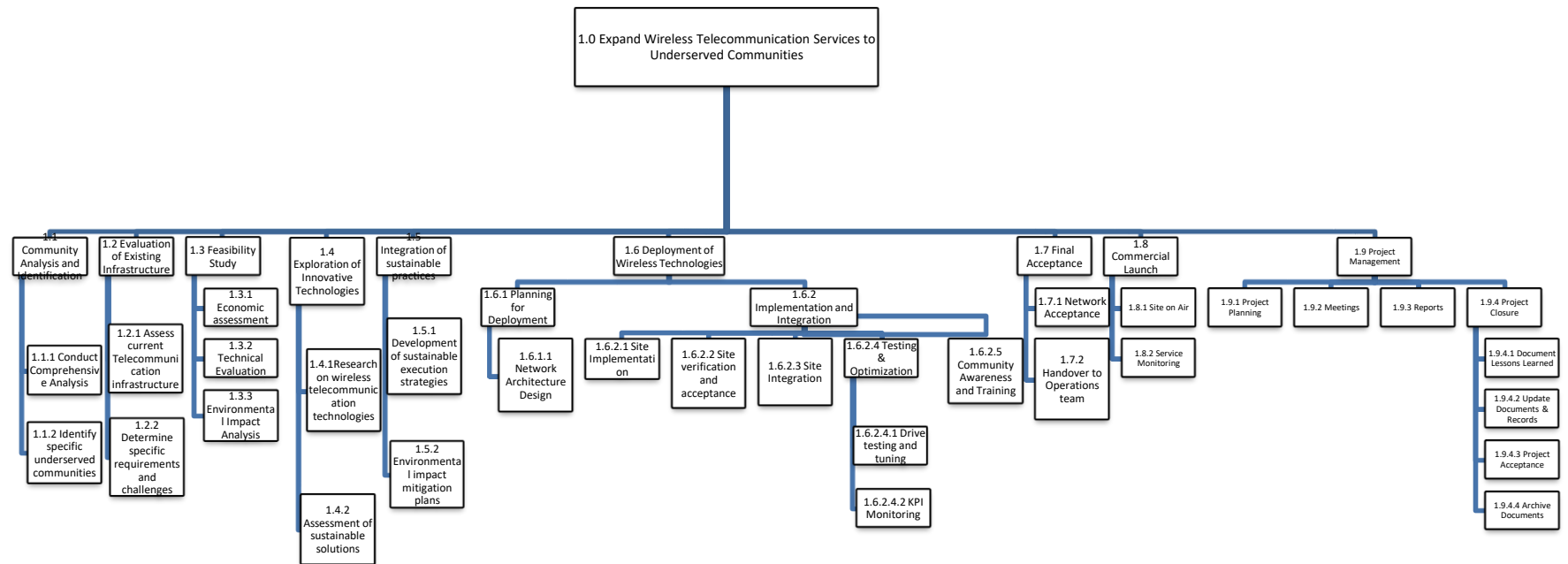
4.3.4 Create Work Breakdown Structure (WBS)

Create work breakdown structure is the process of subdividing the project's deliverables and project work into smaller, more manageable components (PMI, 2017, p. 156). This systematic breakdown helps in organizing, understanding, and managing the scope, facilitating better planning, execution, and control the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project.

4.3.4.1 Work Breakdown Structure

Figure 19 represents the WBS for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project and which will be carried out by the project team to accomplish the objectives and deliverables.

Figure 19: Work Breakdown Structure



Note: Own work

4.3.4.2 Work Breakdown Structure (WBS) Dictionary

The WBS dictionary accompanies the WBS and acts as a reference document to help clarify and provide more context to each element defined in the WBS. It supports the project manager and project team in understanding the scope of work and associated details for effective project execution. Chart 11 represents a structured breakdown of the project objectives into manageable tasks, each with a unique identifier, and a description of the work.

Chart 11: WBS Dictionary

| WBS Level | WBS Code | WBS Name | Description of Work |
|-----------|----------|-----------------------------------------------------------------------|-------------------------------------------------------------------|
| 1 | 1 | Expand Wireless Telecommunication Services to Underserved Communities | Overall project objective |
| 2 | 1.1 | Community Analysis and Identification | Identify specific communities lacking adequate services |
| | 1.1.1 | Conduct Comprehensive Analysis | Gather demographic, geographic, and connectivity data |
| 3 | 1.1.2 | Identify specific underserved communities | Evaluate collected data to pinpoint underserved communities |
| 2 | 1.2 | Evaluation of Existing Infrastructure | Assess functionality and coverage of existing infrastructure |
| 3 | 1.2.1 | Assess current Telecommunication infrastructure | Evaluate functionality and coverage of existing infrastructure |
| 3 | 1.2.2 | Determine specific requirements and challenges | Identify gaps and challenges in current infrastructure |
| 2 | 1.3 | Feasibility Study | Conduct a comprehensive feasibility study |
| 3 | 1.3.1 | Economic assessment | Evaluate economic aspects of deploying telecommunication services |

| WBS Level | WBS Code | WBS Name | Description of Work |
|------------------|-----------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 3 | 1.3.2 | Technical Evaluation | Assess technical feasibility of deploying wireless technologies |
| 3 | 1.3.3 | Environmental Impact Analysis | Study the potential environmental impacts |
| 2 | 1.4 | Exploration of Innovative Technologies | Evaluate various wireless technologies |
| 2 | 1.4.1 | Research on wireless telecommunication technologies | Explore innovative wireless technologies |
| 3 | 1.4.2 | Assessment of sustainable solutions | Assess the sustainability aspects of proposed technologies |
| 2 | 1.5 | Integration of sustainable practices | Assess the sustainability aspects of proposed technologies |
| 3 | 1.5.1 | Development of sustainable execution strategies | Implement sustainable and regenerative practices |
| 3 | 1.5.2 | Environmental impact mitigation plans | Implement measures to reduce environmental impact |
| 2 | 1.6 | Deployment of Wireless Technologies | Deploy wireless technologies in underserved communities |
| 3 | 1.6.1 | Planning for Deployment | High level plan of the requirements, network backhaul and RF design for each of the sites to cover the communities |
| 4 | 1.6.1.1 | Network Architecture Design | Low level design of the Network and integration to the existing infrastructure |
| 3 | 1.6.2 | Implementation and Integration | Installation of the Network and integrating to the existing core Network infrastructure |
| 4 | 1.6.2.1 | Site Implementation | Installation and commissioning of hardware and software at each site |
| 4 | 1.6.2.2 | Site verification and acceptance | Confirmation that all sites have been installed and commissioned as per site installation standards |
| 4 | 1.6.2.3 | Site Integration | Integration of each site to the backhaul network and to the core infrastructure |
| 4 | 1.6.2.4 | Drive testing and tuning | Testing and optimization of the network for maximum efficiency |
| 4 | 1.6.2.5 | KPI Monitoring | Monitor and evaluate the network performance |

| WBS Level | WBS Code | WBS Name | Description of Work |
|------------------|-----------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | 1.7 | Final Acceptance | All deliverables have been met and network is in full commercial mode. |
| 3 | 1.7.1 | Network Acceptance | All key performance indicators have meet met |
| 3 | 1.7.2 | Handover to Operations team | Project and the new Wireless network are handed over to the operations team for daily monitoring and maintenance of the network. |
| 2 | 1.8 | Commercial Launch | All sites go on air and are serving the communities with telecommunication services |
| 3 | 1.8.1 | Site on Air | Site is on commercial mode and provides wireless telecommunication services |
| 3 | 1.8.2 | Service Monitoring | Assess the network and Service performance via the Network Operation Center for reliable wireless services to ensure quality of services 24/7. |
| 2 | 1.9 | Project Management | All activities related to managing, planning, and controlling the project. |
| 3 | 1.9.1 | Project Planning | The creation and maintenance of the project management plan. It includes defining project scope, objectives, deliverables, schedules, resources, and strategies to achieve project goals. |
| 3 | 1.9.2 | Meetings | Scheduling, organizing, and conducting meetings throughout the project lifecycle. Meetings include with stakeholders, and the project team members to discuss project progress, address issues, make decisions, and ensure everyone is aligned with project goals and tasks. |

| WBS Level | WBS Code | WBS Name | Description of Work |
|-----------|----------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | 1.9.3 | Reports | Generating and sharing of reports to stakeholders and team members. These reports include status reports, progress updates, risk assessments, financial reports, and other documentation relevant to project performance. |
| 3 | 1.9.4 | Project Closure | The project closure includes ensuring all project-related activities are completed, and the project can formally close. |
| 4 | 1.9.4.1 | Document Lessons Learned | Lessons learned meeting to document experiences, insights, and best practices gained throughout the project. |
| 4 | 1.9.4.2 | Update Documents & Records | Updates to all Project documents and records to capture the final status and outcomes of the project. |
| 4 | 1.9.4.3 | Project Acceptance | Obtain formal acceptance from stakeholders that all project deliverables have met their requirements and expectations. |
| 4 | 1.9.4.4 | Archive Documents | Archive all project documents, records, and artifacts for future reference or audits. |

Note: Own work

4.3.5 Validate Scope

Validate scope is the process of formalizing acceptance of the completed project deliverables (PMI, 2017, p.163). The Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project will follow the activities below to validate the scope.

- a. The Project Steering Committee will review deliverables during the monthly scheduled meetings to assess the completed deliverables against the predefined project objectives and requirements.
- b. The project manager, product owner and project team will lead and conduct the functional testing to ensure functional tests are performed on the telecommunication services to confirm they operate as intended and meet the defined technical specifications.
- c. Quality control checks will be implemented to verify that the delivered services meet the established quality standards and comply with regulatory requirements.
- d. User Acceptance Testing (UAT) will be conducted by engaging the end-users or community representatives to test and validate the usability and effectiveness of the telecommunication services.
- e. All documentation will be reviewed to ensure that all required documentation, such as lessons learnt, change request, technical specifications, and user manuals, are complete, accurate, and accessible for future reference.
- f. Formal Acceptance sign-off will be obtained from the Project Sponsor and key stakeholders indicating satisfaction with the delivered services and their alignment with the project's scope.
- g. The Scope Documentation will be updated to reflect any changes or clarifications made during the validation process, ensuring alignment with the final project deliverables.

4.3.6 Control Scope

The control scope process involves monitoring the project's scope and managing changes to the scope baseline. For the successful completion of the project the following activities will be undertaken.

- a. The Project Manager and project team will monitor continuously the progress of the project through weekly project updates. The project will be tracked project against the defined scope using the WBS dictionary and key performance indicators (KPIs).
- b. The project team will conduct regular scope reviews to ensure that the project work aligns with the defined scope and objectives.
- c. The Change Request Process described in the Perform Integrated Change Control Process will be followed. All change requests will be made using the Change Request Form presented in **section 4.2.1** and assessed thoroughly to understand their impact on the project scope. The approved changes will be implemented and documented in the Change Log displayed in **Chart 7**.
- d. Scope creep will be managed by identifying and addressing cases of scope creep, ensuring that any changes or additions to the project scope are properly evaluated and approved.
- e. Scope-related documents will be updated, including the scope statement, work breakdown structure (WBS), and scope management plan, to reflect any approved changes accurately.

- f. Regular communication with stakeholders will be conducted about any proposed changes or adjustments to the project scope and necessary approvals will be obtained.
- g. Baselines will be monitored to maintain the project scope baseline. Any changes and their reasons will be documented for future reference.

4.4. Schedule Management Plan

The Schedule Management Plan outlines the approach and procedures for developing, managing, and controlling the project Schedule. The plan serves the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project as a guideline for the project team to ensure that the project stays on track with its timeline, milestones, and deadlines.

The six processes defined are:

- Plan Schedule Management
- Define Activities
- Sequence Activities
- Estimate Activity Durations
- Develop Schedule
- Control Schedule

4.4.1 Plan Schedule Management

According to PMI (2017), the Plan schedule management process is a crucial aspect of project management that involves defining the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule. It will

ensure the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project is completed on time and within budget. The inputs for the development of the project schedule included the project charter, scope management plan, work breakdown structure, enterprise environmental factors and organizational process assets. The tools and techniques utilized involve expert judgment with Digi, meetings with the technical experts, project manager, and selected stakeholders. The primary scheduling software utilized to develop the project schedule is Microsoft Project. It will assist the Project Manager and the project team as a guide in the successful execution of the project within the scheduled time frame.

4.4.2 Define Activities

Define activities is the process of identifying and documenting the specific actions to be performed to produce the project deliverables (PMI, 2017, p. 183). This process serves as the foundation for creating a realistic and achievable project schedule. For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project this process will aid in breaking down the scope into manageable activities, establishing dependencies, and creating a comprehensive list of tasks required to achieve the project objectives. The activities were defined using the WBS and WBS dictionary from the scope management plan. Tools and techniques applied were expert judgement within Digi based on experience in similar wireless projects to provide insights and guidance on defining the appropriate activities, meetings and decomposition. The outputs of this process were an activity list and a milestone list. The milestone list identifies specific project milestones

such as project start date, end date, key decision points, and significant achievements. Chart 12 presents the project milestones.

Chart 12: Milestone List

| Milestone Name | Estimated End Date |
|-------------------------------------------------------------------------------|--------------------|
| Project Start | November 11, 2023 |
| Analysis of identified specific communities Completed | November 30, 2023 |
| Submission of an Infrastructure Assessment Report Completed | December 15, 2023 |
| Development & Integration of Sustainable and Regenerative practices Completed | January 5, 2024 |
| Network Design of Wireless Solution Completed | January 31, 2024 |
| Deployment of Wireless Technology by Districts Completed | November 29, 2024 |
| Testing and Optimization of Solution Completed | December 20, 2024 |
| Community Awareness and Training Completed | December 13, 2024 |
| Monitoring and Final Acceptance Completed | December 20, 2024 |
| Full Network Commercial Launch Completed | December 31, 2024 |
| Project End | December 31, 2024 |

Note: Own work

4.4.3 Sequence Activities

The sequence activities process involves identifying and arranging project activities in the right order to achieve the project objectives. This process will assist in arranging the activities of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project in the correct sequence and will establish the logical relationships between tasks. The project WBS, milestone list, and assumptions were

employed to perform the process. A visual representation of the project schedule network diagram was developed as the key output using Microsoft Project.

4.4.4 Estimate Activity Durations

The estimate activity duration is the process of estimating the number of work periods needed to complete individual activities with estimated resources (PMI, 2017, p. 195). It aids the project manager to develop a realistic and achievable project schedule to ensure the success of the project. Considering the unique challenges of deploying infrastructure in remote areas, the input used in this process were data from past experiences in implementing telecommunication services, WBS dictionary, assumptions and the milestone list. The tools and techniques utilized were meetings with the project team, expert judgement from the technical team familiar with the challenges of deploying infrastructure in remote regions and employing a combination of analogous and bottom-up estimating. Chart 13 displays the activity list for the project.

Chart 13: Activity List

| ID # | WBS ID | Activity ID | Task Name | Duration | Start | Finish | Predecessors |
|------|--------|-------------|------------------------------------------------------------------------------|-----------------|------------------------|------------------------|--------------|
| 1 | 1.0 | | Expand Wireless Telecommunication Services to Underserved Communities | 294 days | Sat Nov 11, '23 | Tue Dec 31, '24 | |
| 2 | | | Project Start | 0 days | Sat Nov 11, '23 | Tue Dec 31, '24 | |
| 3 | 1.1 | | Community Analysis and Identification | 14 days | Mon Nov 13, '23 | Thu Nov 30, '23 | 2 |
| 4 | 1.1.1 | | Conduct Comprehensive Analysis | 8 days | Mon Nov 13, '23 | Wed Nov 22, '23 | |
| 5 | | 1.1.1.1 | Gather all data for analysis | 4 days | Mon Nov 13, '23 | Thu Nov 16, '23 | 2 |
| 6 | | 1.1.1.2 | Review and analysis of data with stakeholders | 4 days | Fri Nov 17, '23 | Wed Nov 22, '23 | 5 |
| 7 | 1.1.2 | | Identify specific underserved communities | 6 days | Thu Nov 23, '23 | Thu Nov 30, '23 | 4 |
| 8 | | 1.1.2.1 | Site visits to all communities | 4 days | Thu Nov 23, '23 | Tue Nov 28, '23 | 6 |
| 9 | | 1.1.2.2 | Generate list of underserved communities | 2 days | Wed Nov 29, '23 | Thu Nov 30, '23 | 8 |
| 11 | 1.2 | | Evaluation of Existing Infrastructure | 11 days | Fri Dec 1, '23 | Fri Dec 15, '23 | |
| 12 | 1.2.1 | | Assess current Telecommunication infrastructure | 5 days | Fri Dec 1, '23 | Thu Dec 7, '23 | 10 |
| 13 | | 1.2.1.1 | Gather data on existing infrastructure | 3 days | Fri Dec 1, '23 | Tue Dec 5, '23 | |
| 14 | | 1.2.1.2 | Prepare assessment | 2 days | Wed Dec 6, '23 | Thu Dec 7, '23 | 13 |

| ID # | WBS ID | Activity ID | Task Name | Duration | Start | Finish | Predecessors |
|------|--------|-------------|----------------------------------------------------------------|----------|-----------------|-----------------|--------------|
| 15 | 1.2.2 | | Determine specific requirements and challenges | 6 days | Fri Dec 8, '23 | Fri Dec 15, '23 | |
| 16 | | 1.2.2.1 | Generate report of specific requirements and challenges | 6 days | Fri Dec 8, '23 | Fri Dec 15, '23 | 14 |
| 18 | 1.3 | | Feasibility Study | 6 days | Mon Dec 18, '23 | Wed Dec 27, '23 | |
| 19 | 1.3.1 | | Economic assessment | 2 days | Mon Dec 18, '23 | Tue Dec 19, '23 | |
| 20 | | 1.3.1.1 | Analyze cost estimates for infrastructure implementation | 1 day | Mon Dec 18, '23 | Mon Dec 18, '23 | 18 |
| 21 | | 1.3.1.2 | Conduct Cost-benefit analysis | 1 day | Tue Dec 19, '23 | Tue Dec 19, '23 | 21 |
| 22 | 1.3.2 | | Technical Evaluation | 2 days | Wed Dec 20, '23 | Thu Dec 21, '23 | |
| 23 | | 1.3.2.1 | Identify required technical specifications | 1 day | Wed Dec 20, '23 | Wed Dec 20, '23 | 22 |
| 24 | | 1.3.2.2 | Evaluate infrastructure requirements | 1 day | Thu Dec 21, '23 | Thu Dec 21, '23 | 24 |
| 25 | 1.3.3 | | Environmental Impact Analysis | 2 days | Fri Dec 22, '23 | Wed Dec 27, '23 | |
| 26 | | 1.3.3.1 | Conduct survey of communities | 1 day | Fri Dec 22, '23 | Fri Dec 22, '23 | 25 |
| 27 | | 1.3.3.2 | Assess potential environmental factors & Mitigation strategies | 1 day | Wed Dec 27, '23 | Wed Dec 27, '23 | 27 |
| 28 | 1.4 | | Exploration of Innovative Technologies | 20 days | Mon Nov 13, '23 | Fri Dec 8, '23 | |
| 29 | 1.4.1 | | Research on wireless telecommunication technologies | 15 days | Mon Nov 13, '23 | Fri Dec 1, '23 | |
| 30 | | 1.4.1.1 | Conduct review of current and emerging wireless technologies | 10 days | Mon Nov 13, '23 | Fri Nov 24, '23 | 5SS |
| 31 | | 1.4.1.2 | Investigate feasibility and applicability of each technology | 5 days | Mon Nov 27, '23 | Fri Dec 1, '23 | 31 |

| ID # | WBS ID | Activity ID | Task Name | Duration | Start | Finish | Predecessors |
|------|---------|-------------|------------------------------------------------------------|-----------------|------------------------|------------------------|--------------|
| 32 | 1.4.2 | | Assessment of sustainable solutions | 5 days | Mon Dec 4, '23 | Fri Dec 8, '23 | |
| 33 | | 1.4.2.1 | Evaluate energy-efficient and renewable-powered technology | 2 days | Mon Dec 4, '23 | Tue Dec 5, '23 | 32 |
| 34 | | 1.4.2.2 | Assess environmental impact of different technologies | 2 days | Wed Dec 6, '23 | Thu Dec 7, '23 | 34 |
| 35 | | 1.4.2.3 | Analyze lifecycle of equipment and its sustainability | 1 day | Fri Dec 8, '23 | Fri Dec 8, '23 | 35 |
| 36 | 1.5 | | Integration of sustainable practices | 6 days | Thu Dec 28, '23 | Fri Jan 5, '24 | |
| 37 | | 1.5.1 | Development of sustainable execution strategies | 4 days | Thu Dec 28, '23 | Wed Jan 3, '24 | 33,26 |
| 38 | | 1.5.2 | Environmental impact mitigation plans | 2 days | Thu Jan 4, '24 | Fri Jan 5, '24 | 38 |
| 40 | 1.6 | | Deployment of Wireless Technologies | 250 days | Mon Jan 8, '24 | Fri Dec 20, '24 | |
| 41 | 1.6.1 | | Planning for Deployment | 18 days | Mon Jan 8, '24 | Wed Jan 31, '24 | |
| 42 | 1.6.1.1 | | Network Architecture Design | 18 days | Mon Jan 8, '24 | Wed Jan 31, '24 | |
| 43 | | 1.6.1.1.1 | Design Network Topology | 6 days | Mon Jan 8, '24 | Mon Jan 15, '24 | 40 |
| 44 | | 1.6.1.1.2 | Select Technologies and Equipment | 6 days | Tue Jan 16, '24 | Tue Jan 23, '24 | 44 |
| 45 | | 1.6.1.1.3 | Create detailed network design/architecture documentation | 6 days | Wed Jan 24, '24 | Wed Jan 31, '24 | 45 |
| 47 | 1.6.2 | | Implementation and Integration | 232 days | Thu Feb 1, '24 | Fri Dec 20, '24 | |
| 48 | 1.6.2.1 | | Site Implementation | 152 days | Thu Feb 1, '24 | Fri Aug 30, '24 | |
| 49 | | 1.6.2.1.1 | Site preparations | 30 days | Thu Feb 1, '24 | Wed Mar 13, '24 | 47 |
| 50 | | 1.6.2.1.2 | Equipment installations | 90 days | Thu Mar 14, '24 | Wed Jul 17, '24 | 50 |
| 51 | | 1.6.2.1.3 | Configuration and testing | 32 days | Thu Jul 18, '24 | Fri Aug 30, '24 | 51 |

| ID # | WBS ID | Activity ID | Task Name | Duration | Start | Finish | Predecessors |
|------|---------|-------------|-----------------------------------------|----------------|------------------------|------------------------|--------------|
| 52 | 1.6.2.2 | | Site verification and acceptance | 20 days | Mon Sep 2, '24 | Fri Sep 27, '24 | |
| 53 | | 1.6.2.2.1 | Conduct site inspection and UAT | 15 days | Mon Sep 2, '24 | Fri Sep 20, '24 | 52 |
| 54 | | 1.6.2.2.2 | Obtain sign off for site acceptance | 5 days | Mon Sep 23, '24 | Fri Sep 27, '24 | 54 |
| 55 | 1.6.2.3 | | Site Integration | 45 days | Mon Sep 30, '24 | Fri Nov 29, '24 | 53 |
| 56 | | 1.6.2.3.1 | Integrate to existing infrastructure | 30 days | Mon Sep 30, '24 | Fri Nov 8, '24 | 55 |
| 57 | | 1.6.2.3.2 | Test interoperability | 15 days | Mon Nov 11, '24 | Fri Nov 29, '24 | 57 |
| 59 | 1.6.2.4 | | Testing & Optimization | 30 days | Mon Nov 11, '24 | Fri Dec 20, '24 | |
| 60 | | 1.6.2.4.1 | Drive testing and tuning | 30 days | Mon Nov 11, '24 | Fri Dec 20, '24 | 58SS |
| 61 | | 1.6.2.4.2 | KPI Monitoring | 30 days | Mon Nov 11, '24 | Fri Dec 20, '24 | 61SS |
| 63 | 1.6.2.5 | | Community Awareness and Training | 55 days | Mon Sep 30, '24 | Fri Dec 13, '24 | |
| 64 | | 1.6.4.1 | Content Development | 25 days | Mon Sep 30, '24 | Fri Nov 1, '24 | |
| 65 | | 1.6.4.1.1 | Develop training content | 15 days | Mon Sep 30, '24 | Fri Oct 18, '24 | 53 |
| 66 | | 1.6.4.1.2 | Design presentations and guides | 10 days | Mon Oct 21, '24 | Fri Nov 1, '24 | 66 |
| 67 | | 1.6.4.2 | Training Delivery | 30 days | Mon Nov 4, '24 | Fri Dec 13, '24 | |
| 68 | | 1.6.4.2.1 | Prepare training schedule and logistics | 5 days | Mon Nov 4, '24 | Fri Nov 8, '24 | 65 |
| 69 | | 1.6.4.2.2 | Conduct Training | 25 days | Mon Nov 11, '24 | Fri Dec 13, '24 | 69 |
| 71 | 1.7 | | Final Acceptance | 22 days | Mon Nov 25, '24 | Tue Dec 24, '24 | |
| 72 | 1.7.1 | | Network Acceptance | 22 days | Mon Nov 25, '24 | Tue Dec 24, '24 | |
| 73 | | 1.7.1.1 | Conduct tests on entire network | 15 days | Mon Nov 25, '24 | Fri Dec 13, '24 | 62SS+10 days |
| 74 | | 1.7.1.2 | Obtain Sign-off | 2 days | Mon Dec 23, '24 | Tue Dec 24, '24 | 74,63 |
| 75 | 1.7.2 | | Handover to Operations team | 10 days | Mon Nov 25, '24 | Fri Dec 6, '24 | |

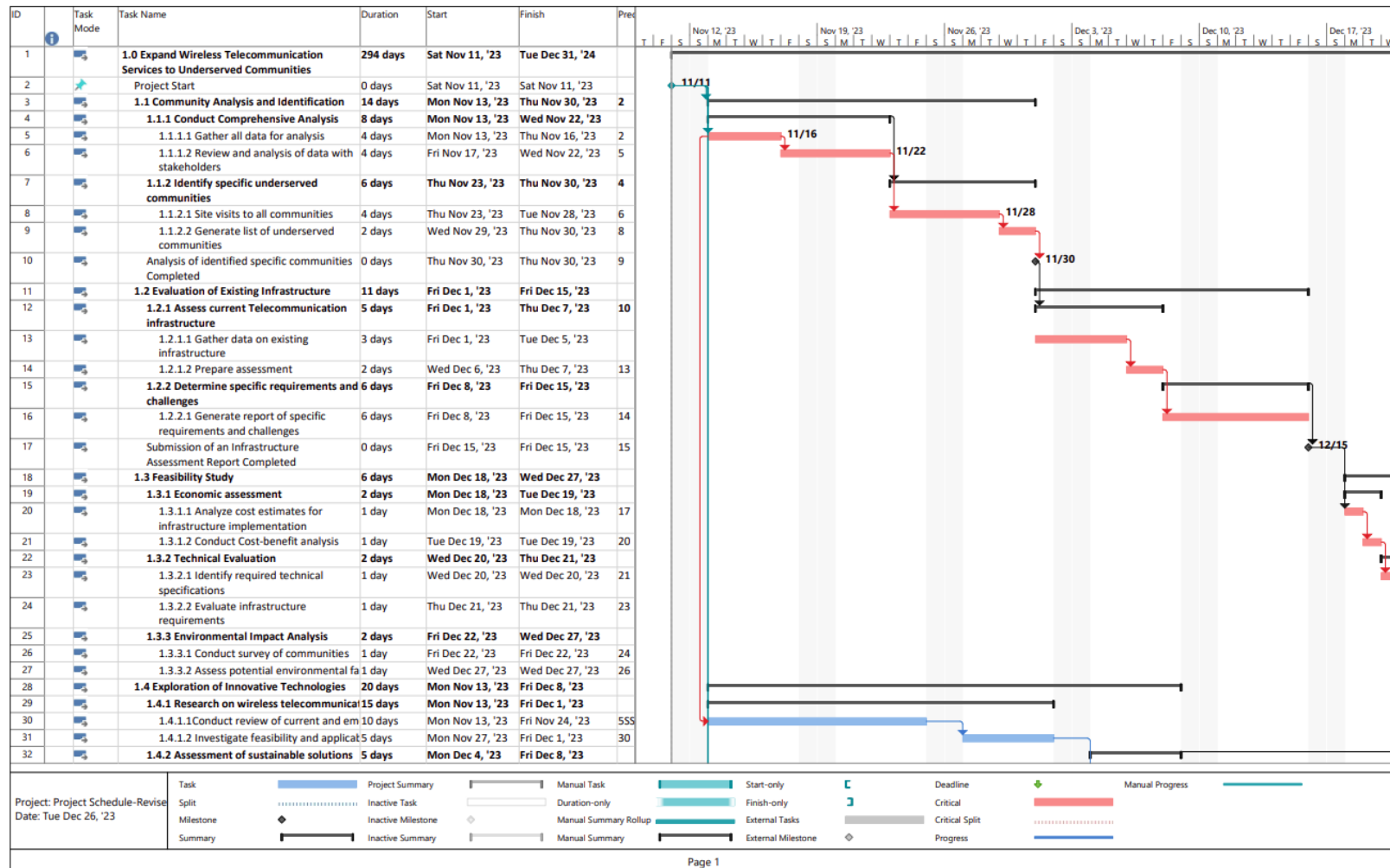
| ID # | WBS ID | Activity ID | Task Name | Duration | Start | Finish | Predecessors |
|-----------|----------------|-------------|---------------------------------------------------------------------|-----------------|------------------------|------------------------|--------------|
| 76 | | 1.7.2.1 | Prepare detailed documentation | 8 days | Mon Nov 25, '24 | Wed Dec 4, '24 | 74SS |
| 77 | | 1.7.2.2 | Handover all relevant documentation | 2 days | Thu Dec 5, '24 | Fri Dec 6, '24 | 77 |
| 79 | 1.8 | | Commercial Launch | 12 days | Mon Dec 16, '24 | Tue Dec 31, '24 | |
| 80 | 1.8.1 | | Site on Air | 4 days | Mon Dec 16, '24 | Thu Dec 19, '24 | |
| 81 | | 1.8.1.1 | Confirm Site Readiness | 2 days | Mon Dec 16, '24 | Tue Dec 17, '24 | 74 |
| 82 | | 1.8.1.2 | Perform Final Checks | 2 days | Wed Dec 18, '24 | Thu Dec 19, '24 | 82 |
| 83 | 1.8.2 | | Service Monitoring | 12 days | Mon Dec 16, '24 | Tue Dec 31, '24 | |
| 84 | | 1.8.2.1 | Conduct quality of service checks | 7 days | Mon Dec 16, '24 | Tue Dec 24, '24 | 82SS |
| 85 | | 1.8.2.2 | Collect feedback and make any adjustments | 5 days | Wed Dec 25, '24 | Tue Dec 31, '24 | 85 |
| 87 | 1.9 | | Project Management | 294 days | Mon Nov 13, '23 | Tue Dec 31, '24 | |
| 88 | 1.9.1 | | Project Planning | 60 days | Mon Nov 13, '23 | Wed Feb 7, '24 | 2 |
| 89 | 1.9.2 | | Meetings | 14 mons | Mon Nov 13, '23 | Wed Dec 11, '24 | 2 |
| 90 | 1.9.3 | | Reports | 280 days | Mon Nov 13, '23 | Wed Dec 11, '24 | 90SS |
| 91 | 1.9.4 | | Project Closure | 17 days | Mon Dec 9, '24 | Tue Dec 31, '24 | |
| 92 | 1.9.4.1 | | Document Lessons Learned | 10 days | Mon Dec 9, '24 | Fri Dec 20, '24 | 76 |
| 93 | | 1.9.4.1.1 | Conduct Lessons learned meetings | 5 days | Mon Dec 9, '24 | Fri Dec 13, '24 | |
| 94 | | 1.9.4.1.2 | Complete lessons learned documentation | 5 days | Mon Dec 16, '24 | Fri Dec 20, '24 | 94 |
| 95 | 1.9.4.2 | | Update Documents & Records | 10 days | Mon Dec 9, '24 | Fri Dec 20, '24 | 93SS |
| 96 | | 1.9.4.2.1 | Complete updates to management plans, project files and all records | 10 days | Mon Dec 9, '24 | Fri Dec 20, '24 | 93SS |
| 97 | 1.9.4.3 | | Project Acceptance | 13 days | Mon Dec 9, '24 | Wed Dec 25, '24 | |

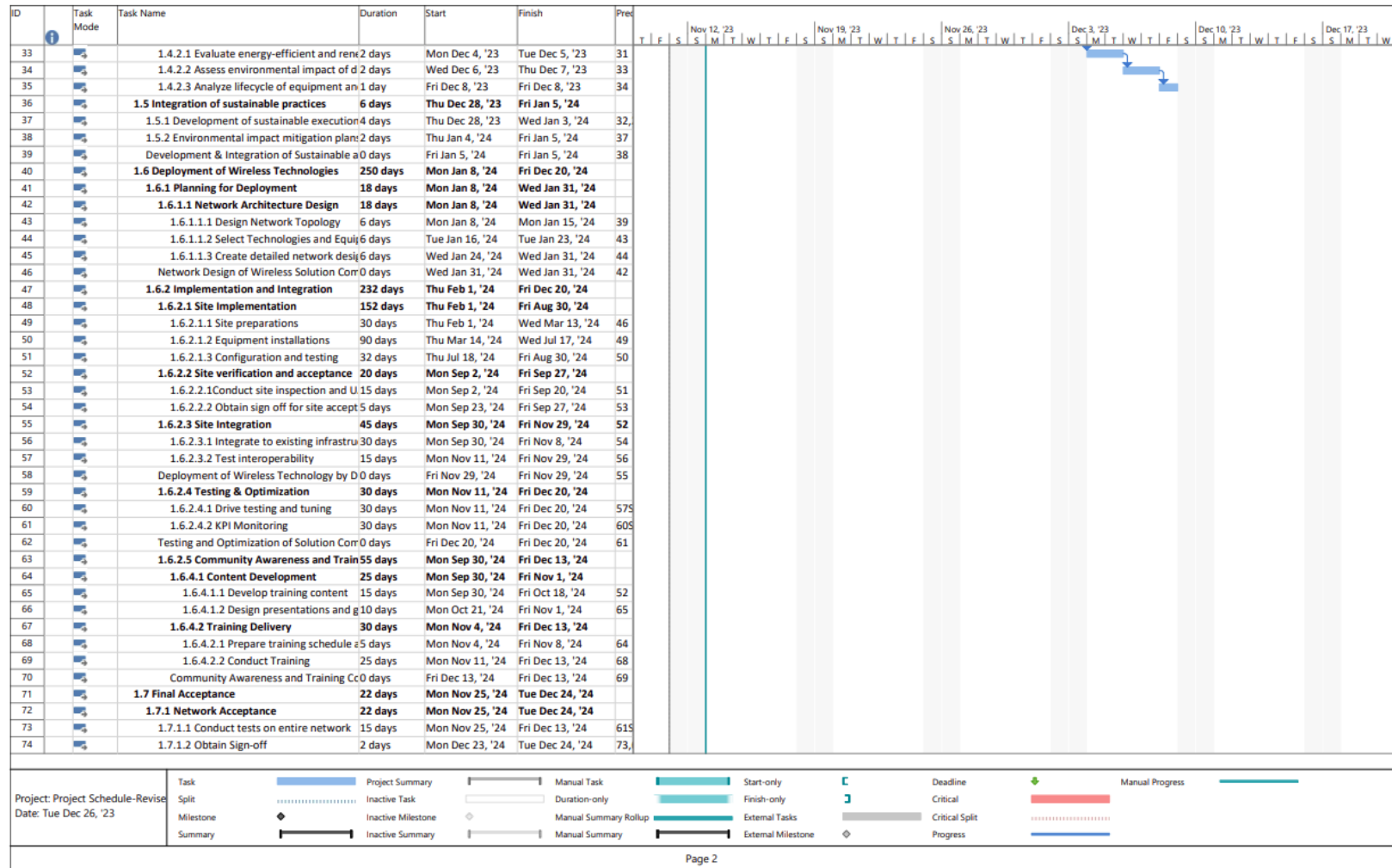
| ID # | WBS ID | Activity ID | Task Name | Duration | Start | Finish | Predecessors |
|-------------|---------------|--------------------|-------------------------------------------|-----------------|-----------------|-----------------|---------------------|
| 98 | | 1.9.4.3.1 | Update all project acceptance as required | 10 days | Mon Dec 9, '24 | Fri Dec 20, '24 | 97SS |
| 99 | | 1.9.4.3.2 | Circulate for Sign off | 3 days | Mon Dec 23, '24 | Wed Dec 25, '24 | 99 |
| 100 | 1.9.4.4 | | Archive Documents | 3 days | Mon Dec 23, '24 | Wed Dec 25, '24 | 100SS |

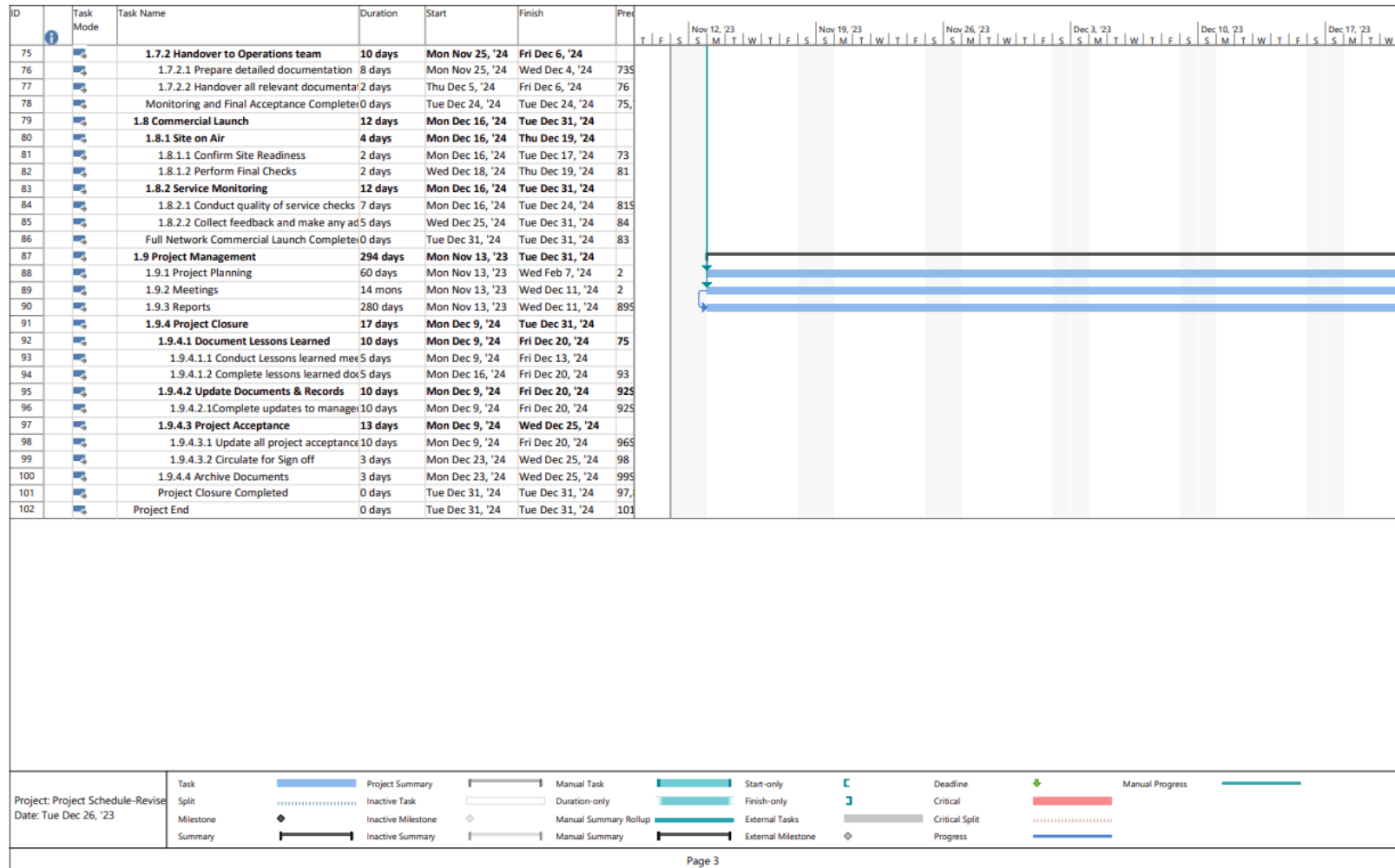
4.4.5 Develop Schedule

According to PMI (2017, p .205), the Develop Schedule process involves analyzing activity sequences, durations, resource requirements, and schedule constraints to create a detailed project schedule. The schedule for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project was created using Microsoft Project. The activity list, sequences, assumptions and constraints, lessons learned, milestones list and duration estimates were utilized as inputs for this process. This data was collected through meetings held with the technical experts and the project team. The project schedule is displayed in Figure 20 along with the critical path and includes the start and end dates for the project activities, predecessors, milestones, and deliverables.

Figure 20: Project Schedule and Critical Path







4.4.6 Control Schedule

Control Schedule is the process of monitoring the status of the project to update the project schedule and managing changes to the schedule baseline (PMI, 2017, p. 222). The project schedule for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project will be monitored to successfully meet its objectives using the following guidelines.

- a. **Regular Monitoring and Reporting:** Conducting regular monitoring of project activities and milestones against the schedule baseline. Microsoft project will be utilized to facilitate real-time tracking of activities.
- b. **Variance Analysis:** Regular variance analysis to compare planned versus actual progress will be conducted. Deviations from the baseline schedule will be identified and analyzed.
- c. There will be a focus on the critical path activities using the Critical Path Method (CPM) and key milestones to identify and mitigate any schedule risk. According to the PMI (2017, p. 210), the critical path is the sequence of activities that represents the longest path through a project which determines the shortest possible project duration. The project manager is responsible for controlling the critical path to ensure the project stays on track, mitigates any risks, and optimizes resources. It will aid the project manager in efficient planning, scheduling, and monitoring of tasks. It will enable prioritizing of tasks and making decisions that may impact the project's timeline. MS Project was used to calculate the critical path of the project.

Any delays in tasks along this path directly extends the project deadlines. Figure 20 shows the activities in red that are in the critical path.

- d. Resource Management: Resources will be continuously managed and optimized to align with the project schedules.
- e. Change Control Process: The change control process displayed in Figure 17 and described in the Integrated Change Control Process section 4.2.1 will be implemented to manage any request changes that could affect the project schedule. The Change Control Request Document will be utilized to approve or reject any schedule changes.

4.5. Cost Management Plan

The Cost Management Plan defines how the project costs will be estimated, budgeted, managed, and controlled throughout the project lifecycle. It ensures that project costs are well-documented, communicated to stakeholders, and managed effectively to keep the project within its budgetary constraints. The cost management plan will serve as a guideline for the project manager and the project team to manage the costs of activities and help in maintaining the financial health of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. The processes include plan cost management, estimate cost, determine budget and control costs.

4.5.1 Plan Cost Management

The Plan Cost Management process involves establishing the guidelines and methodologies for estimating, budgeting, managing, and controlling project costs. The main inputs utilized for this process are the project charter, schedule management plan, risk management plan,

enterprise environmental factors and organizational process assets. The tools and techniques employed include expert judgment within Digi, data analysis of historical cost data and collaborative meetings. This process provides a suitable approach to managing costs for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, aligning the project objectives with the financial constraints.

4.5.2 Estimate Cost

The estimate cost process focuses on predicting the costs of resources, materials, labor, and equipment to complete the project work. This process aids the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project in creating a realistic budget by estimating the expenses involved in implementing wireless telecommunication services. It will facilitate the justification of costs, budget allocation, resource planning, and setting the cost baselines. The inputs utilized in this process are the project management plan including the scope baseline (WBS and WBS dictionary), lessons learned register, project schedule, resources requirements, risk register, enterprise environmental factors and organizational process assets. The tools and techniques employed include a combination of analogous estimating, bottom-up estimating and expert judgement. Reference to similar projects within Digi provided the key basis for cost estimates. Chart 14 presents the total project cost.

Chart 14: Estimated Costs

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|------|--------|-------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 1 | 1 | | Expand Wireless Telecommunication Services to Underserved Communities | | |
| 2 | | | Project Start | | |
| 3 | 1.1 | | Community Analysis and Identification | | \$ 650.00 |
| 4 | 1.1.1 | | Conduct Comprehensive Analysis | | |
| 5 | | 1.1.1.1 | Gather all data for analysis | Estimate of labour required for data collection, validation, tools/materials/software needed. Includes travel expenses for fieldwork. | \$ 200.00 |
| 6 | | 1.1.1.2 | Review and analysis of data with stakeholders | Estimate of labour for data analysis, report preparation and stakeholder meetings. | \$ 150.00 |
| | | | Sub-Total | | \$ 350.00 |
| 7 | 1.1.2 | | Identify specific underserved communities | | |
| 8 | | 1.1.2.1 | Site visits to all communities | Planning, travel, lodging, meals for site visits. | \$ 200.00 |
| 9 | | 1.1.2.2 | Generate list of underserved communities | Estimate of labour for data collection, analysis and list compilation. | \$ 100.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-------------|---------------|--------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------|
| | | | Sub-Total | | \$ 300.00 |
| 11 | 1.2 | | Evaluation of Existing Infrastructure | | \$ 1,100.00 |
| 12 | 1.2.1 | | Assess current Telecommunication infrastructure | | |
| 13 | | 1.2.1.1 | Gather data on existing infrastructure | Estimate of labour for data identification, collection, field surveys and consolidation of data. Cost for travels for surveys. | \$ 500.00 |
| 14 | | 1.2.1.2 | Prepare assessment | Estimate of labour for preparing report and presentation. | \$ 300.00 |
| | | | Sub-Total | | \$ 800.00 |
| 15 | 1.2.2 | | Determine specific requirements and challenges | | |
| 16 | | 1.2.2.1 | Generate report of specific requirements and challenges | Estimate of labour for stakeholder engagement, data compilation and report preparation. | \$ 300.00 |
| | | | Sub-Total | | \$ 300.00 |
| 18 | 1.3 | | Feasibility Study | | \$ 3,900.00 |
| 19 | 1.3.1 | | Economic assessment | | |
| 20 | | 1.3.1.1 | Analyze cost estimates for infrastructure implementation | Estimate of labour for data review, analysis, | \$ 500.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-----------|--------------|-------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------|
| | | | | involvement of financial leads for cost analysis. | |
| 21 | | 1.3.1.2 | Conduct Cost-benefit analysis | Estimate of labour for cost/benefit identification, quantifying, analysis and reports. | \$ 800.00 |
| | | | Sub-Total | | \$ 1,300.00 |
| 22 | 1.3.2 | | Technical Evaluation | | |
| 23 | | 1.3.2.1 | Identify required technical specifications | Estimate of labour for analysis, technology assessment and specifications. | \$ 500.00 |
| 24 | | 1.3.2.2 | Evaluate infrastructure requirements | Estimate of labour for assessment and capacity analysis. Licenses for planning and capacity analysis tools. | \$ 600.00 |
| | | | Sub-Total | | \$ 1,100.00 |
| 25 | 1.3.3 | | Environmental Impact Analysis | | |
| 26 | | 1.3.3.1 | Conduct survey of communities | Estimate for survey planning, fieldwork, data compilation and analysis. Costs for survey form and other devices. Travel expenses. | \$ 700.00 |
| 27 | | 1.3.3.2 | Assess potential environmental factors & Mitigation strategies | Estimate for assessment, regulatory reviews, | \$ 800.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-----------|--------------|-------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------|
| | | | | mitigation planning and reports. | |
| | | | Sub-Total | | \$ 1,500.00 |
| 28 | 1.4 | | Exploration of Innovative Technologies | | \$ 13,500.00 |
| 29 | 1.4.1 | | Research on wireless telecommunication technologies | | |
| 30 | | 1.4.1.1 | Conduct review of current and emerging wireless technologies | Technology research costs, data collection and analysis. Fees to access resources for technology review. | \$ 1,500.00 |
| 31 | | 1.4.1.2 | Investigate feasibility and applicability of each technology | Feasibility assessment and report preparation. | \$ 1,500.00 |
| | | | Sub-Total | | \$ 3,000.00 |
| 32 | 1.4.2 | | Assessment of sustainable solutions | | |
| 33 | | 1.4.2.1 | Evaluate energy-efficient and renewable-powered technology | Cost for evaluation of available energy-efficient and renewable-powered technologies in the telecommunications sector. | \$ 3,000.00 |
| 34 | | 1.4.2.2 | Assess environmental impact of different technologies | Impact analysis, data collection, evaluation and reports. Cost of assessment tools. | \$ 4,500.00 |
| 35 | | 1.4.2.3 | Analyze lifecycle of equipment and its sustainability | Cost for analysis, sustainability assessment and | \$ 3,000.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-----------|----------------|-------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| | | | | report. Cost for tools/equipment. | |
| | | | Sub-Total | | \$ 10,500.00 |
| 36 | 1.5 | | Integration of sustainable practices | | \$ 5,600.00 |
| 37 | | 1.5.1 | Development of sustainable execution strategies | Cost for strategy formulation, assessment, planning and documentation. | \$ 4,000.00 |
| 38 | | 1.5.2 | Environmental impact mitigation plans | Cost for impact assessment, risk analysis, mitigation planning and documentation. Cost for tools and guidelines. | \$ 1,600.00 |
| | | | Sub-Total | | \$ 5,600.00 |
| 40 | 1.6 | | Deployment of Wireless Technologies | | \$ 246,700.00 |
| 41 | 1.6.1 | | Planning for Deployment | | |
| 42 | 1.6.1.1 | | Network Architecture Design | | |
| 43 | | 1.6.1.1.1 | Design Network Topology | Cost for professional services requirements analysis, topology design with subject matter experts. Software license fees for network design. | \$ 6,500.00 |
| 44 | | 1.6.1.1.2 | Select Technologies and Equipment | Cost for technology evaluation, equipment selection/procurement, and vendor research. | \$ 150,000.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-----------|----------------|-------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------|
| 45 | | 1.6.1.1.3 | Create detailed network design/architecture documentation | Cost for detailed technical documentation and compliance checks. | \$ 9,500.00 |
| | | | Sub-Total | | \$ 166,000.00 |
| 47 | 1.6.2 | | Implementation and Integration | | |
| 48 | 1.6.2.1 | | Site Implementation | | |
| 49 | | 1.6.2.1.1 | Site preparations | Site assessment, permits, clearing and preparation costs. Cost for tools to clear and prepare the sites. | \$ 10,000.00 |
| 50 | | 1.6.2.1.2 | Equipment installations | Equipment delivery, installation and safety checks costs including transportation and installation tools. | \$ 30,000.00 |
| 51 | | 1.6.2.1.3 | Configuration and testing | Estimate of vendor professional services for configuration and testing of equipment. | \$ 12,000.00 |
| | | | Sub-Total | | \$ 52,000.00 |
| 52 | 1.6.2.2 | | Site verification and acceptance | | |
| 53 | | 1.6.2.2.1 | Conduct site inspection and UAT | Estimate for labour for inspection, testing and resolutions of issues. Cost for testing tools and software. | \$ 4,000.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-----------|----------------|----------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------|
| 54 | | 1.6.2.2.2 | Obtain sign off for site acceptance | | \$ 200.00 |
| | | | Sub-Total | | \$ 4,200.00 |
| 55 | 1.6.2.3 | | Site Integration | | |
| 56 | | 1.6.2.3.1 | Integrate to existing infrastructure | Cost of vendor professional services for integration of sites including tools. | \$ 6,000.00 |
| 57 | | 1.6.2.3.2 | Test interoperability | | \$ 3,500.00 |
| | | | Sub-Total | | \$ 9,500.00 |
| 59 | 1.6.2.4 | | Testing & Optimization | | |
| 60 | | 1.6.2.4.1 | Drive testing and tuning | Cost for drive test planning, actual drive test and optimization, test equipment, vehicles and tools. | \$ 7,500.00 |
| 61 | | 1.6.2.4.2 | KPI Monitoring | Cost for network monitoring software/tools, labour for monitoring, analysis and identification of issues. | \$ 2,000.00 |
| | | | Sub-Total | | \$ 9,500.00 |
| 63 | 1.6.2.5 | | Community Awareness and Training | | |
| 64 | | 1.6.4.1 | Content Development | | |
| 65 | | 1.6.4.1.1 | Develop training content | Cost for content planning, development and | \$ 800.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-----------|--------------|----------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------|
| | | | | presentations. Fees for use of software/tools. | |
| 66 | | 1.6.4.1.2 | Design presentations and guides | Service cost for presentation design, guide development and document formatting. | \$ 1,200.00 |
| | | | Sub-Total | | \$ 2,000.00 |
| 67 | | 1.6.4.2 | Training Delivery | | |
| 68 | | 1.6.4.2.1 | Prepare training schedule and logistics | Cost for logistics arrangement, resource allocation and administrative costs. | \$ 500.00 |
| 69 | | 1.6.4.2.2 | Conduct Training | Service cost for training, facilitation and evaluation, trainer's fees (including travel) and cost for all training material. | \$ 3,000.00 |
| | | | Sub-Total | | \$ 3,500.00 |
| 71 | 1.7 | | Final Acceptance | | \$ 3,950.00 |
| 72 | 1.7.1 | | Network Acceptance | | |
| 73 | | 1.7.1.1 | Conduct tests on entire network | Cost for specialized testing tools/software, test planning, execution, analysis and reports. | \$ 2,500.00 |
| 74 | | 1.7.1.2 | Obtain Sign-off | | \$ - |
| | | | Sub-Total | | \$ 2,500.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-------------|---------------|--------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------|
| 75 | 1.7.2 | | Handover to Operations team | | |
| 76 | | 1.7.2.1 | Prepare detailed documentation | estimate of labour for documentation, information gathering, development, review and finalization. | \$ 1,450.00 |
| 77 | | 1.7.2.2 | Handover all relevant documentation | | \$ - |
| | | | Sub-Total | | \$ 1,450.00 |
| 79 | 1.8 | | Commercial Launch | | \$ 8,500.00 |
| 80 | 1.8.1 | | Site on Air | | |
| 81 | | 1.8.1.1 | Confirm Site Readiness | Cost for traveling to site for inspection, labour for compliance checks and readiness assessment. | \$ 2,500.00 |
| 82 | | 1.8.1.2 | Perform Final Checks | Estimate of labour for network verification, functionality testing and resolution of issues. Cost of tools and travel. | \$ 2,000.00 |
| | | | Sub-Total | | \$ 4,500.00 |
| 83 | 1.8.2 | | Service Monitoring | | |
| 84 | | 1.8.2.1 | Conduct quality of service checks | Cost for specialized testing tools/software, labour for assessment, testing and analysis of results. | \$ 2,500.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-------------|----------------|--------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 85 | | 1.8.2.2 | Collect feedback and make any adjustments | Estimate of labour for feedback collection, analysis, adjustments and travel expenses. | \$ 1,500.00 |
| | | | Sub-Total | | \$ 4,000.00 |
| 87 | 1.9 | | Project Management | | \$ 16,100.00 |
| 88 | 1.9.1 | | Project Planning | Cost for scope definition, development of schedule, resource planning, risk management. Fees for MS Project, and labour costs including of project manager. | \$ 5,000.00 |
| 89 | 1.9.2 | | Meetings | Estimate of labour for planning, facilitation and documentation including travel, venue and other meeting expenses. | \$ 2,000.00 |
| 90 | 1.9.3 | | Reports | Estimate of labour for report compilation, review and distribution. | \$ 2,500.00 |
| 91 | 1.9.4 | | Project Closure | | |
| 92 | 1.9.4.1 | | Document Lessons Learned | | |
| 93 | | 1.9.4.1.1 | Conduct Lessons learned meetings | Estimate of labour for meeting planning, facilitation and documentation including | \$ 1,500.00 |

| ID # | WBS ID | Activity ID | Task Name | Activity Description/Basis of Estimates | Total (USD) |
|-----------|----------------|-------------|---------------------------------------------------------------------|--------------------------------------------------------------------|---------------------|
| | | | | expenses with travel, venue and materials. | |
| 94 | | 1.9.4.1.2 | Complete lessons learned documentation | Estimate of labour for data compilation, documentation and review. | \$ 600.00 |
| | | | Sub-Total | | \$ 2,100.00 |
| 95 | 1.9.4.2 | | Update Documents & Records | | |
| 96 | | 1.9.4.2.1 | Complete updates to management plans, project files and all records | Estimate of labour for updates and documentation, | \$ 2,500.00 |
| | | | Sub-Total | | \$ 2,500.00 |
| 97 | 1.9.4.3 | | Project Acceptance | | |
| 98 | | 1.9.4.3.1 | Update all project acceptance as required | Estimate of labour for documentation review and making updates. | \$ 2,000.00 |
| 99 | | 1.9.4.3.2 | Circulate for Sign off | | \$ - |
| 100 | 1.9.4.4 | | Archive Documents | | \$ - |
| | | | Sub-Total | | \$ 2,000.00 |
| | | | Total Project Budget | | \$300,000.00 |

Note: Own work

4.5.3 Determine Budget

Determine Budget is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline (PMI, 2017, p.248). This process assists to determine the cost baseline for management and control of project performance throughout the project's lifecycle. The project management plan inclusive of the cost management plan, resource management plan and scope baseline were the main inputs for this process. The tools and techniques utilized were expert judgment, cost aggregation and historical review. The cost baseline is the main output of this process which represents the project budget including a 10% contingency reserve. Chart 15 presents the Total Project Budget for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize encompassing the contingency reserve, cost baseline and an allocated management reserve of 3%.

Chart 15: Project Budget

| WBS ID | Activity ID | WBS Deliverable | Estimated Cost (USD) |
|---------------|--------------------|--------------------------------------------------|-----------------------------|
| 1.1 | | Community Analysis and Identification | \$ 650.00 |
| 1.1.1 | | Conduct Comprehensive Analysis | \$ 350.00 |
| | 1.1.1.1 | Gather all data for analysis | \$ 200.00 |
| | 1.1.1.2 | Review and analysis of data with stakeholders | \$ 150.00 |
| 1.1.2 | | Identify specific underserved communities | \$ 300.00 |
| | 1.1.2.1 | Site visits to all communities | \$ 200.00 |
| | 1.1.2.2 | Generate list of underserved communities | \$ 100.00 |
| 1.2 | | Evaluation of Existing Infrastructure | \$ 1,100.00 |

| WBS ID | Activity ID | WBS Deliverable | Estimated Cost (USD) |
|---------------|--------------------|----------------------------------------------------------------|-----------------------------|
| 1.2.1 | | Assess current Telecommunication infrastructure | \$ 800.00 |
| | 1.2.1.1 | Gather data on existing infrastructure | \$ 500.00 |
| | 1.2.1.2 | Prepare assessment | \$ 300.00 |
| 1.2.2 | | Determine specific requirements and challenges | \$ 300.00 |
| | 1.2.2.1 | Generate report of specific requirements and challenges | \$ 300.00 |
| 1.3 | | Feasibility Study | \$ 3,900.00 |
| 1.3.1 | | Economic assessment | \$ 1,300.00 |
| | 1.3.1.1 | Analyze cost estimates for infrastructure implementation | \$ 500.00 |
| | 1.3.1.2 | Conduct Cost-benefit analysis | \$ 800.00 |
| 1.3.2 | | Technical Evaluation | \$ 1,100.00 |
| | 1.3.2.1 | Identify required technical specifications | \$ 500.00 |
| | 1.3.2.2 | Evaluate infrastructure requirements | \$ 600.00 |
| 1.3.3 | | Environmental Impact Analysis | \$ 1,500.00 |
| | 1.3.3.1 | Conduct survey of communities | \$ 700.00 |
| | 1.3.3.2 | Assess potential environmental factors & Mitigation strategies | \$ 800.00 |
| 1.4 | | Exploration of Innovative Technologies | \$ 13,500.00 |
| 1.4.1 | | Research on wireless telecommunication technologies | \$ 3,000.00 |
| | 1.4.1.1 | Conduct review of current and emerging wireless technologies | \$ 1,500.00 |
| | 1.4.1.2 | Investigate feasibility and applicability of each technology | \$ 1,500.00 |
| 1.4.2 | | Assessment of sustainable solutions | \$ 10,500.00 |
| | 1.4.2.1 | Evaluate energy-efficient and renewable-powered technology | \$ 3,000.00 |
| | 1.4.2.2 | Assess environmental impact of different technologies | \$ 4,500.00 |
| | 1.4.2.3 | Analyze lifecycle of equipment and its sustainability | \$ 3,000.00 |
| 1.5 | | Integration of sustainable practices | \$ 5,600.00 |
| | 1.5.1 | Development of sustainable execution strategies | \$ 4,000.00 |

| WBS ID | Activity ID | WBS Deliverable | Estimated Cost (USD) |
|----------------|--------------------|-----------------------------------------------------------|-----------------------------|
| | 1.5.2 | Environmental impact mitigation plans | \$ 1,600.00 |
| 1.6 | | Deployment of Wireless Technologies | \$ 246,700.00 |
| 1.6.1 | | Planning for Deployment | |
| 1.6.1.1 | | Network Architecture Design | \$ 166,000.00 |
| | 1.6.1.1.1 | Design Network Topology | \$ 6,500.00 |
| | 1.6.1.1.2 | Select Technologies and Equipment | \$ 150,000.00 |
| | 1.6.1.1.3 | Create detailed network design/architecture documentation | \$ 9,500.00 |
| 1.6.2 | | Implementation and Integration | \$ 52,000.00 |
| 1.6.2.1 | | Site Implementation | |
| | 1.6.2.1.1 | Site preparations | \$ 10,000.00 |
| | 1.6.2.1.2 | Equipment installations | \$ 30,000.00 |
| | 1.6.2.1.3 | Configuration and testing | \$ 12,000.00 |
| 1.6.2.2 | | Site verification and acceptance | \$ 4,200.00 |
| | 1.6.2.2.1 | Conduct site inspection and UAT | \$ 4,000.00 |
| | 1.6.2.2.2 | Obtain sign off for site acceptance | \$ 200.00 |
| 1.6.2.3 | | Site Integration | \$ 9,500.00 |
| | 1.6.2.3.1 | Integrate to existing infrastructure | \$ 6,000.00 |
| | 1.6.2.3.2 | Test interoperability | \$ 3,500.00 |
| 1.6.2.4 | | Testing & Optimization | \$ 9,500.00 |
| | 1.6.2.4.1 | Drive testing and tuning | \$ 7,500.00 |
| | 1.6.2.4.2 | KPI Monitoring | \$ 2,000.00 |
| 1.6.2.5 | | Community Awareness and Training | \$ 5,500.00 |
| | 1.6.4.1 | Content Development | \$ 2,000.00 |
| | 1.6.4.1.1 | Develop training content | \$ 800.00 |
| | 1.6.4.1.2 | Design presentations and guides | \$ 1,200.00 |
| | 1.6.4.2 | Training Delivery | \$ 3,500.00 |
| | 1.6.4.2.1 | Prepare training schedule and logistics | \$ 500.00 |
| | 1.6.4.2.2 | Conduct Training | \$ 3,000.00 |
| 1.7 | | Final Acceptance | \$ 3,950.00 |
| 1.7.1 | | Network Acceptance | \$ 2,500.00 |
| | 1.7.1.1 | Conduct tests on entire network | \$ 2,500.00 |
| | 1.7.1.2 | Obtain Sign-off | \$ - |
| 1.7.2 | | Handover to Operations team | \$ 1,450.00 |
| | 1.7.2.1 | Prepare detailed documentation | \$ 1,450.00 |
| | 1.7.2.2 | Handover all relevant documentation | \$ - |

| WBS ID | Activity ID | WBS Deliverable | Estimated Cost (USD) |
|----------------|--------------------|---------------------------------------------------------------------|-----------------------------|
| 1.8 | | Commercial Launch | \$ 8,500.00 |
| 1.8.1 | | Site on Air | \$ 4,500.00 |
| | 1.8.1.1 | Confirm Site Readiness | \$ 2,500.00 |
| | 1.8.1.2 | Perform Final Checks | \$ 2,000.00 |
| 1.8.2 | | Service Monitoring | \$ 4,000.00 |
| | 1.8.2.1 | Conduct quality of service checks | \$ 2,500.00 |
| | 1.8.2.2 | Collect feedback and make any adjustments | \$ 1,500.00 |
| 1.9 | | Project Management | \$ 16,100.00 |
| 1.9.1 | | Project Planning | \$ 5,000.00 |
| 1.9.2 | | Meetings | \$ 2,000.00 |
| 1.9.3 | | Reports | \$ 2,500.00 |
| 1.9.4 | | Project Closure | \$ 6,600.00 |
| 1.9.4.1 | | Document Lessons Learned | \$ 2,100.00 |
| | 1.9.4.1.1 | Conduct Lessons learned meetings | \$ 1,500.00 |
| | 1.9.4.1.2 | Complete lessons learned documentation | \$ 600.00 |
| 1.9.4.2 | | Update Documents & Records | \$ 2,500.00 |
| | 1.9.4.2.1 | Complete updates to management plans, project files and all records | \$ 2,500.00 |
| 1.9.4.3 | | Project Acceptance | \$ 2,000.00 |
| | 1.9.4.3.1 | Update all project acceptance as required | \$ 2,000.00 |
| | 1.9.4.3.2 | Circulate for Sign off | \$ - |
| 1.9.4.4 | | Archive Documents | \$ - |
| | | Total Cost Estimate | \$ 300,000.00 |
| | | Contingency (10%) | \$ 30,000.00 |
| | | Total Cost Baseline | \$ 330,000.00 |
| | | Management Reserve (3%) | \$ 9,900.00 |
| | | Total Project Budget | \$ 339,900.00 |

Note: Own work

4.5.4 Control Costs

The control cost process involves monitoring, reviewing, and managing project costs to ensure that the project remains within the approved budget throughout its execution. The inputs utilized in this process were the cost management plan, cost baseline and

performance measurement baseline. The tools and techniques used were expert judgement, earned value analysis and variance analysis. The project manager on a monthly basis will continuously monitor and control the project costs allowing for timely corrective actions to be executed to keep the project within the approved budget. The guidelines that follow will be utilized in this process.

- a. **Regular Cost Performance Monitoring:** Actual costs will be tracked against the planned budget.
- b. **Variance Analysis:** Discrepancies will be analyzed between planned and actual costs incurred during the execution of the project. Any deviations from the planned budget will be analyzed, helping in making informed decisions and continuous improvement throughout the project life cycle.
- c. **Change Control Process:** The change control process displayed in Figure 17 and described in the Integrated Change Control Process section 4.2.1 will be implemented to manage any request changes that could affect the project cost. The Change Control Request Document will be utilized to approve or reject any cost changes.
- d. **Performance Reporting:** Reports on cost performance will be generated and shared with the stakeholders and project management to highlight any variances, trends, and any recommended corrective actions.
- e. **Managing Contingency Reserves:** Contingency reserves will be utilized cautiously to address any unforeseen events or risks that can affect the project costs. These will be properly authorized and documented.

f. Earned Value Management (EVM): Performance will be measured using the Earned Value Analysis (EVA) technique to compare the performance measurement baseline to the actual schedule and cost performance. The metrics to be used are Schedule Variance, Cost Variance, Schedule Performance Index and Cost Performance Index. These will provide insights into the project performance and variances which will trigger the project manager to analyze, and report followed by taking remedial actions to adjust and realign the project performance to acceptable levels. The Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project will utilize the EVM Performance Management Indicators displayed in Chart 16. The indicators provide a control threshold for the project. The health of the project will be determined as follows:

- Green = Project is on track
- Yellow = Project is behind schedule or budget
- Red= Project needs immediate attention

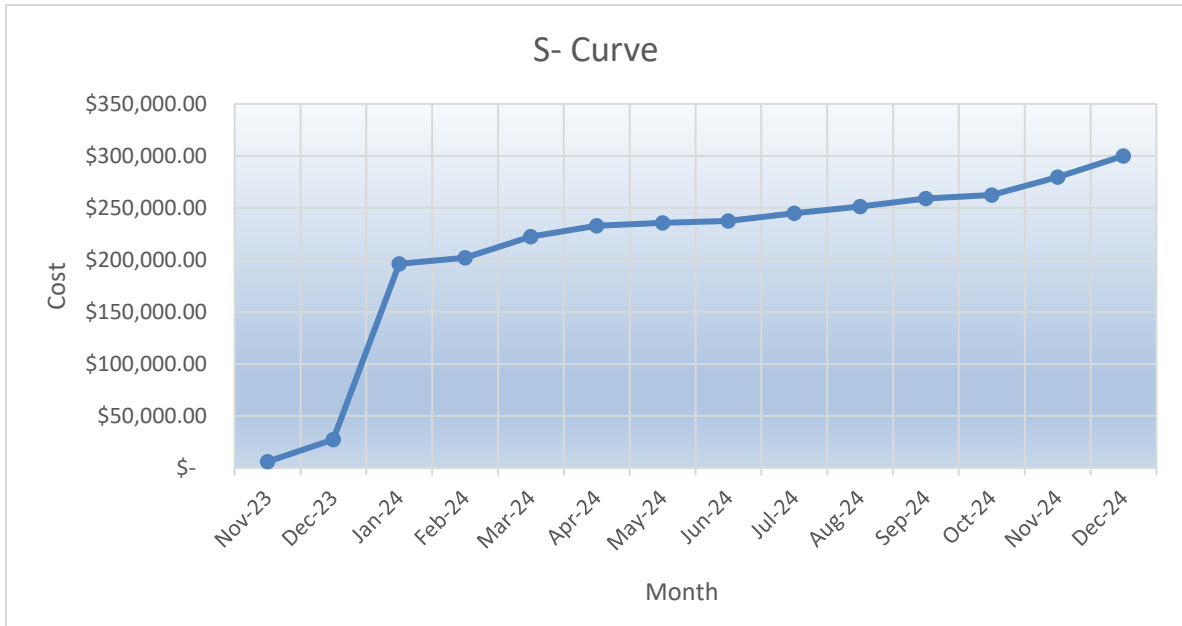
Chart 16: EVM Performance Management Indicators

| Metric | Formula | Green Condition | Yellow Condition | Red Condition |
|------------------------|-------------------------------------------|-----------------------------------------|---------------------------------------------|--------------------------------------------|
| Schedule Variance (SV) | Earned Value (EV) – Planned Value (PV) | Neutral: Project is on Schedule. | Positive: Project is ahead of schedule. | Negative: Project is behind schedule. |
| Cost Variance (CV) | Earned Value (EV) – Actual Cost (AC) | Neutral: Project is on planned cost. | Positive: Project is under planned cost. | Negative: Project is over planned cost. |

| Metric | Formula | Green Condition | Yellow Condition | Red Condition |
|----------------------------------|--------------------------------------------------------|----------------------------------------|------------------------------------------------|--------------------------------------------|
| Schedule Performance Index (SPI) | $\text{Earned Value (EV)} / \text{Planned Value (PV)}$ | Exactly 1: Project is on schedule. | Greater than 1: Project is ahead of schedule. | Less than 1: Project is behind schedule. |
| Cost Performance Index (CPI) | $\text{Earned Value (EV)} / \text{Actual Cost (AC)}$ | Exactly 1: Project is on planned cost. | Greater than 1: Project is under planned cost. | Less than 1: Project is over planned cost. |

Note: Own work

Figure 21 shows the projected monthly expenditure total based on the activities and its duration for the overall project. This will facilitate the monitoring of the cost and work activities during the project. This is represented graphically on the S- Curve displayed in Figure 22.

Figure 22: S- Curve

Note: Own work

4.5.4.1 Cost Management and Reporting

A Budget Tracking Log presented in Figure 23 will be used along with the Projected Monthly Expenditure, displayed in Figure 21, by the project manager to log and forecast future expenditures and have an overview of the budget's current status. This will help to monitor and minimize the risks of exceeding the budget while properly managing the contingency funds. These reports will be integrated into the weekly and monthly reports presented in the Communication Matrix in Chart 23.

Figure 23: Budget Tracking Log

| Project Information | | | | | | | | | |
|---------------------|------------|---------------------|-------------|-----------|-------------|---------------|------------------|-----------|----------|
| Project Name: | | | | | | | | | |
| Project #: | | | | | | | | | |
| Project Manager: | | | | | | | | | |
| Budget Status: | | | \$Actual | | | | | | |
| Budget: | \$300, 000 | | | | | | | | |
| Actual | \$0 | | | | | | | | |
| Variance | \$0 | | | | | | | | |
| Budget Tracking Log | | | | | | | | | |
| Expense ID | Date | Category of Expense | Description | Amount \$ | Approved By | Supplier Name | Purchase Order # | Invoice # | Comments |
| EXP-001 | | | | | | | | | |
| EXP-002 | | | | | | | | | |
| EXP-003 | | | | | | | | | |
| EXP-004 | | | | | | | | | |
| EXP-005 | | | | | | | | | |
| EXP-006 | | | | | | | | | |
| EXP-007 | | | | | | | | | |
| EXP-008 | | | | | | | | | |
| EXP-009 | | | | | | | | | |
| EXP-010 | | | | | | | | | |

Note: Own work

4.6. Quality Management Plan

According to PMI (2017, p. 271), Quality Management Plan includes the processes for incorporating the organization's quality policy regarding planning, managing and controlling project and product quality requirements in order to meet stakeholders' objectives. The process guides the entire project team on how quality will be planned, assured, and controlled throughout the project's lifecycle, making sure that maintaining quality is the primary focus of the project goals. It consists of three processes: plan quality management, manage quality and control quality.

4.6.1 Plan Quality Management

Plan Quality Management involves defining the quality requirements/standards that will be applied to the project and determining how to satisfy them. The inputs used for this process were the project charter, assumption log, requirements traceability matrix, risk register and stakeholder register, enterprise environmental factors and organizational process assets. The tools and techniques applied were expert judgment within Digi, data gathering through benchmarking, brainstorming and interviews, data analysis using cost of quality and meetings. The main output is this process is the Quality management plan. This process sets the foundation for how quality will be approached and ensured throughout the lifecycle of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. It assures the project delivers high-quality outputs that meet stakeholder expectations.

4.6.1.1 Quality Objectives

Below are the outlined quality objectives of the project.

1. To maintain consistent and reliable connectivity, ensure a minimum of 99% network uptime across targeted areas within underserved communities.
2. To provide thorough accessibility, achieve 95% coverage in identified underserved communities, ensuring these areas have access to wireless telecommunication services.
3. To guarantee optimal service quality, maintain a signal strength of at least -80dBm to support high-performance wireless connectivity.
4. To ensure alignment with the triple constraint of scope, schedule, and cost to maintain project balance and efficiency.
5. To foster community involvement, regularly collect and incorporate feedback from community members into service improvements, promoting active engagement.
6. To ensure long-term viability, establish infrastructure capable of accommodating future technological advancements and scalability.
7. To meet regulatory standards, ensure full compliance with telecommunication and safety regulations as specified by the Public Utilities Commission of Belize.
8. To empower users, achieve a 90% user proficiency level through effective training programs, ensuring efficient utilization of telecommunication services.
9. To maintain high satisfaction levels, strive for an average satisfaction score of 4.5 out of 5 through responsive customer support and positive feedback.

4.6.1.2 Quality Metrics and Baseline

The quality metrics and baselines function as measurable indicators to assess the project's adherence to the quality objectives. They provide specific criteria against which the project progress and success will be evaluated by the project manager. It will guarantee the project outcomes align with the stakeholder expectations and defined quality standards. Chart 17 describes the project's quality baseline and definition of quality metrics for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project.

Chart 17: Quality Metrics and Baseline

| Quality Objective | Metric | Metric Definition | Expected Outcome/Results | Measurement Frequency | Responsible |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------------------------------------------------------|-----------------------|-------------------------|
| 1. To maintain consistent and reliable connectivity, ensure a minimum of 99% network uptime across targeted areas within underserved communities. | Network Uptime | Percentage of time the network remains operational | Minimum 99% uptime to ensure consistent connectivity | Daily | Network Operations Team |
| 2. To provide thorough accessibility, achieve 95% coverage in identified underserved communities, ensuring these areas have | Area Coverage | Percentage of targeted underserved areas covered by the network | 95% coverage in identified underserved regions | Weekly | Technical Team |

| Quality Objective | Metric | Metric Definition | Expected Outcome/Results | Measurement Frequency | Responsible |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------|--------------------------|
| access to wireless telecommunication services. | | | | | |
| 3. To guarantee optimal service quality, maintain a signal strength of at least -80dBm to support high-performance wireless connectivity. | Signal Strength | Signal strength measured in decibels (dB) | Signal strength of at least -80dBm for optimal service performance | Monthly | Technical Team |
| 4. To ensure alignment with the triple constraint of scope, schedule, and cost to maintain project balance and efficiency. | Scope statement completeness | Percentage of project deliverables, objectives, and exclusions covered | 100% coverage of project scope in the Scope Statement | Monthly | Project Manager |
| | Schedule Variance (SV) | Variation between planned and actual Schedule | Schedule variance within $\pm 5\%$ of the planned schedule | Weekly | Project Manager |
| | Cost Performance Index (CPI) | Ratio of earned value to actual cost | CPI maintained at or above 1.0 | | |
| 5. To foster community involvement, regularly collect and incorporate feedback from community members into | Community Feedback | Number of feedback responses received from | Regular feedback collection and incorporation into improvements | Quarterly | Public Relations Officer |

| Quality Objective | Metric | Metric Definition | Expected Outcome/Results | Measurement Frequency | Responsible |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------|---------------------------|
| service improvements, promoting active engagement. | | community members | | | |
| 6. To ensure long-term viability, establish infrastructure capable of accommodating future technological advancements and scalability. | Technology Scalability | Ability to scale infrastructure for future growth and demand | Infrastructure capable of accommodating future technological advancements | Biannually | Engineering Team |
| 7. To meet regulatory standards, ensure full compliance with telecommunication and safety regulations as specified by the Public Utilities Commission of Belize. | Regulatory Compliance | Adherence to national regulatory requirements | Full compliance with telecommunication and safety regulations | Monthly | Compliance and Legal Team |
| 8. To empower users, achieve a 90% user proficiency level through effective training programs, ensuring efficient utilization of telecommunication services. | User Proficiency | Percentage of community members proficient in using services | 90% user proficiency through effective training programs | Biweekly | Training and Support Team |
| 9. To maintain high satisfaction levels, strive for an average satisfaction score of 4.5 out of 5 through responsive customer support and positive feedback. | Customer Feedback | Ratings or satisfaction scores provided by end-users | Average satisfaction score of 4.5 out of 5 | Monthly | Customer Services Team |

Note: Own work

4.6.2 Manage Quality

The Manage Quality process refers to the quality activities that focus on ensuring that the project meets the established quality standards. It involves planning, assurance, and control to maintain or enhance the quality of deliverables throughout the project lifecycle. The aim is to deliver high-quality outputs, reducing risks, and ensuring stakeholder satisfaction for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, all while optimizing resources and processes. These will be achieved through the project manager who will be responsible for scheduling and management of the daily quality assurance checks, report any discrepancies and implement corrective actions. The inputs used in this process are the quality management plan, quality control measurements, quality metrics, risk report and organizational process assets. The tools and techniques applied were checklist, quality audit and quality improvement method of Plan-do-check-act (PDCA).

The entire project team will be involved in the quality assurance processes whereby the project manager will ensure collective ownership of quality and foster a collaborative environment focused on delivering high-quality outcomes aligned with the project objectives. The project manager and the project team will undertake the following steps to perform quality assurance:

- Communicate and Train: The project manager will communicate the Quality Management Plan and objectives to the team, highlighting their roles and responsibilities. The project team will attend the training sessions or workshops to

understand the quality standards, processes, and their role in ensuring quality in the project.

- **Implement Quality Assurance Activities:** The project manager will oversee the execution of quality assurance activities. The project team will actively participate in executing quality checks, inspections, and reviews as per the established procedures.
- **Monitor and Measure Quality:** The project manager will regularly monitor the work performance data and quality metrics provided in Chart 7 to assess compliance with standards. The project team will provide timely and accurate data related to their tasks for quality assessment purposes.
- **Review and Analyze Results:** The project manager will analyze quality control measurements and reports to identify trends, areas for improvement, or potential risks. The project team will contribute with their feedback and suggestions based on their observations and experiences during project execution.
- **Implement Corrective Actions:** The project manager will initiate corrective actions or improvements based on identified quality issues or deviations. The project team will collaborate in implementing corrective measures, suggesting improvements, and adapting processes accordingly.

4.6.2.1 Quality Documents

The quality documents and standards are important for managing and ensuring the quality of the wireless telecommunication expansion project in underserved communities in Belize.

They provide a structured framework for quality control, documentation, compliance, and continuous improvement throughout the project lifecycle. The project will organize and maintain electronic and physical copies of information and approvals necessary to document acceptable performance and compliance on the project. Chart 18 presents the documentation that will be assembled for the project.

Chart 18: Quality Documents

| Category | Quality Documents and Standards |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard Operating Procedures (SOPs) | <ul style="list-style-type: none"> • SOPs for Site Installation, Maintenance, and Troubleshooting |
| Quality Standards | <ul style="list-style-type: none"> • TL 9000 Telecommunications Quality Standard • Approved Public Utilities Commission (PUC) Site Electrical Design • Civil Aviation Standards |
| Checklist and Templates | <ul style="list-style-type: none"> • Network/Site Inspection Checklist • Installation and Configuration Templates for Wireless Equipment |
| Specifications and Requirements | <ul style="list-style-type: none"> • Technical Specifications for Telecommunication Equipment and Coverage Requirement |
| Quality Records | <ul style="list-style-type: none"> • Site Inspection and Test records • Site Acceptance Form • Non-Conformance Reports for Service outages or failures • Change control records for Network Configuration changes. |
| Reporting | <ul style="list-style-type: none"> • Progress Reports by community • Coverage reports • Performance Monitoring Reports |
| Health & Safety | <ul style="list-style-type: none"> • Labor Act of Belize • Environmental Protection Act • Occupational Safety and Health Act (OSHA) |

Note: Own work

4.6.2.2 Quality Continuous Improvement Plan

The Plan-do-check-act (PDCA) method will continuously be applied at various stages of the project for continuous improvement. The project manager will foster a culture of continuous improvement by encouraging feedback and integrating lessons learned into future projects. The project team will actively participate in discussions, sharing insights, and proposing enhancements for ongoing quality improvement. The PDCA will be employed as follows:

- i. **Plan:** Define clear quality objectives and establish metrics for the deliverables and the project team will support the expected results.
- ii. **Do:** Execute the quality assurance activities as defined in the Quality Management Plan. Conduct inspections, reviews, and tests on project deliverables to ensure they meet defined quality standards.
- iii. **Check:** Collect data on quality control measurements, comparing actual performance against set quality metrics. Analyze the data gathered from quality control activities to identify any deviations from standards or areas for improvement.
- iv. **Act:** If deviations or issues are identified, initiate corrective actions to address them promptly. Make necessary adjustments or improvements to processes based on the insights gathered from the quality assessment.

4.6.3 Control Quality

Control quality is the process of monitoring and recording results of executing the quality management activities in order to assess performance, and ensure the project outputs are complete, correct and meet customer expectations (PMI, 2017, p. 298). This process helps the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project with identifying and rectifying quality issues contributing to the successful delivery of high-quality service. The inputs used are the quality management plan, project documents which include lessons learned register, quality metrics, test/evaluation documents, approved change requests, enterprise environmental factors and organizational assets. The tools and techniques for this process include checklist, surveys, performance reviews, inspection, testing/product evaluations and meetings which incorporate approved change request reviews and retrospectives/lessons learned. The subsequent process will be followed to control quality in the project applying quality documents presented in Chart 18.

1. The project team will be fully engaged in quality control with specific responsibilities assigned to team members for supervising and verifying that requirements are met.
2. Site Inspections will be conducted by Technicians for on-site assessments of infrastructure and site correctness.
3. Coverage testing will be performed by Technicians to evaluate the extent and reliability of wireless coverage.
4. Equipment inspections will be performed to verify the installation and functionality of telecommunication equipment.

5. Verification of quality control by the Lead Technician will be conducted to review and validate the accuracy of data collected from inspections and tests. A comparative analysis will compare obtained results against the project's predefined quality benchmarks and specifications presented in the Plan Quality Management Process.
6. Adjustments and corrective actions will be performed by the project manager or Lead Technician to implement necessary adjustments to rectify identified issues in accordance with the established integrated change control process.
7. A re-evaluation will follow to reassess affected areas to ensure compliance with quality criteria post-correction.
8. Data collection and reporting will be conducted by the project manager to summarize the findings from inspections, coverage tests, and equipment evaluations.
9. Compliance documentation will be available to provide evidence of adherence to regulatory standards and project specifications in accordance with quality documents presented in Chart 18.
10. Continuous Monitoring for regular inspection and testing of the new site installations or configurations will be undertaken.
11. Feedback Integration will ensure lessons learned and feedback are considered into future quality control measures.
12. The Change Request Process described in the Perform Integrated Change Control Process will be followed. All change requests will be made using the Change

Request Form presented in **section 4.2.1** and assessed thoroughly to understand their impact on the project quality. The approved changes will be implemented and documented in the Change Log displayed in **Chart 7**.

4.7. Resource Management Plan

According to PMI (2017, p. 307), Resource Management Plan includes the processes to identify, acquire and manage the resources required for the successful completion of the project. This process is vital to make certain that the necessary workforce, equipment, and materials are available at the right time and place. This plan will aid in executing tasks effectively, meeting project milestones, and delivering reliable telecommunication services to the underserved communities in Belize within the planned timeline and budget. The processes include plan resource management, estimate activity resources, acquire resources, develop team, manage team and control resources.

4.7.1 Plan Resource Management

The plan resource management process involves determining how resources will be estimated, acquired, utilized, and managed throughout the project. This process is imperative for Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project for the necessary human resources, equipment, and materials to be available and effectively utilized to support the project's objectives. The project manager will be responsible for identifying and acquiring the resources within the current workforce at Digi and/or engage external resources where necessary.

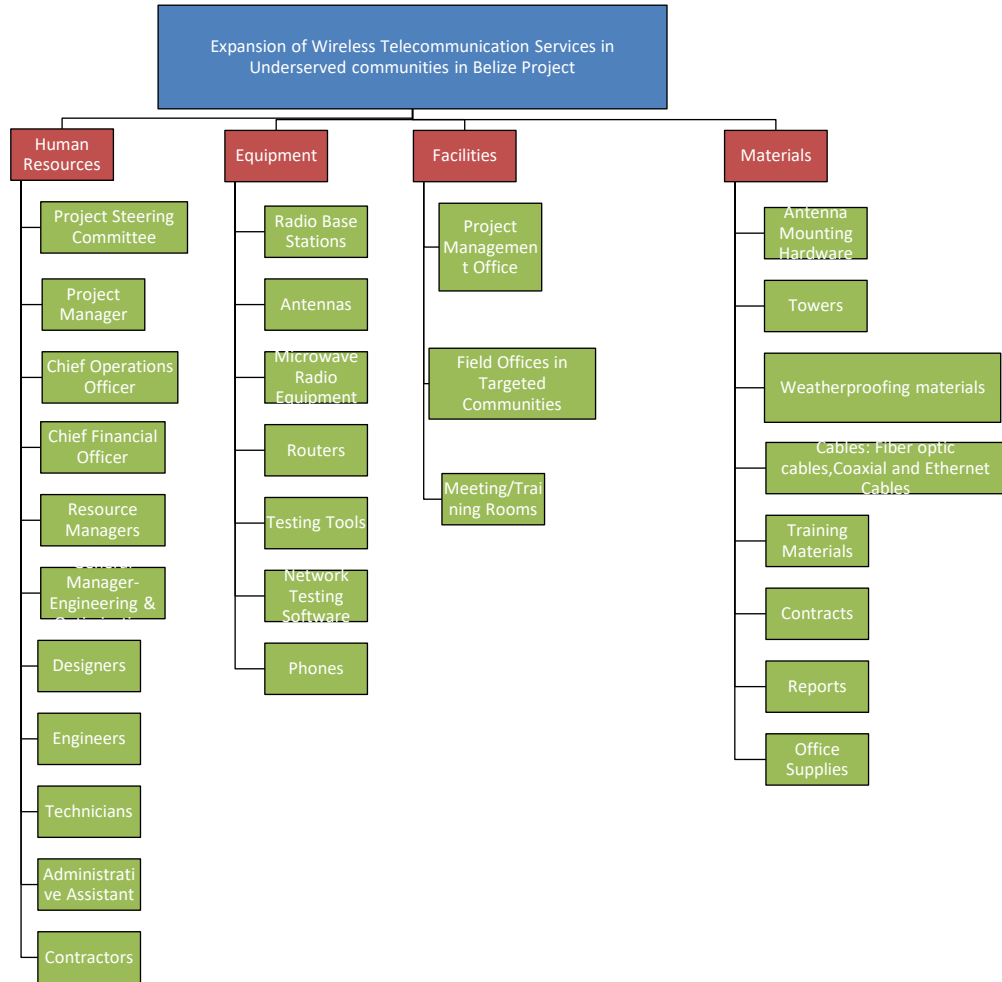
The inputs utilized are the scope baseline, project documents comprising of the project schedule, requirements documentation, risk register and stakeholder register, enterprise

environmental factors and organizational process assets. The tools and techniques required are expert judgment, data representation techniques consisting of the Resource Breakdown Structure (RBS) and Responsibility Assignment Matrix (RACI), and meetings.

4.7.1.1 Resource Breakdown Structure

The Resource Breakdown Structure is a hierarchical representation of project resources categorized and organized according to their types, categories, or other significant classifications. Figure 21 displays the Resource Breakdown Structure (RBS) for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. The RBS illustrates the human resources, equipment, facilities and materials which will be required to successfully complete the project.

Figure 24: Resource Breakdown Structure



Note: Own work

4.7.1.2 RACI Matrix

The Responsible, Accountable, Consulted, and Informed (RACI) matrix will be used to clarify and define roles and responsibilities for various tasks, decisions, or deliverables within the project. The RACI chart represents different levels of involvement individuals or

groups will have in the project activities. The RACI roles are categorized into four types of designation as follows:

1. **Responsible (R):** The person or role responsible for performing the task or activity.
This individual is in charge of executing the work.
2. **Accountable (A):** The person ultimately answerable for the task's success or failure.
This person ensures that the task is completed satisfactorily.
3. **Consulted (C):** Individuals or groups that need to provide input or expertise before a task is completed. They are consulted for their insights but are not directly responsible for the task.
4. **Informed (I):** Individuals or groups that need to be kept informed about the task's progress but are not directly involved in its execution or decision-making.

The following human resources comprise the project team:

- Project Steering Committee (PSC)
- Project Management Office Manager (PMO)
- Project Manager (PM)
- Chief Operations Officer (COO)
- Chief Financial Officer (CFO)
- Resource Managers (RM)
- General Manager- Engineering & Optimization (GM)
- Designers (DE)
- Engineers (Eng)
- Technicians (Tech)

- Administrative Assistant (AA)
- Contractors (Con)

Chart 19 displays the RACI Matrix for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project.

Chart 19: RACI Matrix

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|--------|-------------------------------------------|---------------------------|------|----------------------------------------------|--------------------------------|
| | | R | A | C | I |
| 1.1 | Community Analysis and Identification | PM | DE | COO RM GM Eng Tech PMO PSC | AA CFO Con |
| 1.1.1 | Conduct Comprehensive Analysis | PM | DE | COO RM GM Eng Tech | AA CFO Con PMO PSC |
| 1.1.2 | Identify specific underserved communities | PM | Tech | COO RM GM Eng DE | AA CFO Con PMO PSC |
| 1.2 | Evaluation of Existing Infrastructure | PM | DE | RM GM Eng Tech | AA COO CFO Con |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|--------|-------------------------------------------------|---------------------------|----|--------------------------------|---------------------------------------|
| | | R | A | C | I |
| | | | | | PMO PSC |
| 1.2.1 | Assess current Telecommunication infrastructure | PM | DE | COO RM GM Eng Tech | AA CFO Con PMO PSC |
| 1.2.2 | Determine specific requirements and challenges | PM | DE | RM GM Eng Tech | AA COO CFO Con PMO PSC |
| 1.3 | Feasibility Study | PM | DE | RM GM Eng Tech | AA COO CFO Con PMO PSC |
| 1.3.1 | Economic assessment | PM | DE | COO CFO GM Eng | AA Con PMO PSC |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|--------|-----------------------------------------------------|---------------------------|----|--------------------------|--------------------------------------|
| | | R | A | C | I |
| | | | | Tech | RM |
| 1.3.2 | Technical Evaluation | PM | DE | COO GM Eng Tech | AA CFO RM Con PMO PSC |
| 1.3.3 | Environmental Impact Analysis | PM | DE | COO GM Eng Tech | AA CFO RM Con PMO PSC |
| 1.4 | Exploration of Innovative Technologies | PM | DE | COO GM Eng Tech | AA CFO RM Con PMO PSC |
| 1.4.1 | Research on wireless telecommunication technologies | PM | DE | Eng Tech | AA CFO COO GM |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|--------|--------------------------------------|---------------------------|-----|--------------------------|--------------------------------------|
| | | R | A | C | I |
| | | | | | RM Con PMO PSC |
| 1.4.2 | Assessment of sustainable solutions | PM | DE | COO GM Eng Tech | AA CFO RM Con PMO PSC |
| 1.5 | Integration of sustainable practices | PM | DE | COO GM Eng Tech | AA CFO RM Con PMO PSC |
| 1.6 | Deployment of Wireless Technologies | PM | Eng | COO GM Tech DE | AA CFO RM Con PMO PSC |
| 1.6.1 | Planning for Deployment | PM | Eng | COO | AA |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|---------|--------------------------------|---------------------------|------|------------------------------|---------------------------------------------|
| | | R | A | C | I |
| | | | | GM Tech DE | CFO RM Con PMO PSC |
| 1.6.1.1 | Network Architecture Design | PM | Eng | COO GM Tech DE | AA CFO RM Con PMO PSC |
| 1.6.2 | Implementation and Integration | PM | Eng | GM Tech DE | AA COO CFO RM Con PMO PSC |
| 1.6.2.1 | Site Implementation | PM | Tech | GM Eng DE RM Con | AA COO CFO PMO PSC |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|---------|----------------------------------|---------------------------|------|--------------------------------|--------------------------------|
| | | R | A | C | I |
| 1.6.2.2 | Site verification and acceptance | PM | Tech | GM Eng DE RM Con | AA COO CFO PMO PSC |
| 1.6.2.3 | Site Integration | PM | Tech | GM Eng DE RM Con | AA COO CFO PMO PSC |
| 1.6.2.4 | Testing & Optimization | PM | Tech | GM Eng DE RM Con | AA COO CFO PMO PSC |
| 1.6.2.5 | Community Awareness and Training | PM | Eng | GM Tech DE PMO PSC | AA COO CFO RM Con |
| 1.7 | Final Acceptance | PM | Eng | COO GM Tech | AA CFO RM |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|--------|-----------------------------|---------------------------|-----|---------------------------------------------|-------------------------------|
| | | R | A | C | I |
| | | | | DE PMO PSC | Con |
| 1.7.1 | Network Acceptance | PM | Eng | COO GM PMO Tech DE | AA CFO RM Con PSC |
| 1.7.2 | Handover to Operations team | PM | Eng | COO GM PMO Tech DE RM | AA CFO Con PSC |
| 1.8 | Commercial Launch | PM | Eng | COO GM Tech DE RM PMO PSC | AA CFO Con |
| 1.8.1 | Site on Air | PM | Eng | COO GM | AA CFO |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|--------|--------------------|---------------------------|------|-------------------------------|---------------------------------------------------|
| | | R | A | C | I |
| | | | | Tech DE | Con PMO PSC RM |
| 1.8.2 | Service Monitoring | PM | Tech | Eng DE | AA COO CFO PMO PSC GM RM Con |
| 1.9 | Project Management | PM | Eng | Tech DE RM GM AA | CFO Con PMO PMO PSC COO |
| 1.9.1 | Project Planning | PM | Eng | Tech DE RM GM PMO | AA CFO Con PSC COO |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|---------|--------------------------|---------------------------|-----|-----------------------------------------------------------|---------------------------------|
| | | R | A | C | I |
| 1.9.2 | Meetings | PM | Eng | Tech DE RM GM COO PMO PSC CFO Con | AA |
| 1.9.3 | Reports | PM | Eng | Tech DE RM GM AA | CFO Con PMO PSC COO |
| 1.9.4 | Project Closure | PM | Eng | Tech DE RM GM COO PMO PSC | AA CFO Con |
| 1.9.4.1 | Document Lessons Learned | PM | Eng | Tech DE | CFO Con |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|---------|----------------------------|---------------------------|-----|----------------------------------------------------|--------------------------------|
| | | R | A | C | I |
| | | | | RM GM COO PMO AA | PSC |
| 1.9.4.2 | Update Documents & Records | PM | Eng | Tech DE RM AA PMO | CFO Con COO GM PSC |
| 1.9.4.3 | Project Acceptance | PM | Eng | Tech DE RM GM COO CFO PMO PSC | AA Con |
| 1.9.4.4 | Archive Documents | PM | Eng | AA Tech | CFO Con |

| WBS ID | WBS Deliverable | Project Team/Stakeholders | | | |
|--------|-----------------|---------------------------|---|-----------------|------------------|
| | | R | A | C | I |
| | | | | DE RM PMO | COO GM PSC |

Note: Own work

4.7.2 Estimate Activity Resources

Estimate Activity Resources is the process of estimating team resources and the type and quantities of materials, equipment, and supplies necessary to perform project work (PMI, 2017, p. 320). The project manager and project team will plan and allocate resources, reducing the risk of resource shortages, optimizing resource utilization, and ensuring the successful expansion of wireless telecommunication services in underserved communities within the defined timelines and constraints. The inputs used in this process are the resource management plan, project documents consisting of activity list, assumption log, cost estimates, resource calendars, risk register, enterprise environmental factors and organizational process assets. The project will align with Digi's standard working hours, which are eight hours per week including allocations for overtime work during weekends when required. Public and Bank holidays may be considered as exceptions and used only when necessary.

The tools and techniques applied in this process include expert judgment within Digi, bottom-up estimating, analogous estimating, MS Project and meetings primarily with resource managers. The bottom-up estimating technique will be applied for detailed task breakdown and analogous estimating for quick initial resource estimation. The project team will create a thorough view of resource needs. This will facilitate accurate resource planning and allocation, ensuring that the right resources are available for each phase of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project.

4.7.3 Acquire Resources

Acquire resources is the process of obtaining team members, facilities, equipment, materials, supplies and other resources necessary to complete project work (PMI, 2017, p. 328). This process involves securing and managing resources efficiently to support the execution of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. Project resources will either be internal or external. The Project Manager will be within the Project Management Office (PMO). The internal team within Digi comprising of the Chief Operating Officer, Chief Finance Officer, Resource Managers, General Manager, Designers, Engineers, Technician and Administrative Assistant hold specialized skills in telecommunications, expertise or have prior involvement in similar projects. The Contractor covers the equipment vendors and construction services who are committed to supplying specific equipment, materials and service as per contractual agreements. Physical resource must be acquired in advance of the execution phase. Routine procurement will be conducted for office supplies and recurring items by the Administrative Assistant. Chart 20 outlines the resource acquisition plan for the team and physical resources identified in the RBS in Figure 21.

Chart 20: Resource Acquisition Plan

| ID | Resource | Source | Type of Acquisition |
|----|--------------------------|----------|---------------------|
| | Human Resources | | |
| 1 | Project Manager | Internal | Pre-Assigned |
| 2 | Chief Operations Officer | Internal | Pre-Assigned |
| 3 | Chief Finance Officer | Internal | Pre-Assigned |

| ID | Resource | Source | Type of Acquisition |
|-----------|---------------------------------------------------|---------------|----------------------------------------------------------|
| 4 | Resource Managers | Internal | Pre-Assigned |
| 5 | General Manager- Engineering & Optimization | Internal | Pre-Assigned |
| 6 | Designers | Internal | Pre-Assigned |
| 7 | Engineers | Internal | Pre-Assigned |
| 8 | Technicians | Internal | Pre-Assigned |
| 9 | Administrative Assistant | Internal | Pre-Assigned |
| 10 | Contractors | External | Procurement process, Proposals, CVs and Interviews |
| | Equipment | | |
| 11 | Radio Base Stations | External | Foreign Purchase |
| 12 | Antennas | External | Foreign Purchase |
| 13 | Microwave Radio Equipment | External | Foreign Purchase |
| 14 | Routers | External | Foreign Purchase |
| 15 | Testing Tools | External | Foreign Purchase |
| 16 | Network Testing Software | External | Foreign Purchase |
| 17 | Phones | External | Foreign Purchase |
| | Facilities | | |
| 18 | Project Management Office | Internal | Pre-Assigned |
| 19 | Field Offices in Targeted Communities | External | Local purchase/procurement process |
| 20 | Meeting/Training Rooms | Internal | Pre-Assigned, Local purchase/procurement process |
| | Materials | | |

| ID | Resource | Source | Type of Acquisition |
|----|--------------------------------------------------|----------|------------------------------------|
| 21 | Antenna Mounting Hardware | External | Foreign Purchase |
| 22 | Towers | External | Foreign Purchase |
| 23 | Weatherproofing materials | External | Foreign Purchase |
| 24 | Cables- Fiber optic, coaxial and Ethernet cables | External | Foreign Purchase |
| 25 | Training Materials | External | Local purchase/procurement process |
| 26 | Contracts | Internal | Pre-Assigned |
| 27 | Reports | Internal | Pre-Assigned |
| 28 | Office Supplies | External | Local purchase |

Note: Own work

4.7.4 Develop Team

According to PMI (2017, p. 336), the Develop Team process is the process of improving competencies, team member interaction and the overall team environment to enhance project performance. This process is vital to build a cohesive team, promote collaboration and enhance the skills and capabilities of the project team. The inputs required for the develop team process include resource management plan, project documents components as the lessons learned register, project schedule, project team assignments, resource calendars, enterprise environmental factors and organization process assets. The tools and techniques applied include communication technology, interpersonal and team skills primarily conflict management, motivation, negotiation, team building and recognition and rewards. For the Expansion of Wireless Telecommunication Services in Underserved Communities in Belize Project, ongoing team development initiatives are customized to enhance competencies,

foster team interaction, and cultivate an improved overall team environment. These activities will include:

- On the job training to enhance technical skills on the latest telecommunication technologies, equipment, installation best practices and Occupational Health and Safety training.
- Cross-training sessions with the technical teams to encourage knowledge sharing and broadening skill sets among team members.
- Shadowing opportunities to facilitate opportunities for individuals to shadow colleagues in different roles to broaden their understanding.
- Team-building retreats to strengthen team cohesion and collaboration.
- Quarterly Team Performance Assessments to facilitate open communication and continuous improvement.
- Feedback mechanisms to establish regular feedback sessions allowing team members to share suggestions, concerns, and ideas openly.
- Social Events and Celebrations to boost morale and team spirit.
- Project Milestone Celebrations to acknowledge achievements and milestones reached during project phases.
- Social gatherings to encourage casual interaction and camaraderie among team members.
- Ongoing support and mentoring to provide continuous support and guidance.
- Resource repository via a central repository for resources, documents, and Frequently Asked Questions (FAQ) for easy reference and learning.

4.7.5 Manage Team

Manage Team process involves overseeing and leading the project team effectively throughout the project lifecycle. It focuses on maintaining a positive team environment, resolving conflicts, addressing issues, and ensuring team performance aligns with project goals. The project manager holds the primary responsibility to manage the project team, oversee conflict resolution procedures and adherence, coordinate activities, ensuring alignment with project objectives, and making necessary adjustments based on evaluations and feedback.

The inputs utilized for the manage team process include the resource management plan, project documents comprising of issue log, lessons learnt register, project team assignments, work performance reports, team performance assessments, enterprise environmental factors and organizational process assets. The tools and techniques applied include interpersonal and team skills mainly conflict management, decision making, emotional intelligence, influencing, leadership and MS Project.

4.7.5.1 Team Management

For the Expansion of Wireless Telecommunication Services in Underserved Communities in Belize Project, the project manager holds the central role in the overall team management while the resource managers are responsible for assigning the team members to specific roles. A structured approach described below will be followed to ensure a smooth transition and maintain project expertise.

- **Requesting Changes:** The individual project team members, COO, General Managers, resource managers or the project manager can initiate requests for changes in the project team. The requestor submits a formal request via email detailing the reason(s) for the change, specific roles or team members involved and the expected impact on the project.
- **Approval:** The project manager will review and approve or reject team change requests. The evaluation is based on criteria such as project needs, required skills, resource availability and the overall impact on the project timeline and objectives. Approval will be granted if the change aligns with the project objectives and is feasible within the project constraints. If there are significant changes or the change is of high impact or affecting the critical path, the project manager will consult with the resource manager(s) and follow the Change Request Process described in the Perform Integrated Change Control Process. The change requests will be made using the Change Request Form presented in **section 4.2.1** and further assessed to understand their impact on the project resource management plan. The approved changes will be implemented and documented in the Change Log displayed in **Chart 7**.
- **Process to Implement Changes:** Approved changes to the project team will be communicated to the requestor, resource managers, team members, relevant stakeholders, and those directly affected by the change. The team will be briefed to introduce the changes in the Project Team Meetings or Project Status Meetings as outlined in the Communication Matrix. The Communication Management Plan and Stakeholder Management Plan will be updated as required to align with the changes.

The team member(s) will be given from five (5) to seven (7) working days to handover their duties or transition to the new role, as applicable. An orientation session will be held for the newcomer(s) to familiarize them with the new roles and responsibilities. Jointly, the project manager and the resource manager will continuously monitor the performance of the team member(s) and the effects of the changes on the project performance. Training and development will be implemented if required to equip the team member(s) with any new skill needed for their new role. Feedback sessions will be scheduled to assess the team's adjustment to the changes and ensure a positive working environment, alignment of skills and roles and maintain the overall success of the project.

4.7.5.2 Recognition and Rewards

The project manager will work closely with the resource managers to acknowledge and reward team members for their contributions and achievements to promote motivation and commitment. The project manager will ensure the recognition and rewards program aligns with the project goals and budget. Chart 21 presents the rewards and recognitions for the project team.

Chart 21: Recognition and Awards

| Reward/Recognition | Type | Description |
|---------------------------|-------------|---------------------------------------------------------------------------------------------|
| Spot Awards | Monetary | 10 % Bonus is awarded for exceptional performance or initiatives displayed by team members. |

| Reward/Recognition | Type | Description |
|--------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project milestone events | Celebratory | Celebrating achievements at project milestones to acknowledge collective team efforts. |
| Public Acknowledgement | Token | Publicly acknowledging individual or team achievements during team meetings and in company Employee Bulletins shared by the Human Resource Department. |

Note: Own work

4.7.5.3 Conflict Management

The project manager will oversee the conflict resolution process for effectiveness and fairness while maintaining the project objectives. The conflict resolution approach to be undertaken is the following:

1. Establishing a conflict resolution protocol which defines clear procedures outlining the steps to resolve conflicts, including how conflicts should be reported, who should be involved, and potential resolution strategies.
2. Facilitating open communication to create an environment where team members feel comfortable expressing concerns or disagreements openly.
3. Identifying the root cause by investigating the origin of conflict by collecting information from all parties involved to understand the underlying issues.
4. Seeking collaborative solutions by conducting collaborative sessions to generate potential solutions to the conflict.
5. Mediation and facilitation session where a trained mediator will be appointed to facilitate discussions and guide conflict resolution sessions.

6. Implementing solutions and follow-up once a resolution is agreed upon to monitor the situation after the resolution.
7. Continuous improvement by encouraging feedback from team members to continuously improve conflict resolution strategies and protocols to prevent similar issues in the future.
8. Training on conflict resolution to provide skills focused on conflict resolution techniques to equip team members with the necessary skills.

4.7.6 Control Resources

Control Resources is the process of ensuring that the physical resources assigned and allocated to the project are available as planned, as well as monitoring the planned versus actual utilization of resources and taking corrective action as necessary (PMI, 2017, p. 352). It involves monitoring, tracking, and making necessary adjustments to resources for alignment with the project plan and objectives. The inputs used in this process include the resource management plan, project documents comprising of issue log, lessons learnt register, physical resources assignments, project schedule, resource breakdown structure, resource requirements, and risk register, work performance data, agreements and organizational process assets. The tools and techniques applied were data analysis techniques such as cost-benefit analysis, and performance reviews, problem solving, interpersonal skills including negotiation and influencing, and MS Project. The project manager with support from the resource managers and the project team will ensure that resources remain aligned with the project requirements, mitigating risks that may arise and optimizing performance. For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project it will involve the subsequent steps.

- Tracking of telecommunication equipment usage to monitor the usage across the different sites for optimal deployment.
- Material procurement to monitor material usage and reordering as necessary to avoid shortages or excess inventory.

The following process will be followed to control resources effectively:

1. The existing inventory management system will be utilized to track and manage physical resources such as telecommunication equipment, materials, and hardware. A usage report with details on the usage, maintenance, and status of physical resources at different project sites will be generated.
2. Regular physical resource audits will be scheduled and conducted to verify physical resource inventory against recorded usage and identify discrepancies. In addition, quality checks will be carried out to ensure that physical resources meet the quality standards and are utilized according to the equipment and project specifications.
3. The Change Request Process described in the Perform Integrated Change Control Process will be followed. All change requests will be made using the Change Request Form presented in **section 4.2.1** and assessed thoroughly to understand their impact on the project resources. The approved changes will be implemented and documented in the Change Log displayed in **Chart 7**.

4.8. Communication Management Plan

Communications Management includes the processes necessary to ensure that the information needs of the project and its stakeholders are met through development of artifact and implementation of activities designed to achieve effective information

exchange (PMI, 2017, p.359). The process defines the communication objectives, stakeholders, information to be communicated, methods of communication, frequency, and responsible parties. The project team will ensure efficient and effective communication, fostering stakeholder engagement and contributing to the successful completion of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. The communications management plan consists of three (3) processes: plan communication management, manage communications and monitor communications.

4.8.1 Plan Communication Management

The Plan Communications Management process involves developing an effective and efficient communication management plan tailored to the project and its stakeholders. This is a proactive approach to determine the communication needs of stakeholders and establish a plan to address those needs. The input used for the plan include the project charter, project management plan, stakeholder register, enterprise environmental factors and organizational process assets. The tools and techniques applied include expert judgment, communication technology, meetings, and communication methods comprising of interactive communication, push communication and pull communication.

Chart 22 displays the communication type and communication methods/artifacts used for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project

Chart 22: Communication Type and Communication Methods/Artifacts

| Communication Type | Communication Method/Artifacts |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interactive communication | <ul style="list-style-type: none"> • Phone Calls • Videoconferencing • Meetings • Workshops or Brainstorming Sessions • Consultation Groups • Focus Groups • Instant Messaging/Chat Platforms • Presentations |
| Push communication | <ul style="list-style-type: none"> • Letters • Reports • Emails • Press Releases |
| Pull communication | <ul style="list-style-type: none"> • Sharepoint Intranet Site • Enterprise MS Project • Lessons learned database |

Note: Own work

A Communication Matrix will be utilized in the project to outline the communication requirements for the stakeholders involved. The matrix provides a structured overview of who needs what information, when, why, and how. Chart 23 presents the communication type, purpose, specific audience, communication channel, frequency and owner/responsibility and for the project. It will be updated throughout the project as may be required.

Chart 23: Communication Matrix

| Communication Type | Purpose/Objectives | Audience | Medium | Frequency | Owner/Responsibility |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------|-----------------------------|
| Project Kick-Off Meeting | <ul style="list-style-type: none"> • Introduce the project goals, scope and objectives. • Introduce the project team and their roles. • Establish stakeholder expectations and their roles and responsibilities. • Establish communication channels. • Outlining major project milestones, deadlines, and the project schedule to provide a clear roadmap for the team. | <ul style="list-style-type: none"> • Project Team • Project Sponsor • Project Steering Committee • Main Stakeholders | <ul style="list-style-type: none"> • Face-to-Face meetings | Once | Project Manager |
| Project Team Meetings | <ul style="list-style-type: none"> • Review weekly project status. • Review project timeline. • Discuss any obstacles or project risks. | <ul style="list-style-type: none"> • Project Team | <ul style="list-style-type: none"> • Face-to-Face meetings • Conference Call | Weekly | Project Manager |
| Technical Meetings | <ul style="list-style-type: none"> • Discussion and review of design phase. • Discussion on technology implementation and infrastructure development. | <ul style="list-style-type: none"> • Technical Project Team | <ul style="list-style-type: none"> • Face-to-Face meetings • Conference Call | As needed | Technical Leads |
| Project Status Meetings | <ul style="list-style-type: none"> • Discuss project overall status, action log and progress • Discuss risks, issues and mitigation. | <ul style="list-style-type: none"> • Project Team • Project Sponsor • Project Steering Committee | <ul style="list-style-type: none"> • Face-to-Face meetings • Conference Call | Monthly | Project Manager |

| Communication Type | Purpose/Objectives | Audience | Medium | Frequency | Owner/Responsibility |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------|----------------------|
| | <ul style="list-style-type: none"> Engage stakeholders to participate, ask questions, and offer input or feedback on the project's progress. | <ul style="list-style-type: none"> Main Stakeholders | | | |
| Project Steering Committee (PSC) Meetings | <ul style="list-style-type: none"> Discuss project alignment. Review project risk and mitigation strategies. Address issues escalation and discuss resolution strategies. Milestone review and project progress. Review and approve changes. Review Key Performance Indicators (KPIs) and metrics to ensure project criteria are met. Provide feedback on priorities, Budget and overall status. | <ul style="list-style-type: none"> Project Steering Committee | <ul style="list-style-type: none"> Face-to-Face meetings | Monthly or as needed | Project Manager |
| Community Outreach | <ul style="list-style-type: none"> Engage and inform local communities. | <ul style="list-style-type: none"> Residents of underserved communities Indirect Stakeholders | <ul style="list-style-type: none"> Face-to-Face meetings | As needed | Project Manager |
| Project Status Reports | <ul style="list-style-type: none"> Provide report on project status, achieved milestones, task status. Provide report on Key Performance Indicators (KPIs) such as cost, schedule, quality performance. Provide report on identified risks and issues along with their impact and mitigation strategies. | <ul style="list-style-type: none"> Project Team Project Sponsor Project Steering Committee Main Stakeholders | <ul style="list-style-type: none"> Email | Monthly | Project Manager |

| Communication Type | Purpose/Objectives | Audience | Medium | Frequency | Owner/Responsibility |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------|-----------------------------|
| Technical Reports | <ul style="list-style-type: none"> • Provide progress on technical aspects of the project | <ul style="list-style-type: none"> • Project Team | <ul style="list-style-type: none"> • Email | Weekly | Technical Lead |
| Contractor Progress Meetings | <ul style="list-style-type: none"> • Coordinate tasks between contractors and project team. • Track and discuss progress & address any challenges. | <ul style="list-style-type: none"> • Project Team • Contractors | <ul style="list-style-type: none"> • Face-to-Face meetings | Bi-weekly | Project Manager |
| Presentations | <ul style="list-style-type: none"> • Discuss project updates and other project information. | <ul style="list-style-type: none"> • Project Sponsor • Project Steering Committee • Project Team • Indirect Stakeholders | <ul style="list-style-type: none"> • Face-to-Face meetings • Conference Call | Monthly | Project Manager |

Note: Own work

4.8.2 Manage Communication

Manage Communication involves the efficient and effective distribution of project information to stakeholders and managing communications throughout the project lifecycle. For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, the aim is to ensure that the right information is delivered to the right stakeholders at the right time using appropriate communication methods and technologies. The Communication Matrix presented in Chart 23, is the main reference to be utilized to manage communications for the project. The Project Manager has the pivotal role in managing project communication by strategically planning, executing, and overseeing the communication activities for effective information flow and stakeholder engagement throughout the project.

The inputs required for this process include the resource management plan, communications management plan, project documents comprising of change log, issue log, lessons learned register, quality report, risk report and stakeholder register, enterprise environmental factors, organizational process assets. The tools and techniques which will be applied to manage communications include communication skills covering feedback, nonverbal and presentations, meetings, project management information system (PMIS), project reporting, interpersonal and team skills which includes active listening, conflict management, meeting management and networking.

Project Management Information Systems (PMIS) ensure that stakeholders can easily retrieve the information that they require in a timely manner (PMI, 2017, p. 385). These

systems encompass software, tools, and methodologies that support various project management processes and activities. The following PMIS will be utilized in the project:

1. **Electronic Project Management Tools-** Microsoft Project, SharePoint and Google Drive will be utilized by the project manager and project team. Microsoft Project will be used by the project manager for creating project plans, defining tasks, setting timelines, and resource allocation. The project team members will access Microsoft Project for task assignments, updates, and tracking progress. SharePoint and Google Drive will be used for document storage, sharing, and version control. The project team including external Stakeholders will collaborate on documents, store project files, and access shared resources.
2. **Electronic Communication Management-** The project team and stakeholders will utilize emails, Microsoft Teams for real-time communication including meetings, video conferencing and audio communications.
3. **Social Media Management-** Social media applications namely WhatsApp chat groups, and the Digi website will be utilized to engage with stakeholders and the communities to enhance the team interaction and promote engagement in the project.

4.8.3 Monitor Communications

Monitor Communication is the process which aims to oversee and supervise the flow of project information to ensure effective and efficient communication among stakeholders throughout the project lifecycle. For the Expansion of Wireless Telecommunication

Services in Underserved communities in Belize Project, the process ensures that project communication remains effective, efficient, and aligned with stakeholders' needs.

The inputs required for the manage communication process include the resource management plan, communications management plan, project documents consisting of issue log, lessons learnt register, and project communications, Enterprise environmental factors and organizational process assets. The tools and techniques which will be employed to manage communication in the project are expert judgment, project Management information system, interpersonal and team skills entailing observation/conversation and meetings.

4.8.3.1 Communication Escalation Process

Project escalation is essential in identifying and mitigating potential threats. The Communication Escalation Process will be utilized to manage and resolve communication issues that may arise during the project. The project manager is responsible for communicating and enforcing the escalation process. Chart 24 presents the structured approach for the project to address communication challenges and facilitate their resolution in a timely and efficient manner.

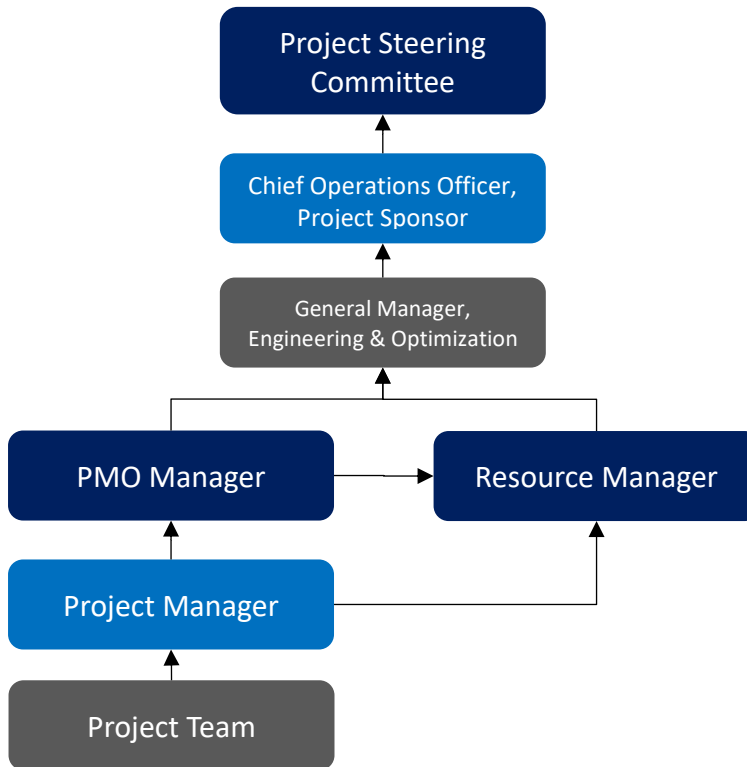
Chart 24: Steps for Issue Management for the Communication Escalation Process

| Step | Action | Description |
|-------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Identify and Document Issues | Recognize and document the challenges or discrepancies within the project. The project manager and team or any stakeholders can raise issues. Communication issues are documented in detail including its impact, triggers, and any attempted resolution. |

| Step | Action | Description |
|------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Review of Issues | Assess the identified communication issues, evaluating their severity, impact on the project objectives, and potential risks associated, and determining the urgency for resolution. |
| 3 | Communication of Issues | Notify relevant stakeholders and team members, about the identified communication challenges. Provide comprehensive details and impact assessment. |
| 4 | Escalate Issues | Follow the Escalation Path presented in Figure 22 to escalate unresolved or critical communication issues. |
| 5 | Issue Resolution | Work towards resolving the escalated communication challenges. |

Note: Own work

Figure 25: Escalation Path



Note: Own work

Chart 25 displays the Communication Escalation Matrix with the priority level, definition of the priority level, decision authorities and timeframe for resolution. The matrix safeguards project continuity and progress as critical information will reach the right authority for a quick action. The Monitor Communication process will result in the need for change requests on communication activities. The Change Request Process described in the Perform Integrated Change Control Process will be followed. All change requests will be made using the Change Request Form presented in **section 4.2.1** and assessed thoroughly to understand their impact on the project communication management plan. The approved changes will be implemented and documented in the Change Log displayed in **Chart 7**.

Chart 25: Communication Escalation Matrix

| Priority Level | Definition | Decision Authority | Timeframe for Resolution |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------|
| Priority 1 | Critical and urgent impact on project scope, schedule, or budget. It poses immediate and significant threats to the project success, viability, or compliance. Urgent action is required to prevent substantial setbacks or failure. | Project Steering Committee (PSC) | Within 24 hours |
| Priority 2 | Medium impact to the project scope, schedule, or budget. If not addressed promptly, it could lead to notable disruptions, delays, or deviations if unresolved. | Project Sponsor (COO) | Within 1-2 days |
| Priority 3 | Minor impact to the scope, schedule, or budget. It requires attention to ensure adherence to the established project objectives. These issues, if unattended, could | Project Management Office (PMO) Manager | Within 2-3 days |

| Priority Level | Definition | Decision Authority | Timeframe for Resolution |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------|
| | lead to minor impacts on the project outcomes or efficiency. | | |
| Priority 4 | Insignificant impact to the scope, schedule, or budget. It does not pose immediate risks or threats but contributes to the ongoing project monitoring. | Project Manager | As needed |

Note: Own work

4.9 Risk Management Plan

Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation and monitoring risk on a project (PMI, 2017, p. 395). The purpose of this process for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project is to proactively identify and address potential threats and opportunities. The project manager will lead the risk management efforts and ensure the project is better prepared to manage uncertainties and minimize their impact on the project objectives. There are seven processes in project risk management which are plan risk Management, identify risk, perform qualitative risk analysis, perform quantitative risk analysis, plan risk response, implement risk response and monitor risk response.

4.9.1 Plan Risk Management

Plan Risk Management process is the initial step in the risk management lifecycle. The primary aim is to establish how risk management activities will be conducted throughout the project. This process commenced from the project initiation phase and will be performed at predefined points in the project such as in a major phase change or change that substantially impacts the project.

The inputs for the plan risk management process include the project charter, all components of the project management plan, stakeholder register, enterprise environmental factors and organizational process assets. The enterprise environmental factors considered are the overall risk thresholds set by Digi and key stakeholders. The organizational process assets reviewed included templates for the risk Management plan, risk register and risk report,

authority levels for decision making and lessons learned repository from previous projects. The main tools utilized are expert judgment, stakeholder analysis and meetings. The risk management planned involved collaboration with relevant project stakeholders, including senior management, subject matter experts, and key project team members who brought diverse and comprehensive perspectives on risk.

4.9.2 Identify Risk

Risk identification is the process of identifying individual project risks, as well as sources of overall project risk, and documenting their characteristics (PMI, 2017, p. 409). For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project the potential risks were identified that may affect the project's objectives. This process will be led by the project manager throughout the project's lifecycle and include the project team members, subject matter experts, stakeholders, and external experts who may provide insights into the specific risk areas. The project manager will create risk awareness sessions and regular risk reviews to cultivate a culture that values risk management and allows for continuous identification, assessment and addressing of risks throughout the project lifecycle.

The inputs utilized for this process include the project management plan comprising of the schedule management plan, cost management plan, quality management plan, resource management plan, risk management plan, scope baseline, schedule baseline and cost baseline, project documents which include assumption log, issue log, lessons learned register, resource requirements, and stakeholder register, procurement documentation, enterprise environmental factors and organizational process assets. The tools and

techniques used are expert judgment, data gathering including brainstorming, checklist and interviews, assumption and constraint analysis, document analysis, prompt list, and meetings.

The Risk Breakdown Structure (RBS) is a hierarchical representation that organizes project risks into a structured and logical format. For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, the RBS was utilized to categorize the various types of risks that the project might encounter. The RBS presented in Chart 26 will help the project team in identifying, analyzing, and managing the risks throughout the project lifecycle. The RBS is divided into five (5) main categories technical risks, management risks, commercial risks, organizational and external risks.

Chart 26: Risk Breakdown Structure

| RBS Level 0 | RBS Level 1 | RBS Level 2 | RBS Level 3 |
|--------------------------------|------------------------|--------------------------|-----------------------------------------------------------------------------------|
| 0. All Sources of Project Risk | 1. Technical Risk | 1.1 Infrastructure | 1.1.1 Inadequate network coverage |
| | | | 1.1.2 Equipment failure due to environmental factors |
| | | 1.2 Technology | 1.2.1 Compatibility issues with existing infrastructure |
| | | | 1.2.2 Integration challenges with existing systems |
| | 2. Management Risk | 2.1 Leadership | 2.1.1 Inadequate team empowerment to make necessary decisions within their scope. |
| | | 2.2 Communication | 2.2.1 Inadequate communication within the team |
| | 3. Commercial Risk | 3.1 Contract Management | 3.1.1 Breach of contract terms |
| | | 3.2 Supplier Reliability | 3.2.1 Material shortages due to Supplier Issues. |
| | 4. Organizational Risk | 4.1 Human Resources | 4.1.1 Skill gaps within the project team |
| | | 4.2 Stakeholder | 4.2.1 Misalignment of stakeholder expectations. |
| | 5. External Risk | 5.1 Environmental | 5.1.1 Extreme weather conditions impacting the infrastructure deployment. |
| | | | 5.1.2 Ecological impact due to infrastructure construction |
| | | 5.2 Political | 5.2.1 Changes in government policies affecting the project. |
| | | 5.3 Economic | 5.3.1 Higher costs due to currency Exchange rate fluctuations |

Note: Own work

4.9.3 Perform Qualitative Risk Analysis

Perform Qualitative Risk Analysis is the process of prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics (PMI, 2017, p. 419). For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, both the project manager and project team conducted this process to collaborate on a comprehensive and accurate risk assessment aiming to prioritize and plan appropriate responses effectively. This process is performed regularly throughout the project's lifecycle with the active involvement of the entire team to foster a shared understanding of risks and encourage collective ownership of risk management within the project.

The inputs utilized for this process are the risk Management plan, project documents comprising of assumption log, risk register and stakeholder register, enterprise environmental factors and organization process asset. The tools and techniques applied include expert judgment, interviews, risk probability and impact assessment, risk categorization, probability and impact matrix, and meetings.

The risk probability and impact assessment is a qualitative method used to evaluate and prioritize identified risks based on two key factors: the probability of occurrence and the potential impact on project objectives if the risk occurs. The risk probability and impact assessment was performed by the project manager and project team utilizing a probability and impact matrix.

4.9.3.1 Probability and Impact Scales

The risks were quantified by assessing the risks' likelihood or probability of a specific event occurring and rated at the highest priority. The risks which were more unlikely or have a low impact were rated at a lower priority. Chart 27 displays the probability scale used to assist the project team in evaluating the risks.

Chart 27: Probability Scale

| Scale | Probability Score | Definition |
|-----------|-------------------|--------------------------|
| Very High | 0.90 | Highly likely to occur |
| High | 0.70 | Likely to occur |
| Medium | 0.50 | Possible to occur |
| Low | 0.30 | Unlikely to occur |
| Very Low | 0.10 | Highly unlikely to occur |

Note: Own work

The impact scale in Chart 28 classified the different impact levels for schedule, cost, scope and quality.

Chart 28: Impact Scale

| Scale | | +/- Impact on Project Objectives | | | | |
|-------------------------|----------|---------------------------------------------------------|---------------------------------------------|----------------------------------|---------------------------------------------------|---------------------------------------------------|
| | | Very Low | Low | Moderate | High | Very High |
| Impact Score/Percentage | | 0.05 | 0.10 | 0.20 | 0.40 | 0.80 |
| Project Objectives | Schedule | 2 to 3 days | 4 to 8 days | 9 to 14 days | 15 to 21 days | >22 days |
| | Cost | < 1% to 1.5% increase (Insignificant change in cost) | 2% to 4 % increase | 5% to 7 % increase | 8% to 10 % increase | > 11% increase |
| | Scope | Slight adjustment on scope | Minor scope change | Major scope change | Unacceptable scope changes | Major scope rework |
| | Quality | Minimal impact on key service area | Minor impact on overall service performance | Some impact in key service areas | Significant impact on overall service performance | Significant impact on overall service performance |

Note: Own work

4.9.3.2 Probability and Impact Matrix

The probability and impact matrix displayed in Figure 26 provides a visual representation of risks to allow the project manager and project team to quickly understand and communicate the relative significance of various risks. The project manager will be able to prioritize risks which are ranked very high, high or moderate and will facilitate risk response planning.




Figure 26: Probability and Impact Matrix

| | | Threats | | | | | Opportunities | | | | | | |
|-------------|-------------------|------------------|-------------|------------------|--------------|-------------------|-------------------|--------------|------------------|-------------|------------------|-------------------|-------------|
| Probability | Very High 0.90 | 0.05 | 0.09 | 0.18 | 0.36 | 0.72 | 0.72 | 0.36 | 0.18 | 0.09 | 0.05 | Very High 0.90 | Probability |
| | High 0.70 | 0.04 | 0.07 | 0.14 | 0.28 | 0.56 | 0.56 | 0.28 | 0.14 | 0.07 | 0.04 | High 0.70 | |
| | Medium 0.50 | 0.03 | 0.05 | 0.10 | 0.20 | 0.40 | 0.40 | 0.20 | 0.10 | 0.05 | 0.03 | Medium 0.50 | |
| | Low 0.30 | 0.02 | 0.03 | 0.06 | 0.12 | 0.24 | 0.24 | 0.12 | 0.06 | 0.03 | 0.02 | Low 0.30 | |
| | Very Low 0.10 | 0.01 | 0.01 | 0.02 | 0.04 | 0.08 | 0.08 | 0.04 | 0.02 | 0.01 | 0.01 | Very Low 0.10 | |
| | | Very Low 0.05 | Low 0.10 | Moderate 0.20 | High 0.40 | Very High 0.80 | Very High 0.80 | High 0.40 | Moderate 0.20 | Low 0.10 | Very Low 0.05 | | |
| | | Negative Impact | | | | | Positive Impact | | | | | | |

Note: Reprinted from A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition. Project Management Institute (PMI), 2017 Figure 11- 15, p. 408.

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Probability and Impact Matrix Legend:

| | | |
|-------------------------------------------------------------------------------------|--------|------------------------------------------------|
|  | High | Risk that can significantly impact the project |
|  | Medium | Risk that can moderately impact the project |
|  | Low | Risk that can minimally impact the project |

4.9.4 Perform Quantitative Risk Analysis

Perform Quantitative Risk Analysis process is where identified project risks are numerically analyzed to determine their potential impact on project objectives. This process uses quantitative techniques and tools to assess the probability and impact of risks more precisely than in qualitative analysis. PMI (2017) describes the inputs for this process are the project management plan encompassing the risk management plan, scope baseline, schedule baseline, cost baseline, project documents which includes assumption log, basis of estimates, cost estimates, cost forecasts, duration estimates, milestone list, resource requirements, risk register, risk report and schedule forecasts, enterprise environmental factors and organizational process assets. The tools and techniques used are expert judgment, interviews, facilitation, representation of uncertainty, data analysis which includes simulation, sensitivity analysis, decision tree analysis and influence diagrams. The quantitative risk analysis process is most appropriate for large and complex size projects. Considering the scale of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project and the risk exposure, a qualitative risk analysis is adequate, and the Perform Quantitative Risk Analysis process was not applied. Due to constraints in resources, time, and expertise at Digi, conducting the quantitative analysis is not practical.

4.9.5 Plan Risk Responses

Plan Risk Responses is the process of developing options, selecting strategies, and agreeing on actions to address overall risk exposure, as well as to treat individual project risks (PMI,

2017, p. 437). This process is a proactive approach aimed at minimizing potential threats and maximizing opportunities that could impact the project's objectives.

The plan risk responses process was conducted through the collaborative efforts of both the project manager and the project team for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. Risk mitigation strategies were developed to minimize individual threats, maximize individual opportunities and a risk owner was assigned to each individual project risk to implement and monitor the risk response actions. The process will be performed throughout the project lifecycle.

The inputs utilized are the project management plan consisting of resource Management plan, risk Management plan, cost baseline, project documents which include lessons learned register, project Schedule, resource calendars, risk register and risk report, enterprise environmental factors and organizational process assets. The tools and techniques employed are expert judgement, interviews, strategies for threats, strategies for opportunities, and strategies for overall project risk.

4.9.5.1 Risk Register

A Risk Register was developed to comprehensively document and manage all the identified risks throughout the project lifecycle. It will serve as the central repository for recording, monitoring, and tracking risks, their attributes, potential impact, and planned responses.

Chart 29 displays the Risk Register for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project which outlines the identified risk, cause, consequence of each risk, risk trigger, probability score, impact score and calculates risk score by multiplying the probability by the impact score and additionally allocates the

respective color code of high, medium and low for each risk. Subsequently, an appropriate risk mitigation strategy for overall project risk is identified for each risk which is classified as avoid, exploit, transfer/share, mitigate/enhance and accept. Lastly, a risk owner is assigned for accountability in managing and monitoring the risk. It is expected that updates to the register will be performed on a weekly basis to encourage the project team to report any changes or new risks they observe during their activities.

Chart 29: Risk Register

| RBS Code | Cause | Risk Description | Consequence | Risk Trigger | Probability P | Impact I | Risk Score PXI | Risk Response & Strategy | Risk Owner |
|----------|------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------|---------------|----------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1.1.1 | Failure with equipment/ radio antennas meeting expected coverage | Inadequate network coverage | Limited or no network coverage in some areas | Drive test report indicates poor coverage areas | 0.50 | 0.80 | 0.40 | Mitigate: Ensure radio frequency design is thoroughly reviewed and simulations conducted to cover all areas. | Project Manager |
| 1.1.2 | Exposure to extreme weather conditions | Equipment failure due to environmental factors | Equipment damage or malfunction | Temperature monitoring of equipment alerts on overheating | 0.30 | 0.40 | 0.12 | Mitigate: Schedule inspections to assess equipment conditions and conduct regular preventative maintenance. | Project Manager |
| 1.2.1 | Outdated or obsolete equipment | Compatibility issues with existing infrastructure | Incompatibility leading to system malfunction or limited functionality | Assessment of existing infrastructure compatibility | 0.30 | 0.80 | 0.24 | Mitigate: Upgrade the existing infrastructure to align with the technological advancements or standards required for compatibility. | Project Manager |

| RBS Code | Cause | Risk Description | Consequence | Risk Trigger | Probability P | Impact I | Risk Score PXI | Risk Response & Strategy | Risk Owner |
|----------|--------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------|---------------|----------|----------------|----------------------------------------------------------------------------------------|----------------------------|
| 1.2.2 | Limitation of legacy systems | Integration challenges with existing systems | Inability to seamlessly integrate new and existing systems | Interface analysis and compatibility checks | 0.30 | 0.80 | 0.24 | Mitigate: Incremental integration in network deployment. | Project Manager |
| 2.1.1 | Lack of clear delegation of authority | Inadequate team empowerment to make necessary decisions within their scope. | Delays progress due to team dependency on approvals | Reports of decision bottlenecks or delays | 0.50 | 0.20 | 0.10 | Mitigate: Delegate authority and encourage proactive decision-making. | Project Manager |
| 2.2.1 | Differences in communication style | Inadequate communication within the team | Misinterpretation of information | Misunderstandings in communication leading to project delays | 0.10 | 0.20 | 0.02 | Mitigate: Monitor communication channels and implement new communication tools. | Project Manager |
| 3.1.1 | Resource constraints impacting obligations | Breach of contract terms | Inability to fulfill commitments | Resource shortages impacting project deliverables | 0.30 | 0.80 | 0.24 | Transfer: Outsource to meet commitments | Project Steering Committee |
| 3.2.1 | Supplier production delays | Material shortages due | Delays in project timelines | Notifications of supplier delays | 0.10 | 0.80 | 0.08 | Mitigate: Engage a diversity of suppliers and | Project Manager |

| RBS Code | Cause | Risk Description | Consequence | Risk Trigger | Probability P | Impact I | Risk Score PXI | Risk Response & Strategy | Risk Owner |
|----------|-------------------------------------|--------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------|---------------|----------|----------------|---------------------------------------------------------------------------------------|-----------------|
| | | to Supplier Issues | | | | | | maintain a buffer stock where possible | |
| 4.1.1 | Evolving technology demands | Skill gaps within the project team | Skills lag behind the technological advancements | Technology updates and advancements | 0.50 | 0.40 | 0.20 | Enhance: Engage the team in continuous learning initiatives to remain current. | Project Manager |
| 4.2.1 | Evolving stakeholders needs | Misalignment of stakeholder expectations | Scope changes or conflicting interests | Change in stakeholder priorities | 0.30 | 0.40 | 0.12 | Exploit: Apply agile methodologies where possible | Project Manager |
| 5.1.1 | Seasonal changes impacting the work | Extreme weather conditions impacting the infrastructure deployment | Disruptions in the deployment phase | Seasonal patterns delaying the project deliverables | 0.10 | 0.20 | 0.02 | Avoid: Plan deployment phase around more favorable weather season | Project Manager |
| 5.1.2 | Pollution due to construction | Ecological impact due to infrastructure construction | Water and air pollution from construction activities | Reports of environmental pollution | 0.10 | 0.10 | 0.01 | Mitigate: Implement pollution control measures | Project Manager |
| 5.2.1 | Regulatory amendments | Changes in government policies affecting the project. | Challenges in complying or project alterations | Regulatory updates or amendments | 0.10 | 0.40 | 0.04 | Mitigate: Regular legal reviews and updates on compliance policies | Project Manager |

| RBS Code | Cause | Risk Description | Consequence | Risk Trigger | Probability P | Impact I | Risk Score PXI | Risk Response & Strategy | Risk Owner |
|----------|--------------------------|---------------------------------------------------------|------------------------------------|---------------------------------------|---------------|----------|----------------|---------------------------------------------------------------------------------------|-----------------|
| 5.3.1 | Global market conditions | Higher costs due to currency exchange rate fluctuations | Impact on imported equipment costs | Market fluctuations affecting imports | 0.50 | 0.20 | 0.10 | Mitigate: Source from alternative suppliers or negotiate Fixed contract prices | Project Manager |

Note: Own work

4.9.6 Implement Risk Responses

Implement Risk Responses process involves taking action of implementing the agreed-upon risk response plan based on their significance and potential impact on the project. During this process the risks will be monitored and reassessed continuously as new information becomes available as the project progresses.

The inputs utilized for this process were the risk management plan, project documents which include lessons learned register, risk register, risk report, and organizational process assets. The tools and techniques applied include expert judgement, influencing and project management information system (PMIS). The risk register ranked four (4) identified risks as very high, which requires the project manager to take action and follow the response strategy. Ongoing efforts to implement risk responses are essential to ensure the project remains on track and resilient against potential threats.

4.9.7 Monitor Risk

Monitor Risks is the process of monitoring the implementation of agreed upon risk response plans, tracking identified risks, identifying and analyzing new risks and evaluating risk process effectiveness throughout the project (PMI, 2017, p. 453). The risk owner will continuously monitor the risks throughout the project lifecycle. The project manager will ensure the project team remains proactive in addressing potential issues.

The inputs utilized for the monitor risk process include risk management plan, project documents comprising of issue log, lessons learned register, and risk report, work performance data and work performance reports. The tools and techniques employed are

risk audits and risk review meetings. For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, the risk register is the central repository of all identified project risk and will be presented by the project manager in the scheduled project team meetings and project status meetings as established in the Communication Matrix in Chart 23. These risk audits and reviews will be part of the scheduled meetings. To maintain the project's health and ensure the risks are monitored and addressed promptly, the following activities will be conducted.

- **Regular Risk Reviews-** These scheduled meetings will review the status of identified risks. Any changes in risk likelihood, impact, and overall status since the last review will be discussed. Progress on risk response plans will be assessed and the effectiveness of implemented strategies will be evaluated.
- **Risk Register Status Updates -** The risk register will be regularly updated with the most current information on each identified risk.
- **Performance Reporting:** Performance reports will reflect on the risks' status, changes in risk, effectiveness of risk response plans, and any emerging risks. The reports will be presented to stakeholders and relevant project team members.
- **Reassessment and Analysis-** Identified risks will be periodically reassessed and reanalyzed to check if any changes in the project have altered the risks. It will be determined if previously identified risks have evolved or new risks have emerged.
- **Communication and Stakeholder Engagement:** The project manager will maintain open communication channels regarding risks as per the Communication Matrix while engaging stakeholders, including the project team, and sponsor, in discussions.

Everyone will be informed about the current risk landscape and potential impacts on the project objectives.

- The Change Request Process described in the Perform Integrated Change Control Process will be followed for any change request concerning risk management. All change requests will be made using the Change Request Form presented in **section 4.2.1** and assessed thoroughly to understand their impact on the project risk management plan. The approved changes will be implemented and documented in the Change Log displayed in **Chart 7**.

4.9.7.1 Lessons Learned

Lessons learned from the risk management process will be documented where insights, successful strategies, and challenges faced during the risk monitoring process will be captured. The lessons learned information will be used to refine the risk management process for future projects. Chart 30 displays the Lessons Learned Log that will be used in the project.

Chart 30: Lessons Learned Log

| Project Information | | | | | | | | | |
|-----------------------------|-----------------|---------------|---------|-------|-------------|----------------|------------------|--------------------|-------|
| Project Name: | | | | | | | | | |
| Project #: | | | | | | | | | |
| Project Manager: | | | | | | | | | |
| Lessons Learnt Tracking Log | | | | | | | | | |
| Lessons Learnt ID Number | Date Identified | Identified By | Subject | Event | Impact Area | Recommendation | Follow-Up Needed | Follow Up Solution | Owner |
| LL-0001 | | | | | | | | | |
| LL-0002 | | | | | | | | | |
| LL-0003 | | | | | | | | | |
| LL-0004 | | | | | | | | | |
| LL-0005 | | | | | | | | | |
| LL-0006 | | | | | | | | | |
| LL-0007 | | | | | | | | | |
| LL-0008 | | | | | | | | | |
| LL-0009 | | | | | | | | | |
| LL-0010 | | | | | | | | | |

Note: Own work

4.10. Procurement Management Plan

Procurement Management includes the processes necessary to purchase or acquire products, services or results needed from outside the project team (PMI, 2017, p. 459).

It involves managing and regulating the procedures essential for developing and administering various agreements, encompassing contracts, purchase orders, memoranda of agreements (MOAs), or internal service level agreements (SLAs). The process will ensure that the project resources and services are acquired in a timely, cost-effective, quality-focused manner and in alignment with the project objectives. The procurement management process includes three (3) processes which are plan procurement management, conduct procurements and control procurements.

4.10.1 Plan Procurement Management

Plan procurement management process involves creating a comprehensive plan that sets the guidelines for how procurement activities will be executed, managed, and controlled throughout the project. For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, Digi has the procurement expertise within the company under the responsibility of the Procurement Department who is the buyer. The Procurement Department is staffed adequately to meet the requirements of the project. They will handle the acquisition of goods, services, and resources necessary for the project. For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, there will be a collaboration with the Legal Department who will support the Procurement Department and project manager to manage contract agreements and jointly foster a positive relationship with contractors.

The inputs required for this process include the project charter, project management plan comprising of scope management plan, quality management plan, and resource management plan, project documents which includes milestone list, requirements traceability matrix, resource requirements, risk register and stakeholder register, enterprise environmental factors, and organizational process assets. The primary enterprise environmental factors reviewed include marketplace conditions, products and services available, typical terms and conditions, seller's past performance, local regulatory requirements, legal advice, financial accounting and contract payment systems. The key organizational process assets considered include preapproved seller list, formal procurements policies, procedures and guidelines. The tools and techniques applied for this process include expert judgement, market research, source selection analysis and meetings.

4.10.2 Conduct Procurements

Conduct Procurements is the process of obtaining seller responses, selecting a seller and awarding a contract (PMI, 2017, p. 482). The collaboration between the project manager, Procurement and Legal Department for the will ensure that the procurement activities are conducted efficiently, contracts are legally sound and aligned with the project requirements while mitigating any risks.

The inputs required for this process include the project management plan consisting of the scope management plan, communications management plan, risk management plan, procurement management plan, and cost baseline, project documents which includes lessons learned register, project schedule, risk register and stakeholder register, procurement documentation, seller proposals, enterprise environmental factors and

organizational process assets. The tools and techniques applied were expert judgment, advertising, bidder conferences, proposal evaluation and negotiation.

4.10.2.1 Procurement Process

The project manager will be responsible for initiating the procurement process and the Procurement Department will lead the procurement activities according to Digi's Procurement Process guided by the Finance Approval System, Budget Clearance and Quotation Policy. Goods and services will be procured from local and foreign vendors. The project manager will coordinate, oversee and align the procurement activities with the project's objectives. Furthermore, the project manager will be responsible for the following activities:

- Define the procurement needs by collaborating with the procurement team to define the specific goods, services, or resources required for the project. The project manager along with the project team will provide input on the technical requirements and specifications necessary for the procurement forms and documents.
- Prepare, review and approve the procurement plans along with the procurement department to ensure that the procurement strategies align with project goals, timelines, and budget constraints.
- Vendor evaluation and selection oversight along with the procurement team to provide input during the evaluation of bids, proposals, or vendor selections. The project manager will ensure that the selected vendor(s) meets the specific technical requirements and quality standards.

- Monitor vendors or contractor performance along with procurement team throughout the project. These will include that vendors or contractors meet their contractual obligations, quality standards, and delivery schedules.
- Communication and collaboration between the procurement department, vendors, and project stakeholders to facilitate effective communication. The project manager will collaborate with the procurement team to resolve any procurement related issues or discrepancies that may impact the project.
- Support with risk assessment and mitigation by providing insights into project specific risks associated with the procurement process.
- Oversee the administration of contracts to ensure compliance with project requirements. The project manager will collaborate with the Procurement and Legal Departments to address any contract changes, disputes, or terminations.

The project manager along with the project team is responsible for developing the Request for Proposal (RFP)/ Request for Quote (RFQ) document and uploading in the Procurement SharePoint portal. These will define the equipment, materials, and scope of works/services. The Procurement Department then requests solicitations according to the established guidelines. The project manager, project team and procurement team will evaluate all offers based on technical, cost and quality criteria. Any requisitions and offers below \$10K will adhere to the company's Finance Approval System. The Tenders Committee (TC) composed of the C-level Executives will evaluate offers for the procurement of goods and services totalling over \$15K. The Legal Department holds responsibility for drafting and

finalizing contract agreements exceeding \$15K. The Procurement Department has the sole responsibility of communicating with the unsuccessful bidders.

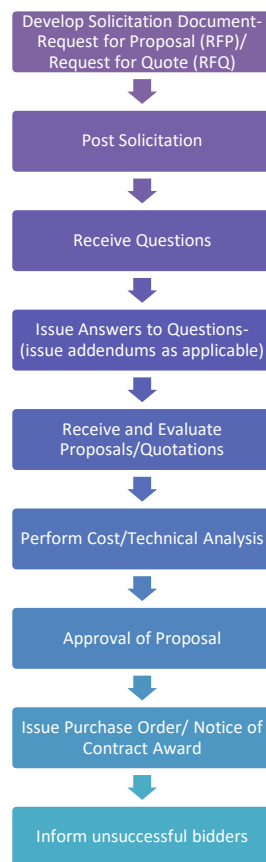
4.10.2.3 Source Selection Analysis

A balanced and flexible approach will be utilized in the selection methods for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. These methods are the following:

1. **Quality- based/highest technical proposal score-** The bidders will be required to submit proposals detailing their cost and technical approach, expertise, innovative solutions and experience. The proposals will be evaluated based on the quality of the technical solution using pre-defined technical and quality criteria such as equipment capabilities, equipment warranties, redundancy, equipment reliability and expertise. Each criterion will be assigned a score and the proposal with the highest overall technical score will be selected. This method will ensure that the bidder selected has the highest technical proficiency and is best equipped to deliver a high-quality solution and professional services.
2. **Quality and cost-based-** To ensure the most reliable and cost-effective service is offered in the communities, the bidders will be required to detail not only their technical approach but also the cost of services and technical resources they offer. A weight will be assigned to both technical quality and cost. This will ensure the project optimizes its budget by ensuring value for money in the selection process.

Figure 27 illustrates the Procurement Process and Source Selection Analysis which will be implemented for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project.

Figure 27: Procurement Process and Source Selection Analysis



Note: Own work

4.10.3 Control Procurements

Control Procurements process is the process of managing procurement relationships, monitoring contract performance, making changes and corrections as appropriate and

closing out contracts (PMI, 2017, p. 492). This process helps to maintain transparency, adherence to contracts, and overseeing the vendor's performance and compliance with agreed terms.

The inputs utilized for this process include the project management plan consisting of risk management plan, procurement management plan, and schedule baseline, project documents which includes assumption log, lessons learned register, milestone list, quality reports, requirements traceability matrix, risk register, and stakeholder register, procurement documentation, enterprise environmental factors and organizational process assets. The tools and techniques employed were expert judgement, performance reviews, inspection and audits.

During the control procurement process, the project manager is responsible for the process, overseeing and coordinating various aspects of procurement in collaboration with the Procurement and Legal Department, to ensure that the acquired goods or services align with the project's goals. The project team will be consulted for the identification of all procurement items as well as support in developing the solicitation documents. The following activities will be conducted for controlling procurement for the project:

- Performance monitoring and oversight- The project manager will monitor vendor performance against established metrics and key performance indicators (KPIs) outlined in the contract agreement. It will ensure that vendors meet delivery schedules, quality standards, and other contractual obligations. The project manager along with support from the project team will oversee the adherence to agreed

contract terms, for vendors compliance with the agreed-upon specifications, timelines, and scope.

- Scope verification and quality assurance- The project manager will verify that the procured goods or services align with the project's defined scope and requirements. There will be collaboration with stakeholders to ensure that procured items meet the specified quality standards and quality assurance checks.
- Risk management and issue resolution- The project manager will identify, assess, and mitigate risks associated with procurement activities, such as supplier reliability, delivery delays, or quality issues.
- Communication and reporting- The project manager will maintain open communication channels with vendors, project team, and stakeholders, providing updates on the progress of procurement and any issues that require attention. Reports on procurement performance will be generated as part of the Project Status Report presented in the Communication Matrix in Chart 23
- Change management and contract closure- The project manager and Legal Department will manage changes in the procurement requirements, scope adjustments, or modifications to contracts through the Change Request Process described in the Perform Integrated Change Control Process. All change requests will be made using the Change Request Form presented in **section 4.2.1** and assessed thoroughly to understand their impact on the procurement management plan. The approved changes will be implemented and documented in the Change Log displayed in **Chart 7**. The project manager will perform the formal closure of

contracts. In consultation with the project team, the project manager will confirm all deliverables are received, invoices are submitted, payments are settled, and any other administrative closure tasks are completed.

4.10.3.1 Procurement Documentation

Chart 31 presents the Procurement Log which will be managed by the project manager throughout the project lifecycle to document and keep track of the products or services to be procured. In addition, the Budget Tracking Log displayed in Figure 23 will be used to keep records of the requisitions, purchase orders, invoices and payments.

Chart 31: Project Procurement Log

| Project Information | | | | | | | | |
|----------------------|-----------------|------------------------------------|--------------|------------|-----------------------------|-------------|---------------|--------|
| Project Name: | | | | | | | | |
| Project #: | | | | | | | | |
| Project Manager: | | | | | | | | |
| Procurement Manager: | | | | | | | | |
| Procurement Log | | | | | | | | |
| ID Number | Date of Request | Description of Product or Services | Requested by | Department | Procurement Method Selected | Action Date | Delivery Date | Status |
| PL-0001 | | | | | | | | |
| PL-0002 | | | | | | | | |
| PL-0003 | | | | | | | | |
| PL-0004 | | | | | | | | |
| PL-0005 | | | | | | | | |
| PL-0006 | | | | | | | | |
| PL-0007 | | | | | | | | |
| PL-0008 | | | | | | | | |
| PL-0009 | | | | | | | | |
| PL-0010 | | | | | | | | |

Note: Adopted from How to Create a Procurement Management Plan in 7 Steps, January 6, 2023 from

<https://www.deskera.com/blog/procurement-management-plan/>. Copyright 2023 by

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4.11. Stakeholder Management Plan

Stakeholder Management includes the processes required to identify the people, groups or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution (PMI, 2017, p. 503). The Stakeholder Management Plan will identify the stakeholders of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project to effectively engage them. Next, stakeholder expectations will be outlined to ensure their needs are met, conflicts are mitigated, and gather project support. Lastly, their power, interest and influence/impact will be determined for the project. This process consists of four (4) processes which are identify Stakeholders, plan stakeholder engagement, manage stakeholder engagement and monitor stakeholder engagement.

4.11.1 Identify Stakeholders

Identify Stakeholders process involves identifying and documenting all individuals, groups, or organizations that are impacted by or have an impact on the project. It aims in understanding the interests, expectations, and influence of the stakeholders throughout the project lifecycle. Through this process, the project manager will be able to develop tailored strategies for communicating, engaging and collaborating with the stakeholders of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project.

The inputs utilized in this process were the project charter, communications management plan, project documents which include the change log, issue log, enterprise environmental factors and organizational process assets. The tools and techniques applied were expert judgment, brainstorming, stakeholder analysis, document analysis, data representation techniques which includes the power/interest grid and meetings.

4.11.1.1 Stakeholder Register

The Stakeholder Register for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project is displayed in Chart 32 which outlines the identified stakeholders, their functional roles, stakeholder type, main expectations from the project, and an assessment of their power and interest levels. The project manager and project team will make adjustments as the project progresses and further insights into the stakeholders is attained. The following power and interest scale was used based on the stakeholders' respective levels of power and their degree of interest in the project:

1. High- Stakeholders have a high level of power or interest in the project's success and outcomes. They are actively engaged and closely monitor project progress because they are directly affected by it.
2. Medium- Stakeholders have a moderate level of power or interest that can affect the project to some extent, but not as significantly as those with high power.
3. Low- Stakeholders have low power or interest over the project's direction or outcomes. They might have little impact or may not be significantly affected by the project's outcomes.

Chart 32: Stakeholder Register

| ID | Stakeholder | Functional Role | Type | Main Expectations | Power | Interest |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------|--------|----------|
| 1 | Project Sponsor: Chief Operations Officer | Sponsor | Direct/Internal | Ensure the project aligns with the company objectives. | High | High |
| 2 | Project Manager | Project Management | Direct/Internal | Successful project delivery within scope, schedule and budget constraints, and adherence to project management standards | Medium | High |
| 3 | Chief Financial Officer | Financial Management | Direct/Internal | Cost control, budget adherence, and financial viability of project. | High | Medium |
| 4 | Project Steering Committee | Oversight and decision-making | Direct/Internal | Project alignment with organizational goals, and strategic direction. | High | High |
| 5 | Project Team members: Technical Leads, Wireless Designers, Radio Telecommunication Engineers, PMO Manager, Resource Managers, Operations Team, Field Technicians | Subject Matter Experts | Direct/Internal | Successful project execution, and meeting technical/resource requirements and supporting the project | Medium | High |
| 6 | Community Residents | Project Beneficiaries | Direct/External | Improved telecommunication services with minimal disruption | Low | High |

| ID | Stakeholder | Functional Role | Type | Main Expectations | Power | Interest |
|----|------------------------------------|---------------------------|-------------------|-----------------------------------------------------------|--------|----------|
| 7 | Technology Partners | Contributor/Supplier | Direct/External | Project integration, and technological expertise | High | Medium |
| 8 | Contractors | Service Provider | Direct/External | Adhere to contract terms, timely and quality deliverables | Medium | Medium |
| 9 | Public Utilities Regulator | Regulator | Indirect/External | Regulatory compliance, and service quality oversight | High | Low |
| 10 | Department of the Environment | Environmental oversight | Indirect/External | Environmental compliance, impact assessment | Medium | High |
| 11 | Community/Village Councils | Community representatives | Indirect/External | Community representation, project alignment | Low | High |
| 12 | Non-Government Organizations | Advocacy and support | Indirect/External | Social impact, and community welfare advocacy | Low | Low |
| 13 | Belize Tourism Industry | Tourism representatives | Indirect/External | Minimize disruptions, and provide positive local impact | Medium | Medium |
| 14 | Small Businesses and Entrepreneurs | Local business | Indirect/External | Economic opportunities, and local employment | Low | High |
| 15 | Belize Electricity Limited | Service Provider | Indirect/External | Utility/infrastructure collaboration | High | Medium |
| 16 | Funding Agencies | Financial Support | Indirect/External | Compliance with funding requirements for project success | High | Medium |
| 17 | Suppliers | Goods/Services Provider | Indirect/External | Timely and quality deliverables of materials | Low | Low |

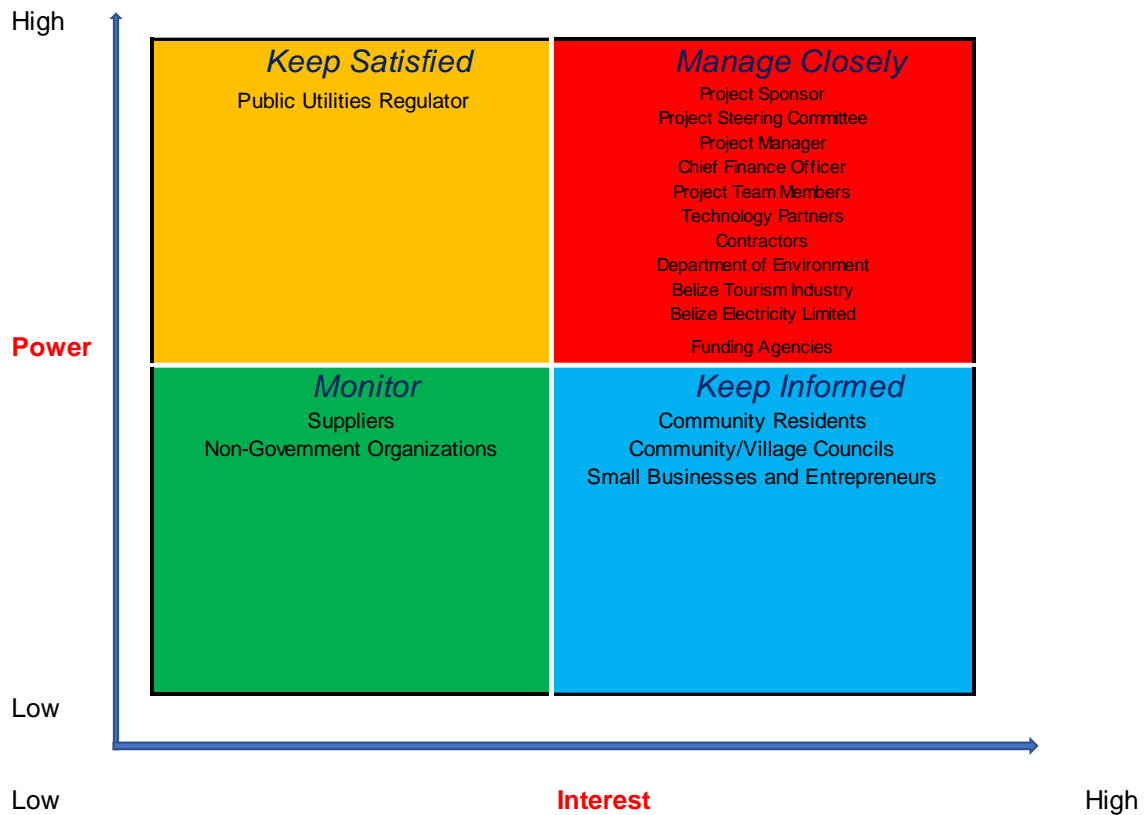
Note: Own work

4.11.1.2 Stakeholder Power/Interest Grid

The Stakeholder Power/Interest Grid was developed to categorize the stakeholders identified in the Stakeholder Register in Chart 32, based on their level of power and their level of interest in the project. Figure 28 displays the visual view for stakeholder management and analysis for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. The Stakeholder Power/Interest Grid illustrates the placement of the project stakeholders into four (4) different quadrants developed based on the guidance from the Stakeholder Register. The engagement strategy for each quadrant is as follows:

1. High Power, High Interest Stakeholders: Manage Closely
2. High Power, Low Interest Stakeholders: Keep Satisfied
3. Low Power, High Interest Stakeholders: Keep Informed
4. Low Power, Low Interest Stakeholders: Monitor

Figure 28: Stakeholder Power/Interest Grid



Note: Own work

4.11.2 Plan Stakeholder Engagement

Plan Stakeholder Engagement is the process of developing approaches to involve project stakeholders based on their needs, expectations, interests and potential impact on the project (PMI, 2017, p. 516). For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, this process will facilitate the effective engagement and management of stakeholders throughout the project lifecycle to maximize their support. It will address stakeholders' concerns and maintain positive relationships in

the project. The inputs utilized were the project charter, project Management plan comprising of the resource management plan, communications management plan, and risk management plan, project documents which included the assumption log, change log, project Schedule, risk register and stakeholder register, agreements, enterprise environmental factors and organizational process assets. The tools and techniques which were employed include expert judgment, assumptions and constraints analysis, stakeholder engagement assessment matrix and meetings.

4.11.2.1 Stakeholder Engagement Assessment Matrix

After developing the stakeholder power/interest matrix, it is crucial for the project manager and project team to understand how well they are engaging with the stakeholders and where improvements or adjustments might be needed. The Stakeholder Engagement Assessment Matrix will be utilized for the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project to help visualize the current and desired levels of engagement for the various stakeholders. The matrix will allow the project team to identify the gaps and focus on strategies to move each stakeholder towards the desired level of engagement necessary for the success of the project. Chart 33 displays the Stakeholder Engagement Assessment Matrix where “C” represents the current level of engagement of each stakeholder and “D” represents the desired level required for the project. The stakeholder engagement levels are classified as follows:

1. Unaware- Represents stakeholders who are unaware of the project and potential impacts.
2. Resistant- Represents stakeholders who are aware of the project and potential impacts but show resistance to any changes that may occur as a result of the work or outcomes of the project.
3. Neutral- Represents stakeholders who are aware of the project but who neither actively support nor oppose the project.
4. Supportive- Represents stakeholders who are aware of the project, are in favor and might provide assistance, cooperation or positive feedback.
5. Leading- Represents stakeholders who are aware of the project, are highly engaged, proactive and influential in driving the project's success.

Chart 33: Stakeholder Engagement Assessment Matrix

| ID | Stakeholder | Unaware | Resistant | Neutral | Supportive | Leading |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------|------------|---------|
| 1 | Project Sponsor: Chief Operations Officer | | | | | C, D |
| 2 | Project Manager | | | | | C, D |
| 3 | Chief Financial Officer | | | | | C, D |
| 4 | Project Steering Committee | | | | | C, D |
| 5 | Project Team members: Technical Leads, Wireless Designers, Radio Telecommunication Engineers, PMO Manager, Resource Managers, Operations Team, Field Technicians | | | | | C, D |
| 6 | Community Residents | | | C | D | |
| 7 | Technology Partners | | | | | C, D |

| ID | Stakeholder | Unaware | Resistant | Neutral | Supportive | Leading |
|----|------------------------------------|---------|-----------|---------|------------|---------|
| 8 | Contractors | | | | C | D |
| 9 | Public Utilities Regulator | | | | C, D | |
| 10 | Department of the Environment | | | | C, D | |
| 11 | Community/Village Councils | C | | | D | |
| 12 | Non-Government Organizations | C | | | D | |
| 13 | Belize Tourism Industry | C | | | D | |
| 14 | Small Businesses and Entrepreneurs | C | | | D | |
| 15 | Belize Electricity Limited | C | | | D | |
| 16 | Funding Agencies | | | | | C, D |
| 17 | Suppliers | C | | | D | |

Note: Own work

4.11.3 Manage Stakeholder Engagement

Manage Stakeholder Engagement process focuses on maintaining and enhancing stakeholder relationships throughout the project lifecycle to ensure their continued support and engagement. This process will help the project manager to foster a supportive environment and cultivate stakeholder support critical for success of the project. The inputs utilized for this process include components of the project management plan which are communications management plan, risk management plan, project documents which include the change log, issue log, lessons learned register and stakeholder register, enterprise environmental factors and organizational process assets. The tools and techniques employed include expert judgment, communications skills, interpersonal and team skills which include conflict management, cultural awareness, negotiation, observation/conversation and meetings. The project manager will be responsible for the following activities to manage stakeholder engagement:

- Regular stakeholder meetings and updates- Facilitate the stakeholder meetings, or presentations as per the Communication Matrix in Chart 23 to provide updates, gather feedback, and address concerns.
- Feedback collection and integration- Collect and document feedback from stakeholders and incorporate their inputs into the project planning and decision-making processes.
- Conflict resolution and issue management- Address conflicts or issues among stakeholders promptly and fairly.

- Maintain the stakeholder register- Maintain the stakeholder register updated with relevant information such as contact details, roles, expectations, and engagement levels.
- Building relationships and trust- Cultivate relationships with stakeholders through regular communication, active listening, and demonstrating responsiveness to their needs.

4.11.4 Monitor Stakeholder Engagement

Monitor Stakeholder Engagement is the process of monitoring project stakeholder relationships and tailoring strategies for engaging stakeholders through modification of engagement strategies and plans (PMI, 2017, p. 530). For the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, this will be an iterative process to ensure that stakeholder engagement remains effective, responsive and adjustments can be made to address the evolving stakeholder needs and expectations.

The inputs utilized in this process were components of the project management plan which include the resource management plan, and communications management plan, project documents comprising of the issue log, lessons learned register, project communications, risk register, stakeholder register, work performance data, enterprise environmental factors and organizational process assets. The tools and techniques utilized include stakeholder analysis, stakeholder engagement assessment matrix, communication skills which include feedback and presentations, interpersonal and team skills consisting of active listening, cultural awareness, leadership, networking and meetings. The project manager will be responsible for the following activities to monitor stakeholder engagement:

- Review the Communication Matrix presented in Chart 23 to evaluate the effectiveness of communication medium used to engage stakeholders. Assess which methods are most efficient and preferred by the different stakeholders.
- Assessment of the Stakeholder Engagement Assessment Matrix presented in Chart 33 to review and assess the effectiveness of the implemented stakeholder engagement strategies. The project manager will ensure the strategies align with the stakeholder expectations and project goals.
- Identify the changing needs of stakeholders by monitoring and identifying any changes in stakeholder needs, expectations, or concerns that might impact the project's progress or outcomes. Update the Stakeholder Register displayed in Chart 32.
- Maintain continuous communication with the stakeholders to address concerns, provide updates, and ensure transparency on progress and changes in the project.

4.12. Sustainable Development Plan

Green Project Management® or Sustainable Project Management is the application of methods, tools, and techniques to achieve a stated objective while considering the project outcome's entire lifecycle to ensure a net positive environmental, social, and economic impact (Green Project Management, 2023). The Sustainable Development Plan outlines an approach that aims to align the project's goals with the sustainable development principles, contributing to social, environmental, and economic well-being of Belize. The plan

involves measures to reduce the environmental impact of the project, promote social equity, support economic growth, and ensure long-term viability in various sectors, all while preserving resources for future generations.

4.12.1 Identifying Sustainability Impacts

The project team will evaluate and further develop the sustainability impacts of the project guided by the P5 Impact Analysis presented in Chart 34 and the Sustainable Development Goals (SDGs) promoted by the project and detailed in Chapter 7. In addition, the following activities be conducted:

- Engage stakeholders from the local communities, environmental groups and other stakeholders to gather varied perspectives on potential impacts.
- Organize workshops and meetings to discuss concerns and gather feedback on potential impacts from various stakeholders.
- Thoroughly benchmark and assess the current sustainability performance of the project by completing and documenting the P5 Impact Analysis (P5IA) utilizing the P5 Standard for Sustainability in Project Management version 5.01. The results of the sustainability indicators will be monitored and tracked quarterly from the P5 initial score, as the benchmark, to the new score as displayed in chart 34.
- Regular monitoring and reporting on the Key Performance Indicators (KPIs) as presented in Chart 36, throughout the project lifecycle during the monthly project status meeting and reports as presented in the Communication Matrix in Chart 23.

Chart 34: Project P5 Score

| Time Period | P5 Domain | Initial Score | New Score | Change |
|-----------------------|---------------------------------|---------------|-----------|--------|
| Q1 | People Impact | | | |
| | Labor Practices and Decent Work | | | |
| | Society and Customers | | | |
| | Human Rights | | | |
| | Ethical Behavior | | | |
| | Planet Impact | | | |
| | Transport | | | |
| | Energy | | | |
| | Land Air, and Water | | | |
| | Consumption | | | |
| | Prosperity Impact | | | |
| | Project Feasibility | | | |
| | Business Agility | | | |
| Local Economic Impact | | | | |
| Q2 | People Impact | | | |
| | Labor Practices and Decent Work | | | |
| | Society and Customers | | | |
| | Human Rights | | | |
| | Ethical Behavior | | | |
| | Planet Impact | | | |
| | Transport | | | |
| | Energy | | | |
| | Land Air, and Water | | | |
| | Consumption | | | |
| | Prosperity Impact | | | |
| | Project Feasibility | | | |
| | Business Agility | | | |
| Local Economic Impact | | | | |
| Q3 | People Impact | | | |
| | Labor Practices and Decent Work | | | |
| | Society and Customers | | | |
| | Human Rights | | | |
| | Ethical Behavior | | | |
| | Planet Impact | | | |
| | Transport | | | |
| | Energy | | | |
| | Land Air, and Water | | | |
| | Consumption | | | |
| | Prosperity Impact | | | |
| | Project Feasibility | | | |
| | Business Agility | | | |
| Local Economic Impact | | | | |
| Q4 | People Impact | | | |
| | Labor Practices and Decent Work | | | |
| | Society and Customers | | | |
| | Human Rights | | | |
| | Ethical Behavior | | | |
| | Planet Impact | | | |
| | Transport | | | |
| | Energy | | | |
| | Land Air, and Water | | | |
| | Consumption | | | |
| | Prosperity Impact | | | |
| | Project Feasibility | | | |
| | Business Agility | | | |
| Local Economic Impact | | | | |

Note: Own work

4.12.2 Responding to Sustainability Impacts

A proactive approach to address and respond to sustainability impacts will be implemented for the Expansion of Wireless Telecommunication Services in Underserved Communities in Belize Project as follows:

- Develop mitigation strategies for all domains and categories to improve negative or severe impact scores following the P5 assessment from section 4.12.1.
- Averting unacceptable impacts.
- Allocate funds for ecosystem restoration and preservation activities in potential impact areas.
- Combine sustainability risk and opportunities within the project risk and opportunity management.
- Integrate adaptation measures in the project such as providing training and support to communities to adapt to changes in the local traditional and lifestyles resulting from the project.
- Allocate resources and budget specifically reserved for sustainability initiatives and impact response measures as present in Chart 34 containing the Budget for Project Sustainability Management.
- Collaborate and partner with local and regional companies, stakeholders and government sectors for sustainable solutions that can be incorporated into the project that will benefit the local and regional economy.
- Review and adjust the Sustainable Development Plan through periodic reviews on the sustainability impacts and response measures to assess their effectiveness.

- Regularly report on the sustainability initiatives and mitigation efforts to relevant stakeholders to ensure transparency and build trust and accountability within the community and project stakeholders.

4.12.3 Roles and Responsibilities

The Project Manager, Project Team and Sustainability Impact Owner will collaborate to ensure the project is managed in a sustainable way.

Project Manager

The project manager will be well involved in advocating for support and will perform the following roles and responsibilities:

- Develop and update the P5 Impact Analysis (P5IA) as outlined in section 4.12.1 with the support of the project team.
- Integrate the activities and resources necessary from the Sustainable Development Plan into the Project Management Plan inclusive of the scope management plan, schedule management plan, cost management plan, quality management plan, risk management plan and procurement management plan.
- Coordinate with the project team to ensure alignment of the project with the P5IA and implement the responses identified.
- Develop, distribute to relevant stakeholders, and implement the Sustainability Development Plan.

- Facilitate lessons learned sessions and update the lessons learned register with insights to enhance the sustainable development plan and foster a culture of continuous improvement in sustainability.
- Prepare comprehensive reports on sustainability progress and ensure compliance to predefined quality standards.
- Organize educational workshops or training sessions for the project team to enhance their understanding of sustainable principles, practices, goals and relevance to the project objectives.
- Identify potential risks associated with sustainability initiatives, assess their impact, and develop contingency plans.
- Lead and facilitate stakeholder engagement sessions on the sustainability impacts and collaborate with stakeholders to address concerns and gather feedback from an environmental and social perspective.

Project Team:

- Provide necessary information to assess the sustainability impacts as outlined in section 4.12.1.
- Collaborate in the implementation of the impact response actions assigned within their respective areas of expertise.

- Assist in identifying potential impacts specific to their project roles and encourage other team members to propose responses for reducing environmental impacts or enhancing social benefits of the project.
- Collaborate in monitoring and reporting on sustainability KPIs.
- Advocate for and support the integration of sustainability practices within the project.
- Engage in stakeholders' consultation sessions providing technical insights and addressing queries associated with sustainability impacts.

Sustainability Impact Owner:

- Identify and assess sustainability impacts across the project.
- Develop strategies to mitigate or adapt to identified sustainability impacts and update the risk response strategy.
- Communicate on the results of sustainability impact and response strategies to the project manager and relevant stakeholders.
- Establish KPIs to measure the effectiveness of sustainability initiatives.
- Regularly evaluate the progress of KPIs and adjust strategies as necessary.
- Facilitate discussions on sustainability measures with internal and external stakeholders.
- Encourage innovation to evaluate and adopt emerging sustainability solutions, technologies, and methodologies applicable to the project objectives for continual improvement.

4.12.4 Budget

The budget displayed in Chart 35 includes items related to managing sustainability impacts within the project. The budget emphasizes the project's commitment to sustainable practices and continuous improvement.

Chart 35: Budget for Project Sustainability Management

| Sustainability-related budget items | Description | Estimated Cost (USD) |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Renewable Energy Integration | Installation of solar-powered base stations to minimize the project's carbon footprint and promote clean energy usage in the communities. | \$ 20, 000 |
| Environmental Impact Assessment | Hiring environmental consultants to conduct thorough assessments to evaluate potential environmental impacts of activities. Ensure compliance with the country's environmental regulations and identify mitigation strategies. | \$ 5, 000 |
| Community Development Programs | Implement initiatives in education, skill development and healthcare with the local communities to enhance livelihoods, promote social equity and create lasting positive impacts in the underserved areas. | \$ 10, 000 |
| Stakeholder Engagement Sessions | Conduct workshops and meetings involving community members, governmental bodies and other stakeholders. This will ensure their active involvement and be able to provide their input in the project decision-making process which will foster transparency and inclusivity. | \$ 5, 500 |
| Sustainability Training Programs | Organize training sessions on sustainable practices for project team members to enhance their knowledge on sustainable practices, which will | \$ 5, 000 |

| Sustainability-related budget items | Description | Estimated Cost (USD) |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| | enable them to integrate eco-friendly methodologies into their work activities. | |
| Reforestation Initiatives | Fund reforestation programs or habitat preservation activities to restore the ecosystem, mitigate deforestation impacts and promote biodiversity conservation. | \$ 6, 000 |
| Health and Safety Equipment | Procure personal protective gear and safety equipment to ensure the health and safety of the project team members. | \$ 4, 000 |
| Allocations for Alternative Materials | Funds will be allocated for technical research, testing and exploring alternative materials/solutions that are more sustainable, eco-certified and environmentally friendly. It will promote innovation, and ecofriendly practices in the project. | \$ 10, 000 |
| Total Cost | | \$65, 500 |

Note: Own work

4.12.5 Key Performance Indicators

The KPIs presented in Chart 36 align with the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. These serve as measurable metrics to assess the effectiveness and progress of the sustainability goals and targets providing a comprehensive assessment of the project's environmental, social and economic performance.

Chart 36: Key Performance Indicators

| P5 Domain | Lens | Category | Element | Key Performance Indicator | Metric |
|-----------|---------------|----------------------------------|------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------|
| People | Lifespan | Labour practices and decent work | Employment and Staffing | Number of non-specialized employment hires | Count of individuals from underserved communities employed for non-specialized roles. |
| | Effectiveness | Society and Customer | Community Engagement | Community Participation Rate | Percentage of community involved in project activities |
| | Lifespan | Human Rights | Dignity, Diversity, Equity and Inclusion | Local workforce utilization rate | Total volume of project work outsourced to the local community / Total available project work volume. |
| Planet | Lifespan | Transport | Local Procurement | Local material sourcing | Percentage of project materials sourced locally. |
| | Servicing | Energy | Renewables and Clean Energy Return | Energy Efficiency Improvement Rate | Percentage decrease in energy consumption compared to baseline |

| P5 Domain | Lens | Category | Element | Key Performance Indicator | Metric |
|------------|---------------|---------------------------------|------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------|
| | Lifespan | Land, Air and Water | Biological Diversity | Regulatory Compliance Rate | Percentage of environmental regulations and standards complied with |
| Prosperity | Lifespan | Project Feasibility | Business Case Analysis | Risk Identification and Mitigation | Number of identified financial risks and corresponding mitigation strategies in the feasibility study. |
| | Lifespan | Business Agility | Resiliency | Resiliency Policy Development | Percentage of resiliency policies developed and implemented within the project. |
| | Effectiveness | Market and Economic Stimulation | Local Economic Impact | Local Economic Growth Rate | Percentage increase in local economic activity. |

Note: Own work

4.12.6 Monitoring and Reporting

An in-depth comprehension of the project's impact will be achieved through conducting the following activities to assess the project's alignment with sustainability objectives. This

process will enable informed decision-making within the project team to consistently improve its sustainability performance.

- Meetings to discuss and make decisions on project sustainability will be held monthly in the Project Status Meetings.
- The initial P5 Impact Analysis will be conducted during the development of the initial project plan as detailed in section 4.12.1. A full reassessment and revision of the P5 Impact Analysis will take place at the onset of each subsequent project phase.
- Performance tracking will be conducted using the KPIs presented in Chart 36 which will be monitored against the predefined sustainability goals and benchmark to measure the project's effectiveness.
- Impact Assessments will be conducted through data collection and analysis to evaluate the actual impact of the project activities on the environment, community, and economy to ensure alignment with the intended sustainability outcomes.
- Reporting and communication through the weekly or monthly meetings and report as established in the Communication Matrix displayed in Chart 23 will be performed. The reports will be communicated to internal and external stakeholders to foster transparency and accountability.
- Stakeholder engagement analysis will occur to assess the stakeholder perceptions, concerns, and engagement levels related to the project's sustainability efforts.

5 CONCLUSIONS

Chapter 5 provides conclusions to the general objective and specific objectives of the FGP. Remote communities in Belize remain underserved with affordable telecommunication services which has created barriers in education, healthcare and extended the digital divide. The FGP was created in response to a transformative initiative to expand wireless services in underserved communities. The project's general objective was to create a Project Management Plan to expand affordable wireless telecommunication access to underserved communities in Belize which has been designed, structured, and aimed at steering this expansion to the underserved communities. The project management plan has been successfully developed and integrates the ten (10) Project Management Knowledge areas developed by the Project Management Institute (2017) and the Sustainable Development Plan that prioritizes sustainable and regenerative development principles. The project management plan utilized a comprehensive consolidation of best practices, and project management framework established in the 6th Edition of PMBOK® Guide which formed the basis of the project and provides a seamless coordination across the various knowledge areas, their respective processes and throughout the project's lifecycle. This holistic approach provides a transformational impact.

The conclusions to the specific objectives are as follows:

1. The Project Charter was developed to formally authorize the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. It defined the scope, objectives and milestones and provided the groundwork for the project management plan.

2. The integration management plan was created outlining the project processes and activities to ensure seamless coordination and alignment across the various knowledge areas. The Integrated Change Control Process was created and utilized throughout the project.
3. The scope management plan was developed and outlined the project requirements to ensure a thorough understanding of the works required for the project completion. It included the development of the requirements traceability matrix, roles and responsibilities, WBS, WBS dictionary, and scope statement.
4. The schedule management plan was developed with a detailed project timeline defining the milestones, activities to be carried out, their duration and sequence, the critical path to be able to monitor and track the timely project completion and adherence to the set deliverables.
5. The cost management plan was established to effectively estimate, manage the budgetary allocations for efficient resource utilization and control throughout the project lifecycle. The cost baseline was established with the total cost estimate and the contingency reserve. The total project cost was estimated at the activity level and includes a 10% contingency and 3% management reserve. A guideline was determined to control the project cost focusing on the Earned Value Management (EVM) technique.
6. The quality management plan was defined to uphold the quality standards of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project to ensure high-quality project deliverables. It established the quality objectives of the project, quality metrics and baselines, outlined the steps for the project

team to perform quality assurance, list of quality documents and standards to be utilized in this process and elaborated on the Plan-do-check-act (PDCA) tool to support with continuous quality improvement.

7. The resource management plan was developed and efficiently identified and allocated necessary resources to the project, outlining how they will be managed and controlled to ensure their optimal utilization for successful implementation of the project. The resource breakdown structure was produced along with the RACI matrix to define the roles and responsibilities of the project. The resource acquisition plan was created to outline the human and physical resources and type of acquisition required for the project. Other essential tools presented included team development, recognition and awards and conflict resolution approach.
8. The communication plan was developed and appropriately identified stakeholders and communication channels. The communication type and communication methods/artifacts, communication matrix, communication escalation process and path, communication escalation matrix were outlined. The plan facilitates effective information distribution and robust stakeholder management.
9. The risk management plan was developed, and established how potential project risks will be identified, analyzed, monitored, and controlled to enhance the project resilience with proper risk responses for unforeseen challenges. The plan presents the risk breakdown structure and applies the qualitative risk analysis to create the probability and impact scale to assist the team in evaluating the project risks. The probability and impact matrix were used to prioritize risks and outlined the risk register for Expansion of

Wireless Telecommunication Services in Underserved communities in Belize Project. Additionally, the lessons learned log is presented to improve the risk management process.

10. The procurement management plan was developed to oversee the acquisition of goods and services through effective procurement strategies to ensure the successful project completion. The plan presents the procurement process, the source selection analysis, and how procurement will be tracked and controlled utilizing the procurement log and budget tracking log.
11. The stakeholder management plan was developed and comprehensively identified and analyzed the project stakeholders, managing their interests, influence, to ensure effective stakeholder engagement in the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project. The main tools utilized include the stakeholder register, stakeholder power/interest grid, and the stakeholder engagement and assessment matrix.
12. The sustainable development plan was developed and holistically evaluated the project's impact, ensuring a regenerative and sustainable approach throughout the project implementation. The plan presents the approach to identify and respond to sustainability impacts, roles and responsibilities, budgeting, and monitoring and reporting process to improve the project's sustainability performance. The key performance indicators (KPIs) were defined following the P5IA conducted to provide an inclusive assessment of the project's environmental, social and economic performance.

6 RECOMMENDATIONS

Chapter 6 provides the recommendations for each of the specific objectives of the FGP.

1. The Project Manager should be empowered to conduct a comprehensive stakeholder engagement plan to gather various perspectives to ensure a well-rounded project charter. The Project Sponsor should fully support the project and collaborate with the Project Manager and Project Management Office on all aspects of the project.
2. The Project Manager should emphasize the collaboration with the Change Control Board (CCB) and promote the established Integrated Change Control Process with the project team to capture and incorporate any changes in the project.
3. The project manager should conduct interactive workshops and training sessions specifically focused on the scope management plan which will provide the stakeholders with an opportunity to ask questions, seek clarification and gain a deeper understanding of the project scope and how changes will be addressed. The project manager and project team should incorporate agile practices into the scope management plan such as adopting the scrum framework for a flexible and increased responsiveness to changes and deliver value to the communities in a collaborative manner.
4. The Project Manager should include contingency buffers in the critical path activities as a proactive approach to unforeseen project delays. The project manager and project team should be equipped with training and the adequate licenses to use the full features of MS Project to facilitate timely updates and adjustments to the project schedule.
5. The Project Manager should continuously monitor closely the project expenses and engage the financial team for periodic cost-benefit analysis to optimize resource

allocation and alignment with the project goals. The project should be tracked via an Enterprise Resource Planning (ERP) system for real-time budget reviews.

6. The project manager should establish regular quality assurance training for the project team to ensure consistent adherence to the quality standards. The project team should incorporate the quality control measures such as the checklists, templates, inspections and other appropriate control tools to verify the work is performed in accordance with the established quality standards.
7. The Project Manager and Functional (Resource Managers) should conduct a skill assessment for the project team members to ensure effective resource allocation and/or outsource the required skillset. Critical highly specialized resources should be identified that if unavailable will impact the project timelines and deliverables. The Project Manager should integrate a weekly resource forecast into the planning process and engage the Resource Managers a week in advance to allocate the resources.
8. The project manager should utilize the diverse communication channels and implement the Communication Matrix presented to engage the stakeholders effectively. The project manager along with the project team should develop a team charter as a tool to outline and communicate the team values and principles, meeting and communication guidelines, and the decision-making framework. This will establish a clear understanding of roles and responsibilities and expectations and avoid any misunderstanding among the project team members.
9. The project manager and project team should adopt a holistic and collaborative approach to risk identification and encourage the team members and stakeholders to contribute with

their insights and experiences. Regular reviews of the risk register should be conducted throughout the project lifecycle to identify new risks and reassess the impact and probability of existing risks. The project manager should update the risk response strategies accordingly. The project manager and Project Management Office should promote cross-functional risk ownership to ensure risks are actively monitored and managed within respective departments across the company.

10. The Project Manager should engage the Procurement Department early and follow the process as outlined in the Procurement Management Plan. This will facilitate better alignment between the project requirements and procurement strategies. Considering the scope of the Expansion of Wireless Telecommunication Services in Underserved communities in Belize Project, it is essential to conduct a thorough research to identify potential suppliers with the aim to assess their capacity to meet the specific project requirements.
11. The project manager should establish regular stakeholder updates and follow the Communication Matrix to provide stakeholders with updates on the project progress, milestones and any relevant updates. The project manager should regularly assess and adjust the communication mediums to capture and align the stakeholder needs and expectations that may evolve throughout the project.
12. The project manager should be empowered by the company at a strategic level by establishing a sustainability review board to ensure ongoing alignment and commitment with the environmental and community needs. In addition, the Project Steering Committee (PSC) should support the Project Manager in establishing partnerships with

environmental organizations, regulatory bodies or both governmental or non-governmental organizations to leverage their expertise in sustainable development to enhance the project's capacity to address environmental challenges and fulfill its social responsibility.

7 VALIDATION OF THE FGP IN THE FIELD OF REGENERATIVE AND SUSTAINABLE DEVELOPMENT

The FGP's alignment with the principles of regenerative and sustainable development are explored and validated in Chapter 7. Both a sustainability and regenerative analysis were performed to attain this objective.

Regenerative development is an approach which seeks to “encourage communities to support and create positive relationships that will benefit society and our environments by allowing the system to evolve and adapt to changing circumstances” (University of Melbourne, 2019). Muller (2017) highlights six (6) processes to make progress in implementing regenerative development encompassing a comprehensive approach. The six processes are: environmental, social, economic, political, cultural, and spiritual.

Regenerative development goes beyond sustainability by actively improving both the natural and social systems. It is a more proactive and transformative approach to addressing environmental and social issues, while sustainable development is more focused on maintaining the status quo (Green Project Management, 2023). Its key characteristics include resilience, adaptability and long-term regeneration.

There is a positive relationship and impact of regenerative development based on the objective of the project to expand affordable wireless telecommunication access to underserved communities in Belize. The project promotes the environmental, social, economic, and spiritual dimensions. During project execution, the project fosters regenerative development by employing regenerative practices such as using locally sourced materials where possible, minimizing habitat disruption in the communities, and implementing green construction techniques. The minimal telecommunications

infrastructure needed in the underserved communities allows functional regeneration of ecosystems enabling the environment to thrive. These practices positively impact regenerative development by preserving and enhancing the local ecosystems in the underserved communities. The project's deliverables of providing access to telecommunication services in these communities, contributes to regenerative development by fostering economic growth and social well-being resulting in the creation of opportunities for sustainable livelihoods and reducing inequalities. With the use of renewable energy sources and the efficient use of resources for the operation of telecommunications equipment, it impacts regenerative development by reducing the project's environmental footprint.

The project's end product comprises of telecommunications services. The expansion of telecommunication services promotes regenerative development by encouraging community engagement, facilitating knowledge sharing and supporting ecosystem restoration initiatives.

Green Project Management (2023) defines sustainable development as “an approach to economic growth and development that seeks to meet the needs of the present without compromising the ability of future generations to meet their own needs. It aims to balance environmental, social, and economic concerns in order to achieve a healthy and prosperous society that can continue into the future”. Its focus is on economic, social and environmental dimensions and aligns with the specific goals and indicators of the United Nations Sustainable Development Goals (SDG). The SDGs are seventeen (17) interlinked goals which are No poverty (SDG 1), Zero hunger (SDG 2), Good health and well-being

(SDG 3), Quality education (SDG 4), Gender equality (SDG 5), Clean water and sanitation (SDG 6), Affordable and clean energy (SDG 7), Decent work and economic growth (SDG 8), Industry, innovation and infrastructure (SDG 9), Reduced inequalities (SDG 10), Sustainable cities and communities (SDG 11), Responsible consumption and production (SDG 12), Climate action (SDG 13), Life below water (SDG 14), Life on land (SDG 15), Peace, justice, and strong institutions (SDG 16) and Partnerships for the goals (SDG 17).

There is a positive relationship and impact on sustainable development based on the objective of the project to expand affordable wireless telecommunication access to underserved communities in Belize. The execution of the project includes the planning, construction and implementation which can have several positive impacts. There is alignment with sustainability goals with the adoption of sustainable construction practices, efficient resource use and implementation of renewable energy solutions which reduce the environmental impacts in delivering the telecommunication solution which promotes SDG 11 (Sustainable Cities and Communities) and SDG 3 (Good Health and Wellbeing).

Primarily, the project facilitates employment generation which will be practical and cost effective for the project to source parts of its project execution to residents in the underserved communities. This will lead to job creation, stimulating economic growth and contributing to SDG 8 (Good Work and Economic Growth).

The project will build telecommunication infrastructure in underserved communities in Belize which will improve connectivity, supporting access to information and services contributing to SDG 9 (Innovation and Infrastructure).

The end product of the project is to provide telecommunication services which subsequently facilitate access to information and promoting education which contributes to SDG 4 (Quality Education) and SDG 16 (Peace and Justice). Finally, the underserved communities will be empowered economically with enhanced connectivity which fosters entrepreneurship and economic growth, contributing with SDG 1 (No Poverty) and SDG 8 (Good Work and Economic Growth).

Inversely there can be negative impacts during the construction and execution phase which may result in environmental disruption and social displacement. This can potentially impede the efforts in regenerative and sustainable development. The project team will mitigate these effects with the implementation of rigorous environmental impact assessments, training, and adherence to sustainable construction practices. In parallel, close monitoring to minimize environmental damage will be conducted.

To align with the Sustainable Development Goals (SDGs) and establish a connection between the project and sustainability principles, the P5 framework is utilized as a reference to measure and integrate P5 aspects within the project. P5 represents Product, Process, People, Planet and Prosperity. It describes the various actions that guide a project manager to deliver a sustainable project. P5 is a tool that supports the alignment of portfolios, programs and projects with an organizational strategy for sustainability and focuses on the impacts of project processes and deliverables on the environment, society, the corporate bottom line and the local economy (Carboni et al. 2018).

Chart 6 shows a P5 analysis for the project to expand wireless telecommunication services to underserved communities in Belize.

Chart 37: P5 Analysis

| P5 Domain | Category | Description (Cause) | Potential Impact | Proposed Response |
|-----------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| People | Labour practices and decent work | The company currently outsources limited personnel for project execution. | The project will be delayed leading to not meeting project deadline and budget over runs. | Employment opportunities will be extended in the underserved communities for the non-specialized skills. |
| | Society and customer | Limited Community engagement and customer satisfaction may arise as the project team may face challenges in reaching the remote communities. | The project requirements may not be captured appropriately which can affect the telecommunication serviced delivered. | Engage with the community through regular meetings and feedback sessions. |
| | Human Rights | Skillset may be limited in the local communities. | The scope of work available for outsourcing to the local community workforce may be restricted | Develop a training program aimed for the local residents to provide them with opportunities to participate in the project and benefit from employment and skill set development. |
| Planet | Transport | Local material to procure may be limited due to the nature of the | The project may experience delays due to shipment logistics with the material. | Develop the bill of materials as soon as possible and provide to potential bidders to |

| P5 Domain | Category | Description (Cause) | Potential Impact | Proposed Response |
|------------|---------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | telecommunication solution. | | source as much of the materials locally. It will support the local economy, reduce inventory and shorter delivery times. |
| | Energy | Telecommunications equipment is generally purchased with its own power source. | The solution may not be equipped with renewable sources of energy and efficient energy consumption. | Detail the energy requirements of the telecommunication solution and invite bidders who are specialized in sustainable energy solutions to meet the requirements to reduce energy costs, carbon footprint and improve air quality in the communities. |
| | Land, Air and Water | The project may not consider proper sustainable construction practices during execution. | Telecommunication infrastructure at the communities may disrupt the local biodiversity. | Develop policies and installation standards to comply with environmental regulations to ensure a healthy ecosystem everywhere the development occurs. |
| Prosperity | Project Feasibility | The project does not account for effects in inflation and | The project's ability to reach all underserved communities as projected | Conduct a comprehensive financial feasibility study to |

| P5 Domain | Category | Description (Cause) | Potential Impact | Proposed Response |
|-----------|---------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | economic variation in the country which may cause a budget increase. | may be compromised in the long run due to sustainability concerns. | identify potential risks and constraints to support the long-term viability of the project. |
| | Business Agility | The project has not considered policies or procedures to recover from unexpected disruptions. | There may be increased risk of project delays and cost overruns. | Develop procedures to integrate resiliency in the project to reduce the probabilities of losing resources and increase the project's ability to response to extreme situations. |
| | Market and Economic Stimulation | The project has not considered all relevant economic impacts in its implementation approach. | It can hinder the local economy and development and potentially restrict the areas where the project can generate savings. | Conduct a local economic impact assessment to identify potential negative effects. Establish partnerships in the communities to stimulate economic growth. |

Note: Own work

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APPENDICES

Appendix 1: FGP Charter**CHARTER OF THE PROPOSED
FINAL GRADUATION PROJECT (FGP)**

1. Student name

| |
|-------------------|
| Heidi Selene Cruz |
|-------------------|

2. FGP name

| |
|------------------------------------------------------------------------------------------------------------------------------|
| Development of a project management plan to expand wireless telecommunication services to underserved communities in Belize. |
|------------------------------------------------------------------------------------------------------------------------------|

3. Application Area (Sector or activity)

| |
|--------------------|
| Telecommunications |
|--------------------|

4. Student signature

| |
|-------------------------------------------------------------------------------------|
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|-------------------------------------------------------------------------------------|

5. Name of the Graduation Seminar facilitator

| |
|-------------------------------|
| Roger Valverde Jimenez |
|-------------------------------|

6. Signature of the facilitator

| |
|-------------------------------------------------------------------------------------|
|  |
|-------------------------------------------------------------------------------------|

7. Date of charter approval

| |
|-------------------|
| 11 September 2023 |
|-------------------|

8. Project start and finish date

| |
|----------------|
| 29 August 2023 |
|----------------|

| |
|----|
| NA |
|----|

9. Research question

What innovative wireless technologies or strategies can be employed to expand affordable telecommunication access to underserved communities, and how can these be effectively addressed with project management standards?

10. Research hypothesis

Is it possible to use project management standards to develop a well-structured strategy/plan for implementing innovative wireless technologies to significantly expand affordable telecommunication access to underserved communities in Belize?

11. General objective

To create a Project Management Plan to expand affordable wireless telecommunication access to underserved communities in Belize.

12. Specific objectives

1. To develop a project charter that defines the project's scope, objectives and milestones to create the project management plan.
2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success.
3. To develop the scope management plan that includes the scope of works required for successful completion of the project.
4. To create a schedule management plan that ensures the timely completion of the project.
5. To create a cost management plan for effective management of the budget in order to complete the project within budget.
6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project.
7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project.

8. To develop a communication plan to identify stakeholders and communication channels to facilitate effective information distribution and stakeholder management.
9. To create a risk management plan to identify potential project risks, assess and manage risks to enhance project resilience.
10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully.
11. To produce a stakeholder management plan to identify and analyze project stakeholders to manage their interests, influence and potential impact on the project.
12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development.

13. FGP purpose or justification

Belize is undergoing a revolutionary growth and emphasizing the importance of digital connectivity for education, healthcare, public safety and economic growth. However, there is a digital divide where underserved communities and low- income households have limited access and opportunities to essential services and consequently are not progressing. There is a significant need for affordable wireless telecommunication access in these underserved communities.

According to a study by the World Bank, it is estimated that a 10% increase in telecommunication penetration would result in a GDP growth of 1.38% in developing countries. By quantitatively bridging the divide, the project has the potential to positively stimulate economic growth in underserved communities, creating jobs, boosting economic development, reducing the digital divide, improve public safety, expand health care and enhance their overall well-being.

The success of this transformation centers on the project management plan to expand wireless telecommunication services to underserved communities in Belize which will serve as the roadmap for the project. It will provide a structured approach to guide the project managers and project team in their efforts to expand affordable wireless telecommunication access. The project management plan will ensure comprehensive documents are available following best practices to guarantee proper integration, consistency and coordination of the project management knowledge areas throughout the project lifecycle. These are vital to guarantee that the telecommunication access provided to the underserved communities is both reliable and meets the needs effectively.

14. Work Breakdown Structure (WBS). In table form, describing the main deliverable as well as secondary, products or services to be created by the FGP.

- | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">1. Graduation Seminar<ul style="list-style-type: none">1.1 FGP Deliverables<ul style="list-style-type: none">1.1.1 Deliverable 1<ul style="list-style-type: none">1.1.1.1 Charter Section 1 to 101.1.1.2 Bibliographic research1.1.2 Deliverable 2<ul style="list-style-type: none">1.1.2.1 Charter Sections 11 to 121.1.2.2 WBS1.1.3 Deliverable 3<ul style="list-style-type: none">1.1.3.1 Charter Sections 13 to 191.1.4 Deliverable 4<ul style="list-style-type: none">1.1.4.1 Theoretical Frameworks1.1.5 Deliverable 5<ul style="list-style-type: none">1.1.5.1 Methodological Framework1.1.6 Deliverable 6<ul style="list-style-type: none">1.1.6.1 Introduction1.1.6.2 Chapter 71.1.6.3 Charter Section 221.1.6.4 Schedule Appendix 31.1.7 Deliverable 7<ul style="list-style-type: none">1.1.7.1 Abstract and Executive Summary1.1.7.2 References and Indexes1.1.7.3 Charter signature & Submission1.2 Graduation Seminar Approval2. Tutoring Process<ul style="list-style-type: none">2.1 Tutor2.2 Adjustments of previous chapters2.3 Chapter IV Development<ul style="list-style-type: none">2.3.1 Project Management Plan<ul style="list-style-type: none">2.3.1.1 Project Charter2.3.1.2 Integration Management Plan2.3.1.3 Scope Management Plan2.3.1.4 Schedule Management Plan2.3.1.5 Cost Management Plan2.3.1.6 Quality Management Plan2.3.1.7 Resource Management Plan2.3.1.8 Communication Management Plan2.3.1.9 Risk Management Plan2.3.1.10 Procurement Management Plan |
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- 2.3.1.11 Stakeholder Management Plan
- 2.3.1.12 Sustainable Development Plan
- 2.4 Chapter V Conclusions
- 2.5 Chapter VI Recommendations
- 3. Reading by Reviewers
 - 3.1 Reviewers Assignment Request
 - 3.1.1 Assignment of two reviewers
 - 3.1.2 Communication
 - 3.1.3 FGP submission to reviewers
 - 3.2 Reviewers work
 - 3.2.1 Reviewer 1
 - 3.2.1.1 FGP Reading
 - 3.2.1.2 Reader 1 report
 - 3.2.2 Reviewer 2
 - 3.2.2.1 FGP Reading
 - 3.2.2.2 Reader 2 Report
- 4. Adjustments
 - 4.1 Report for Reviewers
 - 4.2 FGP Update
 - 4.3 Second Review by Reviewers
- 5. Presentation to Board of Examiners
 - 5.1 Final review by Board
 - 5.2 FGP Grade Report

15. FGP budget

Philologist review of final document: US \$ 150
 Printing and binding of documents: US \$ 100
 Shipping to Costa Rica: US\$ 200

Total Budget Cost: US \$ 450

16. FGP planning and development assumptions

1. All project deliverables will be completed within the allocated timeframe for the FGP development.
2. The assigned tutor will be supportive, provide constructive and effective feedback during the tutoring process.
3. The researcher is available to dedicate 15 hours weekly to the project.
4. The relevant information for the project is available and accessible.

17. FGP constraints

1. The project is required to adhere to academic quality requirements and standards defined by the university and the FGP development guidelines.
2. The project timeframe is 3 months.
3. The budget for the project is US \$ 450.
4. One resource is assigned to the project.

18. FGP development risks

1. If the schedule is inadequately managed, the project may not be completed on time.
2. Misinterpretations of the weekly instructions may lead to delays in meeting the deadlines and optimum quality of the deliverables.
3. Any decline in the student's health might lead to delays in the scheduled submission of deliverables.
4. The occurrence of a hurricane or other adverse weather conditions might delay the progress on the deliverables and impact the timely submission of the FGP.

19. FGP main milestones

Milestones are related to deliverables on the second level (deliverables) and third level (control accounts) of the WBS of section 14 of this Charter. At the same time the deliverables are related to the specific objectives (in the case of the FGP please include the times for the tutorship reviews as well as for the readership).

| Deliverable | Finish estimated date |
|--------------------------------------------------------------------------------------------------------------|------------------------------|
| 1 Graduation Seminar | October 23, 2023 |
| 1.1 FGP Deliverables | October 16, 2023 |
| 1.1.1 Deliverable 1 (Charter Section 1 1-10 & Bibliographic research) | September 4, 2023 |
| 1.1.2 Deliverable 2 (Charter Section 11-12 & WBS) | September 11, 2023 |
| 1.1.3 Deliverable 3 (Charter Section 13-19) | September 18, 2023 |
| 1.1.4 Deliverable 4 (Theoretical Frameworks) | September 25, 2023 |
| 1.1.5 Deliverable 5 (Methodological Framework) | October 2, 2023 |
| 1.1.6 Deliverable 6 (Introduction, Chapter 7, Charter Section 22, Schedule) | October 9, 2023 |
| 1.1.7 Deliverable 7 (Abstract and Executive Summary, References and Indexes, Charter Signature & Submission) | October 16, 2023 |
| 1.2 Graduation Seminar Approval | October 23, 2023 |
| 2 Tutoring Process | January 30, 2024 |
| 2.1 Tutor | October 26, 2023 |
| 2.1.1 Tutor Assignment | October 24, 2023 |
| 2.1.2 Communication | October 26, 2023 |
| 2.2 Adjustments of previous chapters | November 2, 2023 |
| 2.3 Chapter IV Development | January 16, 2023 |
| 2.3.1 Project Management Plan | January 16, 2023 |
| 2.4 Chapter V: Conclusions | January 23, 2023 |
| 2.5 Chapter VI: Recommendations | January 30, 2024 |
| 3 Reading by Reviewers | February 20, 2024 |
| 3.1 Reviewers Assignment Request | February 6, 2024 |
| 3.1.1 Assignment of two reviewers | February 1, 2024 |
| 3.1.2 Communication | February 5, 2024 |
| 3.1.3 FGP submission to reviewers | February 6, 2024 |
| 3.2 Reviewers work | February 20, 2024 |
| 3.2.1 Reviewer 1 | February 19, 2024 |
| 3.2.2 Reviewer 2 | February 20, 2024 |
| 4 Adjustments | March 19, 2024 |

| | |
|--------------------------------------|----------------|
| 4.1 Report for Reviewers | March 4, 2024 |
| 4.2 FGP Update | March 5, 2024 |
| 4.3 Second Review by Reviewers | March 19, 2024 |
| 5 Presentation to Board of Examiners | March 26, 2024 |
| 5.1 Final review by Board | March 21, 2024 |
| 5.2 FGP Grade Report | March 26, 2024 |

20. Theoretical framework

20.1 Estate of the “matter”

Belize has seen considerable growth in recent years in the telecommunications sector but there are underserved and remote communities with limited or no access to affordable wireless telecommunication services. Telecommunication access is a key enabler for economic development, access to education, healthcare and overall quality of life for these residents. Without access to these services, it hinders the overall development of the country. The FGP can resolve this situation by extending the benefits of connectivity, presently made available mostly in urban areas and few rural areas, to undeserved communities enabling them to access education, healthcare, economic opportunities and communication with the rest of the country and the world. The execution of the project management plan will enhance the connectivity possibilities and contribute significantly to the social and economic development by bridging the digital divide and fostering inclusivity.

The Government along with Digi have recognized the need to address this issue. After partnering with Huawei Technologies in 2016, Digi has been engaged in expanding its wired and wireless network infrastructure to connect customers, improving lives and developing communities. There have been barriers in limited resources, high cost of doing business, technology/regulatory requirements and geographical hurdles which have made it challenging to reach these communities.

Digi continues to invest annually in gradually expanding its network infrastructure. Through its Engineering/Optimization Department, research and development is being conducted to investigate affordable wireless technologies to reach remote locations. Proposed improvements involve considerations for construction of low-cost towers and wireless equipment in these remote locations. Partnership with local businesses has been an area that Digi has explored, and which has resulted in the implementation of telecommunication services in specific areas of the country. The Marketing Department at Digi continually focuses on researching and strategizing on affordable or special pricing structures to make services more accessible to the Belizean population. The company conducts feasibility studies annually to assess economic solutions to reach some areas. However, these studies have not been viable.

Through its annual strategic goals, Digi has made it possible to expand telecommunication access to previously unconnected communities. It faced challenges such as hurricanes which damaged the infrastructure and affected limitations to funding.

There are initiatives by the Inter-American Telecommunication Commission (CITEL), to expand telecommunications in rural, unserved or underserved areas observing regulatory provisions applicable in each country (Davalos, 2023). Nonetheless, it provides general recommendations and is not targeted to address the situation using a project management approach.

The COVID-19 pandemic highlighted the need to prioritize telecommunication access which increases the efforts to bridge the digital divide. There is a demand for telecommunication services in underserved communities despite the challenges of Belize's geography, low population density, and high cost of services. These challenges present meaningful opportunities for growth and the FGP through its integrated project management plan is an essential step towards realizing the project effectively.

The current work has been on addressing individual projects but there has not been one to uniquely address the overall problem of expanding affordable wireless telecommunication access to underserved communities in Belize with the application of a Project Management Plan. Nonetheless, these individual projects provide valuable knowledge for developing a comprehensive project management plan to specifically address the problem of expanding affordable wireless telecommunication access to underserved communities in Belize.

20.2 Basic conceptual framework

Project management, project lifecycle, project knowledge areas, project performance, domains, project management processes, sustainability, technology innovations, telecommunications

21. Methodological framework

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. To develop a project charter that defines the project's scope, objectives and milestones to create the project management plan. | Project Charter | <p>Primary:</p> <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's technical managers and executives. • Project documents from similar past projects <p>Secondary:</p> <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Project Charter Template • Expert Judgment • Data Gathering Techniques including Brainstorming, Focus groups and Interviews • Meetings | <p>Assumptions: It is assumed the project charter will be the first document created.</p> <p>Constraints: There is limited time available to create the project charter document.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | (PMI) online database <ul style="list-style-type: none"> • Government publications • Case Studies • Internet | | | |
| 2. To develop an integration management plan that outlines the various project management processes and activities for integration and coordination to ensure the project's success. | Integration Management Plan | Primary: <ul style="list-style-type: none"> • Meetings • Email communication • Project documents from similar past Projects Secondary: <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition | Analytical Research Method, Qualitative Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgement • Data gathering Techniques including Brainstorming, Focus groups and Interviews • Data analysis • Meetings • Interpersonal and team skills including active listening • Project Management Information System | Assumptions: It is assumed all necessary integration tasks, activities and processes will ensure the project is synchronized and creates cohesion. It is assumed that there are effective communication channels and tools available |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|---------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet | | | <p>for project integration and coordination.</p> <p>Constraints: There may be complexities in recognizing all tasks, activities and processes within the allocated time frame.</p> <p>There is limited time for which integration activities can be completed.</p> |
| 3. To develop the scope management plan that includes the scope of works required for | Scope Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Personal interviews with Digi's technical managers and executives. | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering Techniques including Brainstorming and Interviews • Data Analysis | <p>Assumptions: It is assumed that the project information to define the scope is readily available.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|---------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| successful completion of the project. | | <ul style="list-style-type: none"> • Meetings • Reports and other relevant company documents Regulations <p>Secondary:</p> <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet | | <ul style="list-style-type: none"> • Meetings • Decomposition | <p>It is assumed that stakeholders in Digi are helpful in the development of the scope.</p> <p>Constraints: The time allocated for the development of the scope plan is limited.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|--------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. To create a schedule management plan that ensures the timely completion of the project. | Schedule Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication Reports and other relevant company documents <p>Secondary:</p> <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database | Analytical Research Method, Qualitative Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Project management information system (MS Project) • Critical Path Method • Expert Judgment • Data Analysis • Meetings • Decomposition • Parametric Estimating • Analogous Estimating • Bottom-up Estimating | <p>Assumptions: It is assumed that the project schedule is practical for completing the project.</p> <p>It is assumed that adverse weather conditions will not significantly impact the project schedule.</p> <p>Constraints: The availability of specialized resources in the underserved communities is limited.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
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| | | <ul style="list-style-type: none"> • Government publications • Online Project Management communities • Internet | | | |
| 5. To create a cost management plan for effective management of the budget in order to complete the project within budget. | Cost Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Digi's High-level costing for wireless network expansions • Personal interviews with Digi's technical managers and executives. <p>Secondary:</p> <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition | Analytical Research Method, Qualitative Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert judgment • Data Analysis • Meetings • Analogous estimating • Parametric estimating • Bottom-up estimating | <p>Assumptions: It is assumed that material and resource costs will remain stable throughout the project.</p> <p>Constraints: The budget constraints may limit the procurement options.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet | | | |
| 6. To create a quality management plan to establish quality requirements to effectively manage quality of deliverables in the project. | Quality Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Personal interviews with Digi's technical managers and quality managers, and executives. • Meetings • Email communication | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering including Brainstorming and Interviews • Data Analysis • Meetings • Benchmarking • Data Representation • Inspection • Testing | <p>Assumptions: It is assumed that the wireless technologies selected will meet the required quality standards.</p> <p>Constraints: The budget constraints may</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|-----------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------|-----------------------------------|
| | | <ul style="list-style-type: none"> • Reports and other relevant company documents Regulations Secondary: • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Books • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet | | | compromise the quality standards. |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7. To create a resource management plan to identify and allocate necessary resources for the successful implementation of the project. | Resource Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Personal interviews with Digi's technical and resource managers and executives. • Meetings • Email communication Reports and other relevant company documents <p>Secondary:</p> <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Data Representation • Analogous estimating • Parametric estimating • Bottom-up estimating • Project management information system (MS Project) • Meetings • Data Gathering Techniques | <p>Assumptions: It is assumed that necessary resources such as skilled personnel and equipment are available.</p> <p>Constraints: There are limited project resources to execute the project.</p> <p>There are competing projects within Digi.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
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| | | <ul style="list-style-type: none"> • Government publications • Online Project Management communities • Internet | | | |
| 8. To develop a communication plan to identify stakeholders and communication channels to facilitate effective information distribution and stakeholder management. | Communication Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication Reports and other relevant company documents | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Communication requirements analysis • Communication technology • Communication models • Communication methods • Interpersonal and team skills • Data representation Meetings | <p>Assumptions: It is assumed that stakeholders will actively support and promote the project.</p> <p>Constraints: There is insufficient response from stakeholders.</p> <p>Tools used in communication are not readily available or are</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|-----------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| | | Secondary: <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet | | | unstable which may affect engagement of stakeholders. |
| 9. To create a risk management plan to identify potential project risks, assess and manage risks to | Risk Management Plan | Primary: <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering including Brainstorming and Interviews • Data Analysis | Assumptions: It is assumed that all possible risks are identified in the risk |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|-----------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| enhance project resilience. | | <p>with Digi's technical managers and executives.</p> <ul style="list-style-type: none"> • Meetings • Email communication • Reports and other relevant company documents <p>Secondary:</p> <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications | | <ul style="list-style-type: none"> • Meetings • Strategies | <p>management plan.</p> <p>Constraints: There is limited historical data which may constrain risk assessment and mitigation planning.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> • Online Project Management communities • Internet | | | |
| 10. To develop a procurement management plan to manage the procurement of goods and services in order to complete the project successfully. | Procurement Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication • Reports and other relevant company documents <p>Secondary:</p> | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering including Brainstorming and Interviews • Data Analysis • Meetings • Inspection • Audits | <p>Assumptions: It is assumed that local suppliers can meet the procurements requirements.</p> <p>Constraints: The budget constraint may limit procurement options.</p> <p>There may be shipping delays with foreign shipments.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|-----------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project Management communities • Internet | | | |
| 11. To produce a stakeholder management plan to identify and analyze project stakeholders to manage their | Stakeholder Management Plan | <p>Primary:</p> <ul style="list-style-type: none"> • Digi's PMO Project management templates • Personal interviews with Digi's | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Data Gathering including Brainstorming and Interviews • Data Analysis including | <p>Assumptions:</p> <p>It is assumed that stakeholder interests align with the project's objectives.</p> |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|-----------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| interests, influence and potential impact on the project. | | technical managers and executives. <ul style="list-style-type: none"> • Meetings • Email communication • Reports and other relevant company documents Secondary: <ul style="list-style-type: none"> • PMBOK Guide 7th Edition • PMBOK Guide 6th Edition • Project Management Institute (PMI) online database • Government publications • Online Project | | Stakeholder Analysis <ul style="list-style-type: none"> • Data Representation including Stakeholder Engagement assessment matrix • Meetings • Interpersonal and team skills including active listening • Communication Skills | It is assumed that stakeholders identified will provide timely feedback. Constraints: The stakeholder attitudes and interests can change over time and create dynamic constraints. |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Management communities <ul style="list-style-type: none"> • Internet | | | |
| 12. To develop a sustainable development plan to evaluate the relationship and impact of the project implementation and its end product in the regenerative and sustainable development. | Sustainable Development Plan | Primary: <ul style="list-style-type: none"> • Personal interviews with Digi's technical managers and executives. • Meetings • Email communication Reports and other relevant company documents Secondary: <ul style="list-style-type: none"> • PMBOK Guide 6th Edition • Project Management Institute | Analytical Research Method and Qualitative Research Method | <ul style="list-style-type: none"> • Expert Judgment • Interviews • Meetings • Data Gathering • Data Analysis • P5 Impact Analysis | Assumptions: It is assumed that the project activities align with the sustainable goals of the country. It is assumed that adequate resources (financial, human, and technological) are available to support sustainable development initiatives. Constraints: |

| Objective | Name of deliverable | Information sources | Research method | Tools | Restrictions |
|-----------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | (PMI) online database <ul style="list-style-type: none"> • Sustainable Project Management: The GPM Reference Guide • Internet | | | <p>There may be environmental regulations and permits which may hinder sustainable development practices.</p> <p>The development of the sustainable development plan can be constrained by the project timeline.</p> |

22. Validation of the work in the field of the regenerative and sustainable development.

The FGP aligns with the principles of both sustainability and regenerative development. The project promotes a positive relationship and impact of regenerative development based on the objective of the project to expand affordable wireless telecommunication access to underserved communities in Belize. The project contributes to the environmental, social, economic, and spiritual dimensions. The project fosters regenerative development by employing regenerative practices such as using locally sourced materials where possible, minimizing habitat disruption in the communities, implementing green construction techniques, encouraging community engagement, facilitating knowledge sharing and supporting ecosystem restoration initiatives. The minimal telecommunications infrastructure needed in the underserved communities allows functional regeneration of ecosystems enabling the environment to thrive. These practices positively impact regenerative development by preserving and enhancing the local ecosystems in the underserved communities. The project's deliverables of providing access to telecommunication services in these communities, contributes to regenerative development by fostering economic growth and social well-being resulting in the creation of opportunities for sustainable livelihoods and reducing inequalities. With the use of renewable energy sources and the efficient use of resources for the operation of

telecommunications equipment, it impacts regenerative development by reducing the project's environmental footprint.

The project promotes sustainable development by complying with several SDGs inclusive of SDG 1 (No Poverty), SDG 3 (Good Health and Wellbeing), SDG 4 (Quality Education), SDG 8 (Good Work and Economic Growth), SDG 9 (Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities) and SDG 16 (Peace and Justice).

Inversely there can be negative impacts which may result in environmental disruption and social displacement. The project team will mitigate these effects with the implementation of rigorous environmental impact assessments, training, monitoring, and adherence to sustainable construction practices.

To align with the Sustainable Development Goals (SDGs) and establish a connection between the project and sustainability principles, the P5 framework supports the integration of these aspects into the project's implementation.

Potential indicators and ways to measure the alignment of the FGP are:

Economic growth in underserved communities. This will be measured by tracking the increase in job creation and economic activities post-project implementation.

Community engagement. This will be measured by 85% level of community involvement and participation indicating active engagement.

Cost savings through renewable energy. This will be measured by 10% cost savings obtained by using renewable energy sources compared to the existing traditional energy sources.

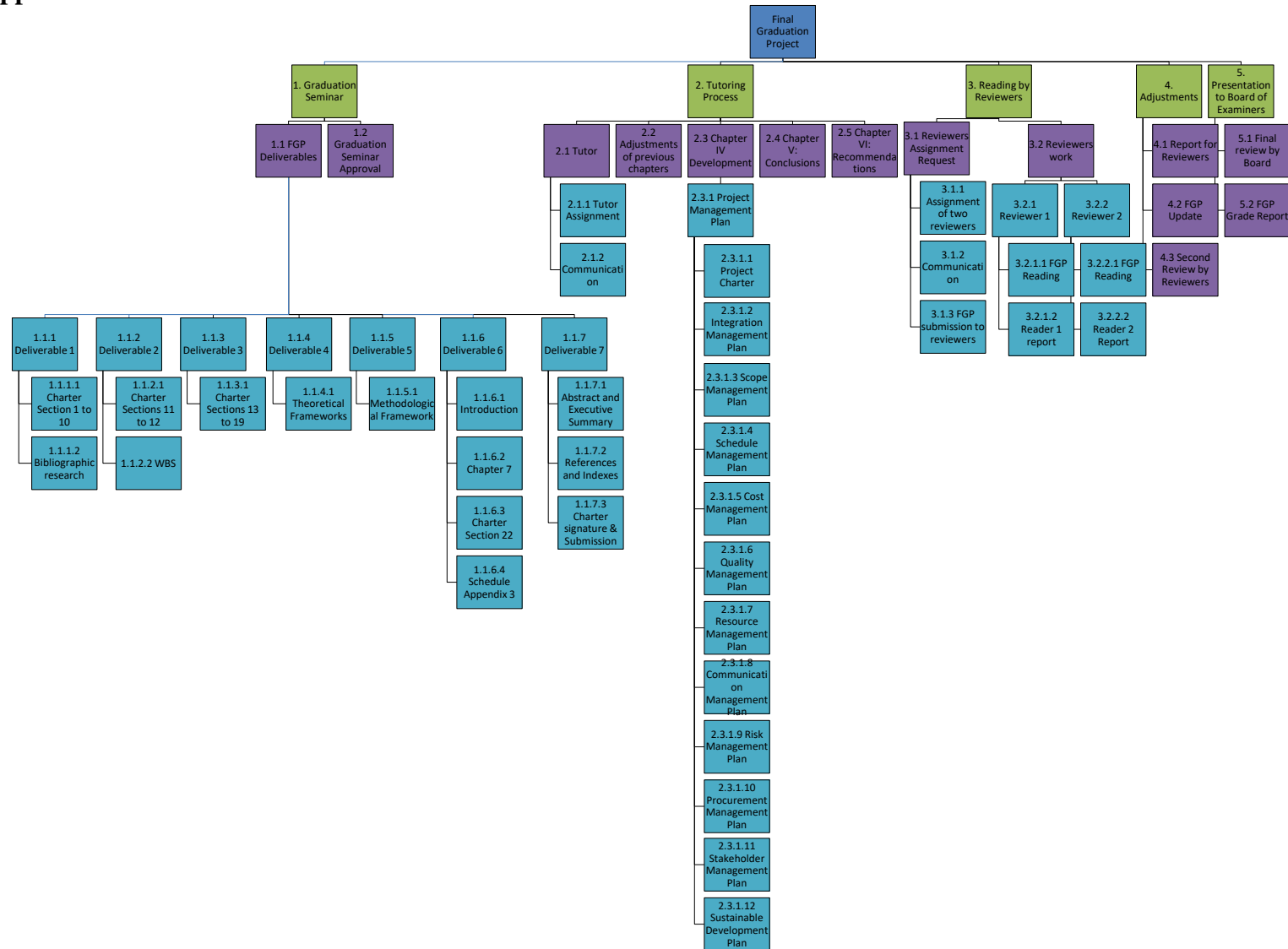
Access to telecommunication services: This will be measured by measuring the percentage increase in telecommunication services in underserved communities compared to the baseline value.

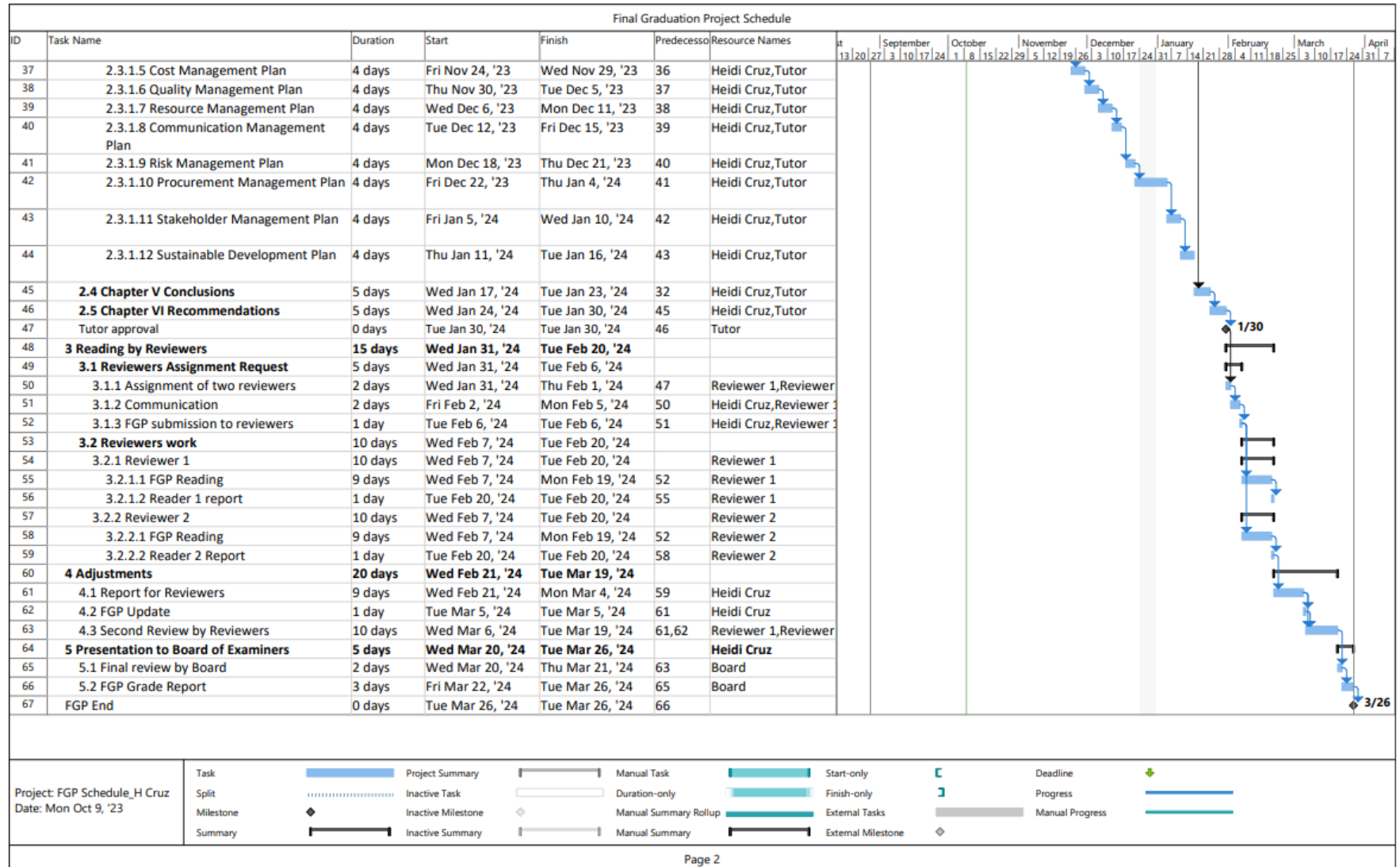
Poverty rate. This will be measured by a 50% decrease in the poverty rate, considering the increase in economic opportunities in the underserved areas.

Project timelines. This will be measured by 95% of project milestones are completed on time.

Budget adherence: This will be measured by keeping project costs within 5% of the budget allocated while implementing sustainable measures.

Appendix 2: FGP WBS





Appendix 4: Preliminary Bibliographical Research

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Appendix 5: Philological Dictum

Stephanie Flores Bradshaw

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January 25, 2024

Re: Philological Review of Final Graduation Project submitted by Heidi Selene Cruz in partial fulfilment of requirements for a Master's Degree in Project Management (MPM)

Dear Academic Tutor,

With this letter, I confirm that I have reviewed the Final Graduation Project (FGP) submitted by MPM candidate Heidi Selene Cruz entitled "Project Management Plan to Expand Wireless Telecommunication Services to Underserved Communities in Belize."

I hereby confirm that Ms. Cruz has made all the corrections to the FGP as I have advised as philologist. It is my professional opinion that the document meets the literary and linguistic standards in written English as required for the MPM by the Universidad para la Cooperación Internacional.

Warm Regards,



Stephanie Flores Bradshaw

Philologist

Baldosta State University

This Certifies That
The Board of Regents of the University System of Georgia Upon Recommendation of the
Faculty of Baldosta State University
Has Conferred on

Stephanie Denise Flores-Bradshaw

the Degree of

Master of Arts

English

with all the Rights, Privileges, and Honors thereunto appertaining.
Whereof the seal of the University and the signatures of its duly authorized
officers are hereto affixed.

Given this thirtieth day of July, in the year of our Lord
two thousand and eleven

Henry M. Huchaby
Chancellor of the University System of Georgia

Alfred [unclear]
Dean, Division of Graduate Studies



Joseph R. Gley
President of the University

Stanley Jones
Registrar