

MASTER IN PROJECT MANAGEMENT (MPM)

UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN DEVELOPMENT FOR THE CONSTRUCTION
OF THE BELIZE ENTERPRISE AND INNOVATION INSTITUTE (BEI2)

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DEDICATION

This final graduation project is dedicated to my sons, Baden Benjamin Riverol, and Noah Gabriel Riverol, for being the reason why I thrive every day to be a better version of who I was yesterday.

To all those women who inspire me in different ways, in particular my mother, who taught me the value of discipline, and perseverance.

To my sisters who have the biggest and highest respectable job in the world-being mothers, wives, housewives, nurses from a young age when they took care of me. I admire their tenacity and selfless love and care.

To all those individuals who work and study, who never give up on their goals, despite wearing so many hats. I dedicate this to them as testament that once you have the commitment and the willingness, you can achieve anything you set your mind to.

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Lastly, to God who through my faith has always given me the capacity to persevere, despite the many challenges.

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ABBREVIATIONS AND ACRONYMS

AC-Actual Cost

AC/FO- Accountant/Finance Officer

ASTM- American Society for Testing and Materials

BEI2-The Belize Enterprise and Innovation Institute

BEL-Belize Electricity Limited

BELTRAIDE- The Belize Trade and Investment Development Service

BIM- Building Modelling Information

BPO- Business Processing Outsourcing

BTL-Belize Telemedia Limited

BTEC-Belize Training and Employment Centre

BWS-Belize Water Services

CBA-Central Building Authority

CEO-Chief Executive Officer

CO-Contractor

CPI-Cost Performance Index

CV-Cost Variance

EE-Electrical Engineer

ENOVA- Entrepreneurship and Innovation @UB

ES- Electrical Subcontractor

EVM-Earned Value Management

FGP-Final Graduation Project

GST-General Sales Tax

HVAC-Heating, Ventilation and Air Conditioning

ICT- Information and Communications Technology

ITTA- International Timber Treatment Association

LS- Land Surveyor

LEED- Leadership in Energy and Environmental Design

ME-Mechanical Engineer

MOU- Memorandum of Understanding

MSMEs-Micro, Small and Medium Sized Enterprises

PE-Plumbing Engineer
PEI- Porcelain Enamel Institute
PERT-Program Evaluation and Review Technique
PMBOK-Project Management Book of Knowledge
PMI- Project Management Institute
PM- Project Manager
PO- Project officer
PSI- Pounds per Square Inch
PS- Plumbing Sub Contractor
PV-Planned Value
QS- Quality Surveyor
RACI- Responsible, Accountable, Consult, Inform
RBS- Risk Breakdown Structure
RFPs- Request for Proposals
SBDCBelize- The Small Business Development Centre Belize
SE-Structural Engineer
SPI-Schedule Performance Index
SQ FT- Square Feet
SV-Schedule Variance
TS- Tiling Sub Contractor
UB- University of Belize
UCI-University of International Cooperation
USD-United States Dollar
WBS-Work Breakdown Structure
WDS- Windows and Doors Subcontractor

EXECUTIVE SUMMARY (ABSTRACT)

The Belize Trade and Investment Development Service (BELTRAIDE) requested the development of a Project Management Plan for the construction of the Belize Enterprise & Innovation Institute (BEI2). In 2014 Edge Partners Co. Ltd. was contracted by BELTRAIDE to design the 24, 000 SQ FT facility which has as an objective to inspire and to nurture entrepreneurship and innovation. The facility's design will incorporate Green technology, suitable for sub-tropical climate, inclusive of SMART technologies. Structurally and functionally, BEI2 will provide for two (2) advising/meeting rooms (140 square feet each), two (2) training rooms (470 square feet each), space for eight (8) small business incubators (6000 square feet), and a resource Centre. BEI2 will headquarter BELTRAIDE's Small Business Development Centre- SBDCBelize and International Trade Centre- EXPORT Belize given their existing synergies in providing one to one business advising to Micro, Small and Medium Sized Enterprises (MSMEs).

BELTRAIDE has limited to no experience overseeing projects in the construction sector. In Belize, when constructing buildings, the Construction companies and its respective project teams guide the work; however, they rarely have comprehensive project management documented tools, or methodologies. One of the most common tool used is a bill of quantities and informal approaches of project management to keep stakeholders informed. Due to the size of investment being done by BELTRAIDE, and the complexity and size of building that will be built, it has been crucial to develop a comprehensive and holistic project management instrument such as the "project management plan" which incorporates elements that will be used to make informed decisions during the life of the project.

Throughout the life of project, BELTRAIDE considers scope accomplishment very important. Additionally, ensuring that the project team remains within budget, and time is crucial. The total budget for the project is highly controlled; therefore, there is no room for inconsistencies. The tools, templates, analysis within the subsidiary plans generated will be of great assistance to the team to remain within the projected construction parameters. The project management plan will incorporate its relevant subsidiary plans in the ten (10) knowledge areas of project management, and which will be developed utilizing PMI's standards to assist the project team to have the framework for the planning and initiating phases of the project.

The general objective was to develop a Project Management Plan to facilitate the compliance with the construction requirements and functionality of BEI2 during the initiating and planning stage. Its specific objectives include: to create the project charter that will allow for the authorization of the project, to develop a scope management plan in order to document how the project construction scope will be defined, to develop a time management plan to establish the planning of the project schedule, to develop a cost management plan to determine the costs associated with the project, to develop a quality management plan in order to identify quality requirements, to develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of

the project team, to develop a communication management plan in order to establish the necessary communication, to develop a risk management plan in order to plan, identify and document project risks, to develop a procurement management plan to determine buying decisions, and to develop a stakeholder management plan to identify and analyze all stakeholders.

For the purpose of this study, an analytical method was used where existing information was analyzed from both primary and secondary sources. Interviews with direct and indirect stakeholders were conducted, and meeting minutes were documented as a primary source of information, inclusive of existing project documents. Additionally, the PMI's Project Management Book of Knowledge (PMBOK, fifth edition) was utilized as the main reference. Tools were derived from this standard to guide the framework of the results, and recommendations of the project management plan for the construction of BEI2.

The general and specific objectives were addressed in the results segment of the FGP. The Project Management Plan for the Construction of BEI2 was developed with all its subsidiary plans. Integration management, scope management, time management, cost management, human resources management, quality management, risk management, communication management, procurement management and stakeholder management were the knowledge areas of project management analyzed with its respective inputs, tools and outputs for project initiation and planning.

The following outputs were developed: the project charter, the Scope Management Plan, with the WBS and its respective WBS Dictionary, and the requirements for the project. A Time Management Plan with the activity list, milestone list, activity attributes, duration, and scheduling analysis was developed, a Cost Management Plan, a Quality Management Plan, a Human Resources Management Plan, a Communication Management Plan, a Risk Management Plan, a Procurement Management Plan and the Stakeholder Management Plan.

The Project Management Plan was developed as a result of BELTRAIDE not having organizational assets to support this type of projects. The type of projects BELTRAIDE is familiar with isn't related to construction. As Such, it is recommended that the institution takes the Project Management Plan and all its subsidiary plans as a tool for the current and future projects, and that it be stored securely; therefore, it is relevant for them to invest in a document control system. Additionally, it is recommended that BELTRAIDE opts for formal Project Management of projects, where the appropriate processes are utilized to ensure project success. Also, Edge Partners Co. Ltd. should consider using formal project management approaches as a means of accountability, and transparency to sponsors. BELTRAIDE should ensure that prior to the commencement of a project, relevant initiation and planning tools be developed to ensure project success.

INTRODUCTION

1.1. Background

The Belize Trade and Investment Development Service (BELTRAIDE), operates under the Ministry of Economic Development, Petroleum, Investment, Trade and Commerce, and has responsibilities of investment and trade development and promotion, micro, small and medium sized enterprise (MSME) development, entrepreneurship and skills training. BELTRAIDE signed a Memorandum of Understanding (MOU) with the University of Belize (UB), and launched its Small Business Development Centre, Belize (SBDCBelize) on October 31st, 2012. The SBDCBelize offers one to one business advisory services and business development trainings to Entrepreneurs and MSMEs to allow them to start, improve or expand their business. Due to the success and demand, and with the integration of one more Centre, EXPORTBelize, which offers specialized services to MSMEs in international trade, it was necessary for BELTRAIDE to plan for a sizeable expansion, in the areas of human resources, specialized advising, and physical facilities, so as to satisfy its private sector's demand on services.

Edge Partners Ltd. was contracted to design the larger facility, being marked as the Belize Enterprise & Innovation Institute (BEI2) and which will be 24,000 SQ FT. Its design is to inspire and to nurture entrepreneurship and innovation. The facility's design should incorporate Green technology, suitable for sub-tropical climate, as well as taking advantage of SMART technologies. Functionally, BEI2 will provide for two (2) advising/meeting rooms (140 square feet each), two (2) training rooms (470 square feet each), space for eight (8) small business incubators (6000 square feet), and a resource Centre. BEI2 will headquarter both SBDCBelize and EXPORTBelize given their existing synergies. In addition, the construction of BEI2 will reinforce and strengthen the partnership with UB, considering the functionality and complementarity of the services that both institutions offer.

BELTRAIDE will be the leading project manager and sponsor of the BEI2 construction cycle with the Architect playing the role of consultant during the execution, controlling and closing phases of the project.

BELTRAIDE is requesting for the development of a project management plan to ensure that all details are considered. Currently they only have a first set of renderings for the building, and nothing else to guide them in the initiating and planning phases, and generally for the entire project life. Following the project management plan that will be developed as a result of this final graduation project, it is expected that the organization will have the direction necessary to lead the project team throughout the life cycle of the BEI2 construction project, from its initiation to the closing.

1.2. Statement of the problem

BELTRAIDE has engaged in the design and execution of several projects but never have they overseen projects in the construction sector. Normally, when construction of buildings is done, the construction team is guided by Construction companies and its respective project teams; however, they rarely have project management documented tools, or methodologies that guide their work. They normally depend on the bill of quantities and minimal tools to keep stakeholders informed. Due to the size of investment being done by BELTRAIDE, and the complexity and size of building that will be built, it is crucial to develop a comprehensive and holistic project management instrument such as the “project management plan” which will incorporate elements that will explain in detail the tools, theories, and techniques that will be used to make informed decisions during the life of the project.

1.3. Purpose

There are studies that have shown the positive correlation between planning and project success in the construction sector (Serrador, P. (2012). The importance of the planning phase to project success. Paper presented at PMI® Global Congress 2012—North

America, Vancouver, British Columbia, Canada. Newtown Square, PA: Project Management Institute). It is evident that if efficiency, scope, cost, and time completeness is to be accomplished, it must be supported by the necessary tools to guide its design, implementation, control, and closing. BELTRAIDE considers scope accomplishment very important. Another important factor is to ensure that it remains within budget, and time. The total budget for the project is highly controlled; therefore, there is no room for inconsistencies..

The tools, templates, analysis within the plans generated will be of great assistance to the teams to remain within the projected construction parameters. The project management plan will be developed utilizing PMI's standards to assist the project coordinating team to have the framework for the planning and initiating process incorporating the necessary principles; thus, enabling the identification of dependencies and interdependencies among the integration, scope, time, cost, quality, human resources, communication, risk, procurement, and stakeholders management. This will enable BELTRAIDE to oversee and guide the contracted construction company to identify and manage risks, and ensure compliance to stakeholders requirements for the construction of BEI2.

Additionally, as indicated in the problem statement, it is the first time that a project of this type and sector is being overseen by BELTRAIDE, so the elements of the project management plan will greatly add value to the team, not only in initiating and planning within the framework of project management, but to successfully develop the future process groups of implementation, control, and closing. In addition, the documents will form part of the institution's organizational assets.

1.4. General objective

To develop a Project Management Plan to facilitate the compliance with the construction requirements and functionality of BEI2 during the initiating and planning stage.

1.5. Specific objectives

1. To create the project charter that will allow for the authorization of the project and grant the project manager with the authority to apply organizational resources to the project in order deliver the project's objectives, in this case " the project management plan".
2. To develop a scope management plan in order to document how the project construction scope will be defined as per the standards established in the Project Management Book of Knowledge (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) for project initiating and planning
3. To develop a time management plan to establish the planning of the project schedule as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) for project initiating and planning
4. To develop a cost management plan to determine the costs associated with the project as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) for project initiating and planning
5. To develop a quality management plan in order to identify quality requirements as per the standards established in the PMBOK for project initiating and planning
6. To develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of the project team as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) for project initiating and planning
7. To develop a communication management plan in order to establish the necessary communication to address stakedholder needs as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the

Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) for project initiating and planning

8. To develop a risk management plan in order to plan, identify and document project risks as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) for project initiating and planning
9. To develop a procurement management plan to determine buying decisions as per the standards established in the PMBOK for project initiating and planning
10. To develop a stakeholder management plan to identify and analyze all stakeholders as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) for project initiating and planning

THEORETICAL FRAMEWORK

1.1 Company/Enterprise framework

1.1.1 Company/Enterprise background

The Micro, Small and Medium Sized Enterprise (MSME) Policy and Strategy of Belize (2012) indicates and describes Belize as “an economy comprising mainly MSMEs” (Seepersaud, Michael, *“Belize MSME Policy and Strategy Report”*, Belize, 2012, pg.1). Seepersaud estimated that MSMEs generate over 70% of private sector employment and incomes, and contribute high to the GDP of the country although failure rate is still considered high. There are many causes of this; among which are:

- Business Environment
- limited access to finance,
- market access and competitiveness and the availability of quality business support services

As result of this, BELTRAIDE, as a statutory body, under the portfolio of the Ministry of Economic Development, Petroleum, Investment, Trade and Commerce, Petroleum, Investment, Trade and Commerce exists to promote the vision of economic prosperity through investment promotion and development, trade promotion and development, MSME development, Entrepreneurship, and skills training (retrieved from “<http://www.belizeinvest.org.bz/>, July 12th, 2017). The organization operates with 6 main technical units, who are all exposed to project proposal development at the initiating phase, and execution. The Construction of BEI2 is the first construction project that BELTRAIDE will oversee, and as such the Board of Directors, which is chaired by the Chief Executive Officer of the reporting Ministry believes that a comprehensive project management plan will assist them in guiding the project team once the project starts (Gideon, Melanie, *personal communication*, June 26th, 2017).

2.1.2 Mission and vision statements

Mission

BELTRAIDE is dedicated to all its stakeholders by enhancing Belize's prosperity of fostering investor **confidence**, entrepreneurship, business growth and innovation. This translates into the institution being entrepreneurial in the way it delivers its services to clients. The institution prides itself for being an agent of change in the way it conducts business. They believe that accountability is essential and they pride themselves in the impact it generates and reports through the different projects it oversees (Gideon, Melanie, general Manager, "personal communication," July 11th, 2017).

From the inception of the BEI2, the general manager and relevant personnel have been involved in the preliminary design of the building, engaging the Architect as deemed necessary with the objective of nurturing trust and building the necessary relationship to ensure that the project remains within scope and stays within the mission of promoting economic development from the initial stage to its conclusion (Gideon, Melanie, general Manager, "*personal communication*," July 11th, 2017).

Vision

BELTRAIDE's vision is to enable a competitive environment for the development of Belize's social and economic growth. This is being done by establishing the necessary infrastructure that will allow for economic activity to be stimulated. The infrastructure is enabled internally among its human capital and translated into the external environment. BELTRAIDE seeks to position itself as an entity that advocates for creativity, accountability, proper planning and quality in all the services it delivers. (Gideon, Melanie, General Manager, "*Personal Communication*," July 11th, 2017).

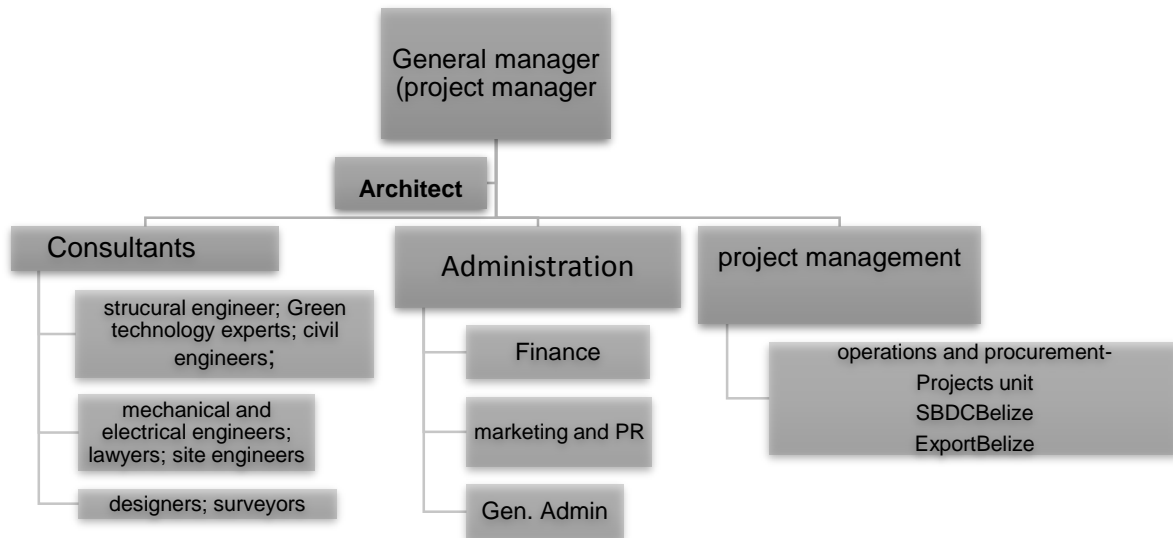
2.1.3 Organizational structure

BELTRAIDE is a statutory body made up of a relatively small team. It has two divisions, namely; (1) The Enterprise and Innovation Division; which comprises of three (3) main technical units: The Small Business Development Centre, Belize (SBDCBelize), EXPORTBelize, and the Belize Training and Employment Centre (BTEC). The second division is the Investment and Trade Division which encompasses: (1) the Investment Generation Unit and the (2) After Care Unit. The institution is supported by a Corporate Services Department, which comprises of a projects sub unit; Finance Unit, Information Technology Unit, Marketing and Information Unit, and the general administration; inclusive of Human resources (Gideon, Melanie, General Manager, “*Personal Communication*,” July 11th, 2017).

The institution comprises of forty (40) employees, and when projects are executed, different personnel from different departments are requested to take on different responsibilities and tasks. **Figure 1** visualizes an organizational structure that reflects the envisioned BEI2- project management plan project organogram. The organization is headed by Ms. Lejia Melanie Gideon, General Manager for the Enterprise and Innovation Division and project manager for the project. There are five (5) different units: SBDCBelize, EXPORTBelize, Projects Unit, Finance Unit, and Marketing and Information that will be part of the project team. In addition, there will be a list of independent consultants that will be contracted and sub-contracted on a needs basis. The architect is considered a lead consultant that will report directly to the general manager. In figure 2 the organizational structure of the company itself highlights the relationship between the different technical units of the organization.

The type of organizational structure that BELTRAIDE has is that of a Weak Matrix projecting a combination of functional and projectized characteristics. Each department has its functional manager with relevant staff reporting to them. There is a Sr. Project Officer that fall within a Sub Unit referred to as Projects Sub Unit that renders support to

all functional managers and departments. Her role is in very limited occasions that of coordinator and in most cases expedite. The Sr. Projects Officer responds to the General Manager and cannot make or enforce decisions.



Word smart tools

Figure 1 Organizational structure-project (Source: Gideon, Melanie; Personal Communication, July 10th, 2017)

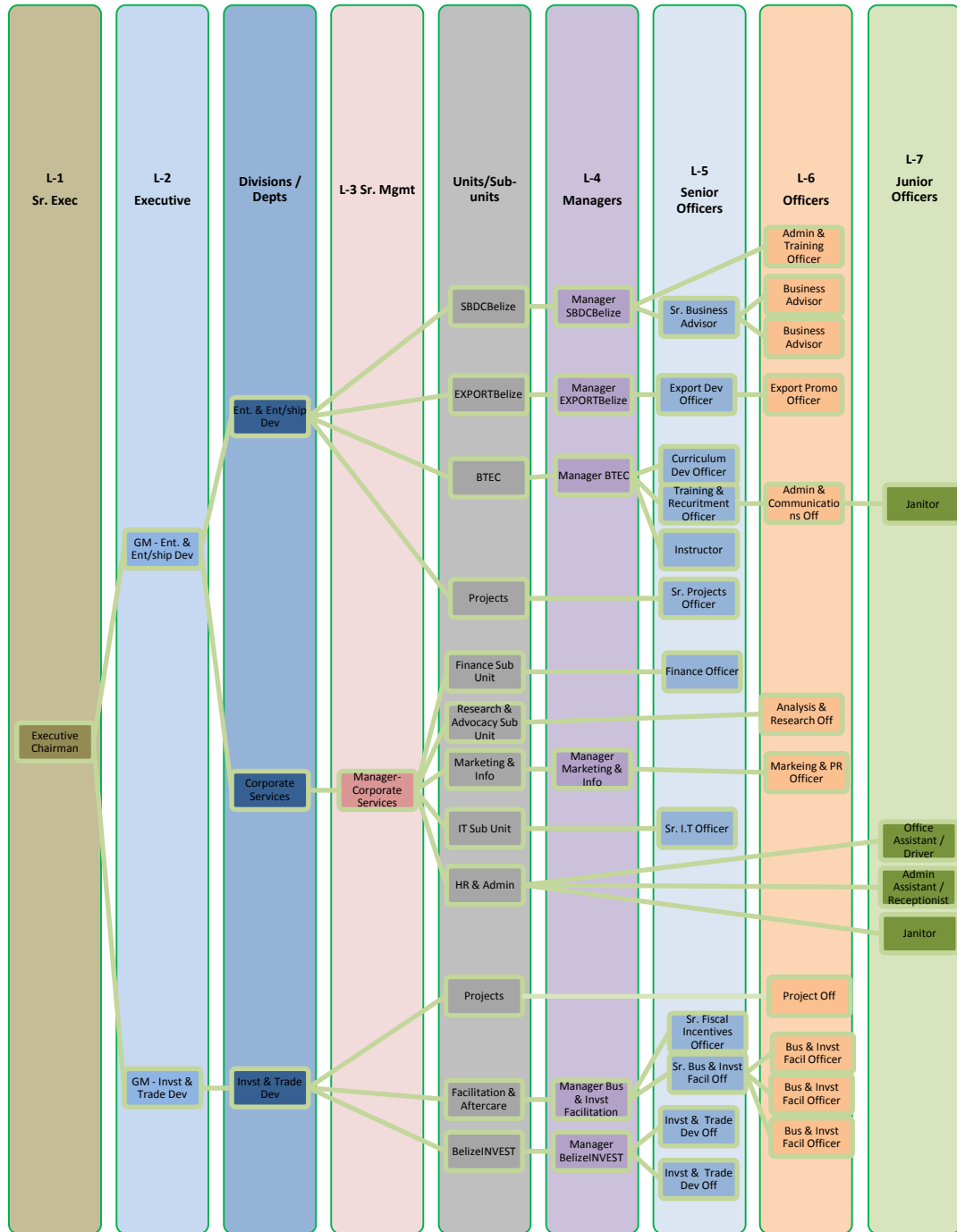


Figure 2 Organizational structure (Source: Gideon, Melanie; Personal Communication, July 10th, 2017)

2.1.4 Products offered

BELTRAIDE, through its technical units SBDCBelize and EXPORTBelize offers one to one business advising and business development/export related trainings to entrepreneurs, and established enterprises. The organization also offers investors the service of guiding them in their investment journey. Complementing this service, BTEC offers skills training for job preparedness. With the construction of BEI2 it is expected that the product offering will extend to incubation, acceleration and research services.

In relation to project management, each unit executes special projects within their respective functions and assigned locations. Special projects that are executed are in relation to the four service areas: Entrepreneurship and MSME development; Investment and Trade; Skills training, Exporting (Gideon, Melanie, general Manager, “personal communication,” July 11th, 2017).

1.2 Project Management concepts

1.2.1 Project

Construction building has been an activity from ancient times and it was defined as the “art, trade or work of a building” (Houghton, Mifflin Harcourt, American Heritage Dictionary of the English Language, Fifth Edition. Copyright © 2016 by Houghton Mifflin Harcourt Publishing Company). Collins Thesaurus (2002) also makes reference to construction as a “structure, building, erection or shape” as cited by free dictionary (free dictionary, <http://www.thefreedictionary.com/Building+construction> retrieved, retrieved July 14th, 2017). Based on these definitions, we can determine that construction relates to a building or structure that is determined by its shape, size and design.

A **project** therefore can be defined as a “temporary endeavor that is undertaken to create a unique product, service or result” (A guide to the project management body of knowledge, PMBOK Guide, Fifth edition; pg. 3). This definition indicates that in

construction, the project should have a start date- with its relevant activities- and a closure date- completion of the building/structure, with all deliverables in place. According to BELTRAIDE's definition of a project, outside of it having a start and end date- it is a process whereby flexibility is considered, as changes may happen to the design of the project; however, scope should be maintained (Alfaro, Debbie; Projects Officer, personal communication; July 11th, 2017). This emphasizes that a project may be iterative considering the different stakeholders that may have an interest in the project.

At Edge Partners Co. Ltd, a project is ensuring that client's requirements are met as per scope, and it ensures that planned activities get executed within the time frame, cost, and quality projected without any contractual litigations due to non- compliance with agreements (Jr. Riverol, Hilberto, Lead Architect, "personal communication", July 12th, 2017). This again portrays a project as having a start and end; but takes into consideration certain aspect of the process groups in project management.

2.2.2 Project management

Project Management integrates applying "knowledge, skills, tools, and techniques to project activities in order to meet the project requirements" (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013., p.g. 5). Project management integrates processes that enable a project team to start and close a project ensuring that scope, time, quality, risks and resources are well-adjusted.

Project management provides evident efficiency in the industrial and commercial fields and that it could be used in architecturally-designed buildings and by extension its construction (Self, R. H. (1974). Project management in construction: fast-tracking. *Project Management Quarterly*, 5(2), 22–24). The concept of project management in construction has also been referred to as the integration of the different components or phases which includes:

- A. Project initiation- defining client requirements
- B. Planning phase- this phase integrates a comprehensive plan which takes into consideration costing, and the roles and responsibilities of the team to be involved.
- C. Design phase- this phase incorporates the design, contract conditions and preparation, and costing is furthered elaborated
- D. Bidding or procurement phase- requirements for supplier selection and awarding of consultancies inclusive of contractors.
- E. Construction phase- the project is coordinated in all aspects of building and construction, taking into consideration quality testing, and closure

(Simpkin, J. G. (1976). Management of construction projects. *Project Management Quarterly*, 7(4), 26–29.).

The Ontario Association of Architects indicate that “project management is a task which has be done on every construction project” (Ontario Association of Architect: “Using the Work Breakdown Structure”, Volume 2A, Section 1, P.g. 119). It is evident that project management is the art of taking a project from its initial phase to its closure in an effective and efficient way. Under this conclusion, the FGP is expected to develop a project management plan for the construction of BEI2 and as such will reference the PMBOK Guide (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition) throughout its development considering it is recognized globally as a standard for project management.

Simpkin made an adequate representation of construction management making reference to it as being the same as the general term “project management”, where both concepts consider the five processes of “initiating, planning, executing, monitoring and control, and closing” (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition, *Project Management Institute, Inc.*, 2013, P.g. 5). The development of the project management plan for the construction of BEI2 is being considered a project which will

focus on the first two phases of initiating and planning. Successful project management is considered when project objectives have been met.

2.2.3 Project life cycle

Projects have been established to be different in many aspects; however, they can be planned to the following standard life cycle configuration as shown in **figure 3**. Starting a project, organizing and preparing, carrying out the work, and closing the project are standard approaches that can be utilized to present the project. (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, *Project Management Institute, Inc.*, 2013.)

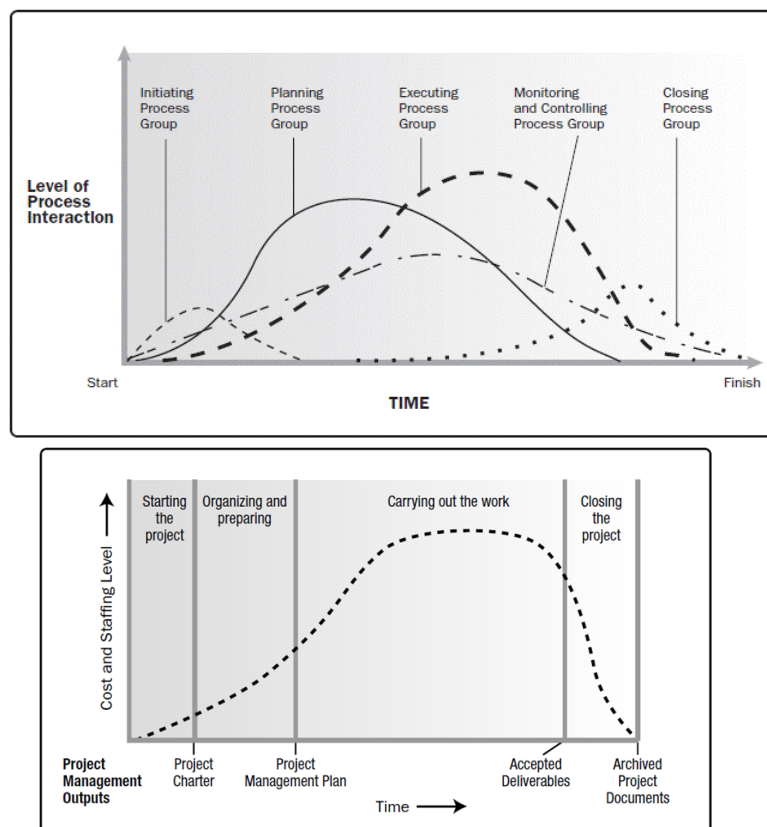


Figure 3 Generic Life cycle structure showing interactions among different phases, image reprinted from Project Management Institute. (2015). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013., pg. 51

PMBOK® Guide defines the project life cycle as a “series of phases that a project goes through from initiation to closure, normally sequential in nature” (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, *Project Management Institute, Inc.*, 2013., p.g 38). This definition can be related to figure 3 above, and essentially to the development of the project management plan for the FGP, and likewise to the actual construction development project of BEI2.

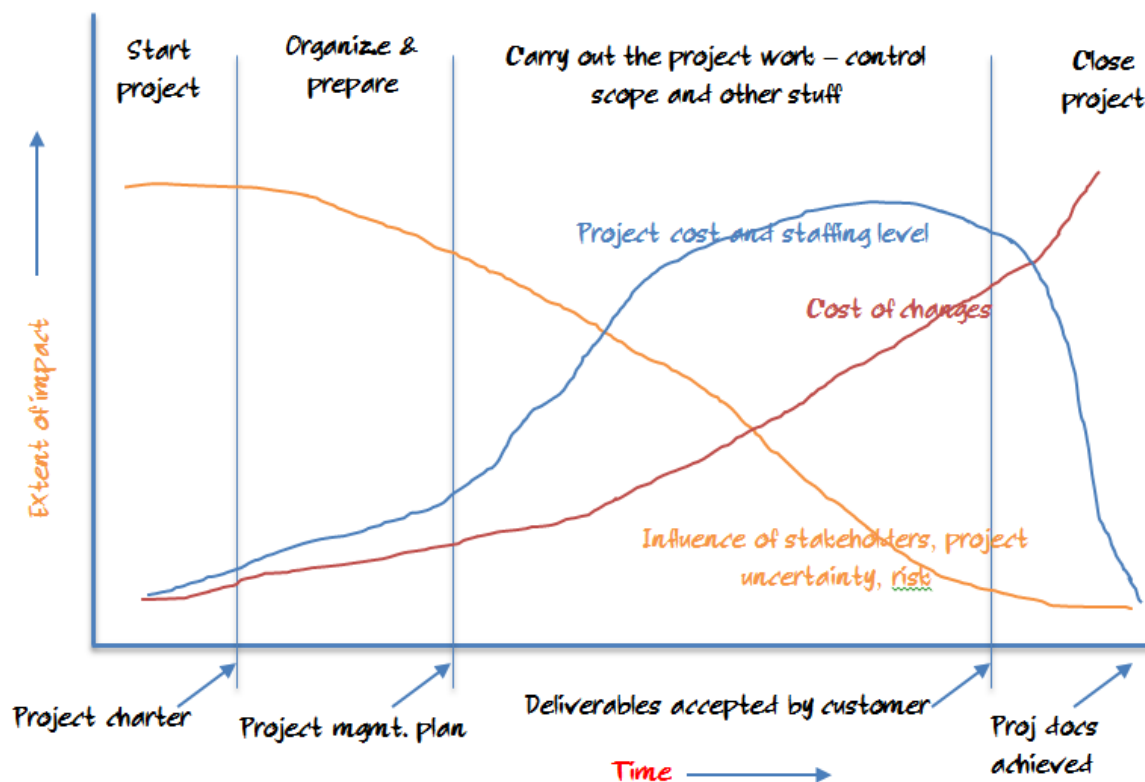


Figure 4 Shivshanker Shenory, *Project life cycle*, retrieved from <http://www.pmaxamsmartnotes.com/project-lifecycle/>

Figure 4 above show a clear picture of the life cycle of a project where the sequence of activities is elaborated to reflect time changes and progression in relations to impact on project deliverables. The development of the FGP will follow this structure where during the start or initiating phase, a project charter is finalized, followed by the elaboration of a project management plan within the organizing & preparing (planning stage). According

to Edge Partners Co. Ltd., all projects that they execute follow this natural sequence of defined activities, and as such will more than likely be applied to BEI2 (Riverol, Hilberto, “*Personal Communication*, July 11th, 2017).

2.2.4 Project management processes

The Project management processes “ensure that effective flow of the project throughout its life cycle”, (Project Management Institute. (2015). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide*, P.g. 47). A process is “a series of actions bringing about a result”; while a “result” is a concrete outcome” (American Heritage Dictionary). It is evident that among the processes, there are some overlapping circumstances, meaning that each will have inputs, tools, and techniques and corresponding outputs. The interaction happens when outputs of one process become inputs of the following process (Duncan, W. R. (1993). The process of project management. *Project Management Journal*, 24(3), 5-10).

For the purpose of the FGP which concerns the development of the Project Management Plan for BEI2, only the initiating and planning processes will be used. The different aspects of these two processes is highlighted in **figure 6** below.

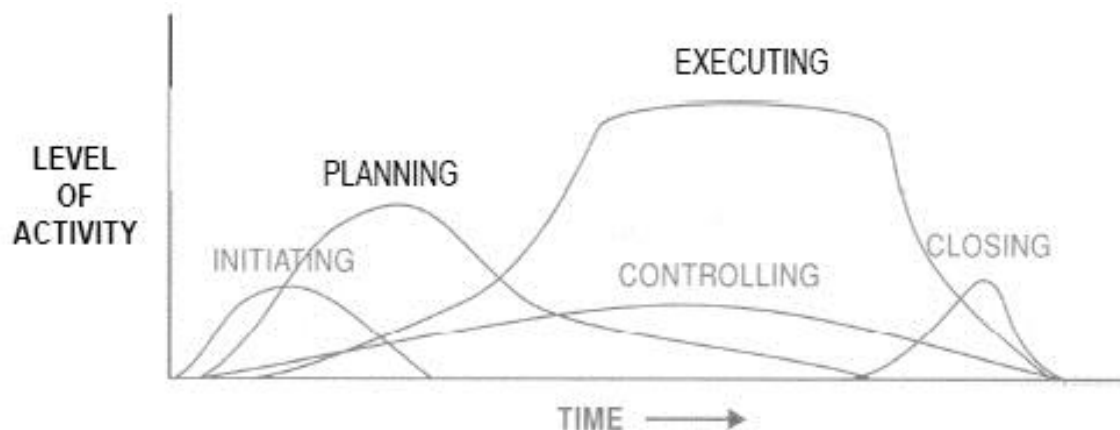


Figure 5 Basic Project Management Processes over time. Retrieved from Duncan, W. R. (1993). The process of Project management. *Project Management Journal*, 24(3), 5–10.

The Initiating Process Group consists of those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase." (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013., p.g. 54). Planning on the other hand has been defined by PMI's (*PMBOK® Guide*) as "those processes performed to establish the total scope of the effort, define and refine the objectives, and develop the course of action required to attain those objectives (*PMBOK® Guide*, p.g. 55). The Project Management Plan will be developed within the planning process group, and as such will become the output of this process, integrating all ten (10 areas) of knowledge areas of project management.

		Initiating	Planning
Knowledge Areas	Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan
	Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS
	Project Time Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Resources 6.5 Estimate Activity Durations 6.6 Develop Schedule
	Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget
	Project Quality Management		8.1 Plan Quality Management
	Project Human Resource Management		9.1 Plan Human Resource Management
	Project Communications Management		10.1 Plan Communications Management
	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
	Project Procurement Management		12.1 Plan Procurement Management
	Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Management

Figure 6. Initiating and Planning Processes. Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition, Project Management Institute, Inc., 2013., pg. 61

2.2.5 Project management knowledge areas

PMBOK® Guide indicates that ten (10) knowledge areas are derived from a total of forty-seven (47) project management processes. Projects generally use these ten knowledge areas as deemed necessary (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013.). **Figure 6** identifies the knowledge areas and its relationship or integration with the process groups under consideration. As can be seen the ten knowledge areas comprise of:

1. Integration management
2. Scope management
3. Time Management
4. Cost Management
5. Quality management
6. Human resources management
7. Communications management
8. Risk management
9. Procurement management
10. Stakeholder management

1.2.5.1 Integration management

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” (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013., p.63). **Figure 7** below explain how integration management connects the process groups in relation to its inputs, tools and techniques and outputs.

Within **figure 7** we can note the indication of the different inputs, tools that should be used to develop the project charter as highlighted in section 4.1 of the **figure 7**. This guide will be used to develop the Project Charter within the initiating process of the development of the Project management Plan for BEI2. Likewise, on **section 4.2** we can see the different inputs, tools and techniques required to complete the Project Management Plan- output for the planning process group, being considered as part of the FGP's objectives.

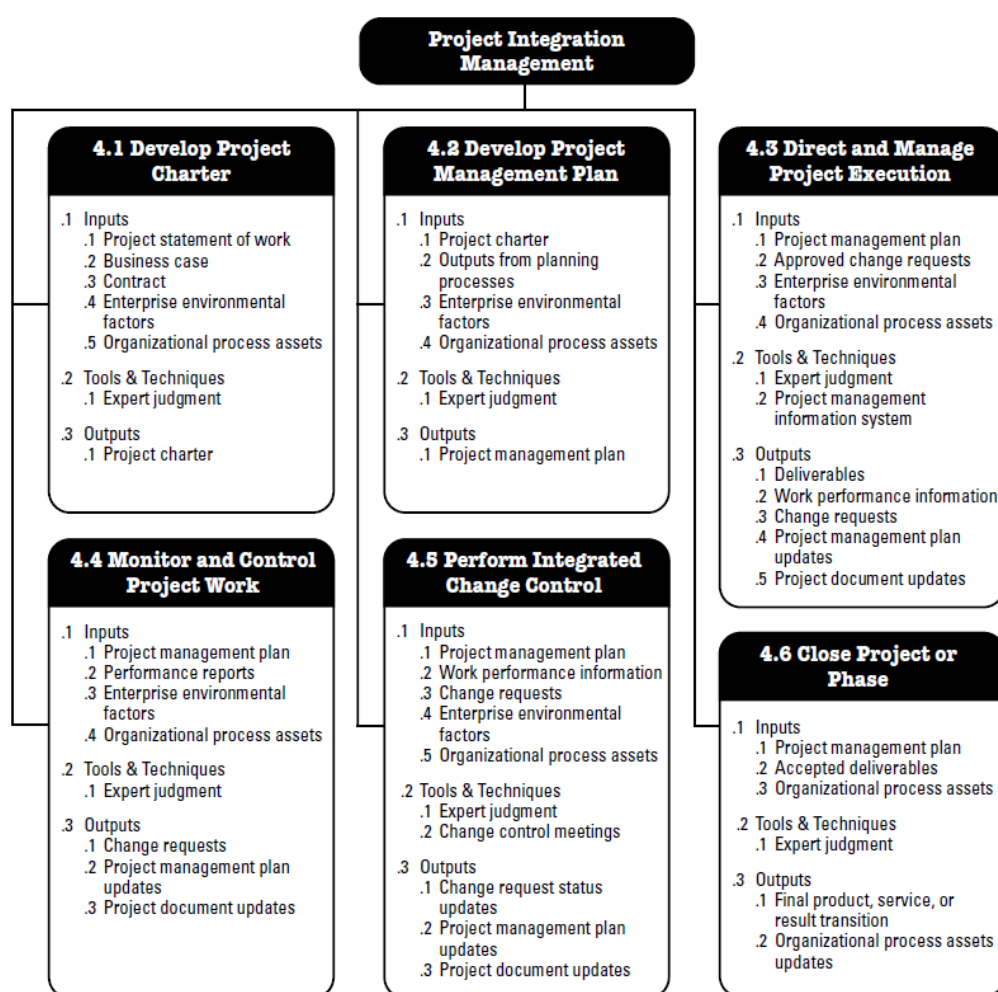


Figure 7. Project integration management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition, Project Management Institute, Inc., 2013. Pg. 65

2.2.5.2 Scope management

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” (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013., p.105). The scope therefore depends on the objectives of the project and the requirements specified by the client. For the purpose of developing the Project Management Plan for BEI2 the following processes of scope management will be considered: plan scope management, collect requirements, define scope, and create WBS. **Figure 8** below explains the inputs, tools and outputs of each process to be included in the FGP’s scope management plan development.

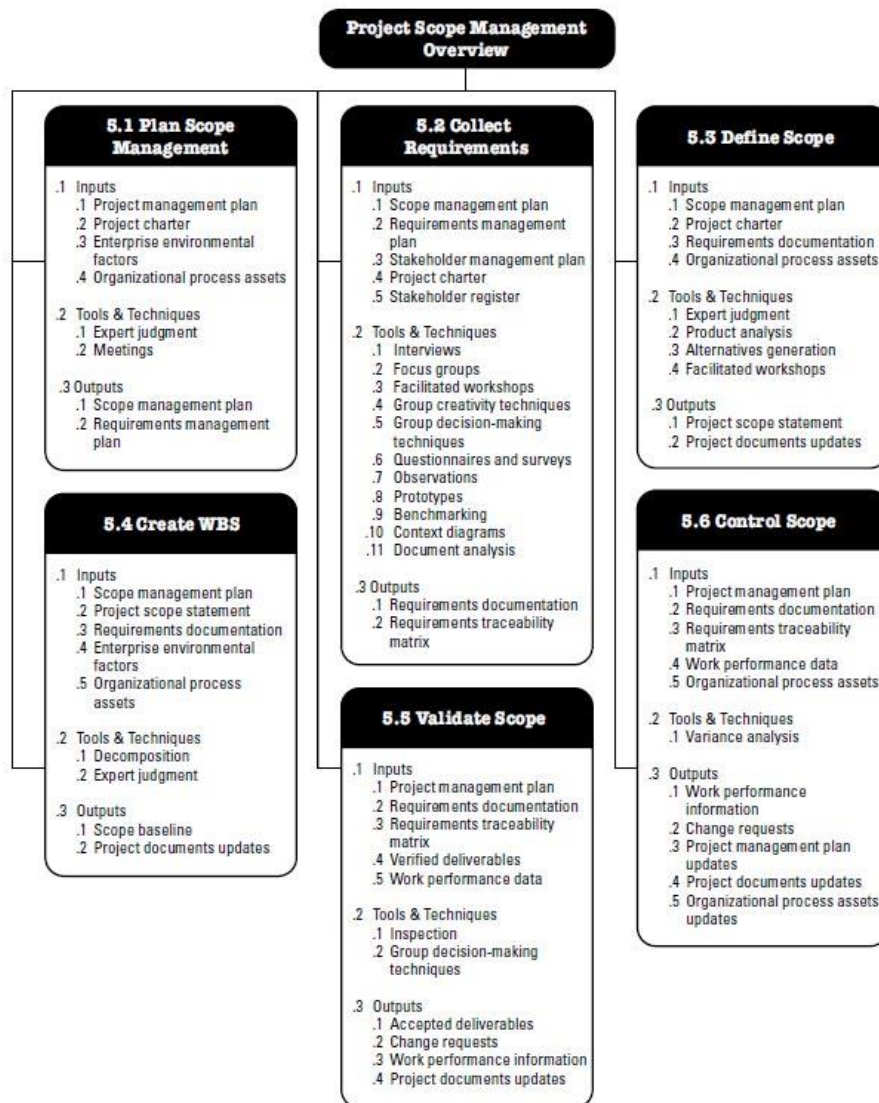


Figure 8. Project scope management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition, Project Management Institute, Inc., 2013., pg. 106

2.2.5.3 Time management

The importance of scheduling in projects is evident due to the concept of project performance being related to how well activities are accomplished, reported and monitored against what was established in the projects work breakdown structure and

work packages (Project Management Institute. (2011). Practice standard for Scheduling , second edition - *Project Management Institute, Inc.*, 2011).

A detailed scheduling plan can enable a team to know not only when but also how it is expected to deliver the activities in order to meet client requirements and ensure that the final product is delivered within the required parameters. *PMBOK® Guide* further elaborates that project time management “includes the processes required to manage the timely completion of the project.” (Project Management Institute, 2013, p.141).

The development of Project Management Plan for BEI2 will include 6.1 to 6.6 as illustrated in **figure 9** below. The inputs, tools and techniques will be considered during the elaboration of the time management subsidiary plan.

- 6.1 Plan Schedule Management**—The process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.
- 6.2 Define Activities**—The process of identifying and documenting the specific actions to be performed to produce the project deliverables.
- 6.3 Sequence Activities**—The process of identifying and documenting relationships among the project activities.
- 6.4 Estimate Activity Resources**—The process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity.
- 6.5 Estimate Activity Durations**—The process of estimating the number of work periods needed to complete individual activities with estimated resources.
- 6.6 Develop Schedule**—The process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model.
- 6.7 Control Schedule**—The process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan.

Figure 9. Project Time management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013., pg. 141

2.2.5.4 Cost management

Estimating costs for projects is crucial. Ensuring that costs are estimated early on and as accurately as possible in the project cycle is relevant to plan ensure that activities may be carried out. The Practice Standard for Project Estimating indicates that “effective project estimating is a key contributor to the successful planning and delivery of a project’s

objectives” (Project Management Institute. (2011). Practice standard for Project Estimating, second edition - *Project Management Institute, Inc.*, 2011, p.4). Project Cost Management includes the processes that allow for “planning, estimating, budgeting, financing, funding, managing, and controlling costs” to ensure that the project’s budget remain within the approved parameters (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, *Project Management Institute, Inc.*, 2013. p.193). For the purpose of the FGP- planning process, the following processes for cost management will be considered: plan cost management, estimate costs, and determine budget. These are illustrated in figure 10 below.

- 7.1 Plan Cost Management**—The process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs.
- 7.2 Estimate Costs**—The process of developing an approximation of the monetary resources needed to complete project activities.
- 7.3 Determine Budget**—The process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.
- 7.4 Control Costs**—The process of monitoring the status of the project to update the project costs and managing changes to the cost baseline.

Figure 10. Project cost management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013, pg. 194

The Earned Value Management (EVM) Technique will be used to control costs. EVM is an effective technique for tracking costs and examining project expenditures comparative to completed work. It will use the Work Breakdown Schedule (WBS) and budget created in the Cost Management Subsidiary Plan, and will further tracks these metrics during the implementation stage of the construction of BEI2. Below are the different high level definitions of the different analysis of EVM.

- Planned Value (PV): Initial budgeted value or cost
- Actual Cost (AC): Actual expenditures at measured points in the project
- Earned Value (EV): Value of work accomplished –at a certain point in the project
- Estimate to Completion (ETC): Management estimate of costs, (from a certain point in the project schedule), necessary to complete the project.

- Budget at Completion (BAC): The total budget allocated to the project (projected cost to complete all project work)

EVM uses tables and charts such as is shown in Figure 11. The y-axis of the chart represents **cost** and the x-axis represents **time**. The **planned value** throughout the project can be plotted from values of cost and time contained in the BEI2 Project's WBS. In other words, if the plan was to complete Tasks A, B, and C by the end of Week 5, the planned value at that time is the budgeted cost associated with these tasks. As the team executes the project, the **actual cost** can also be graphed. At any given time, the actual cost is the total of direct and indirect costs incurred to complete tasks. If Tasks A, B, and C take more time or resources to complete than planned for, the actual cost will exceed the planned value, which of course isn't a good sign. On the chart below, the actual cost line will begin to track above the planned value line (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition).

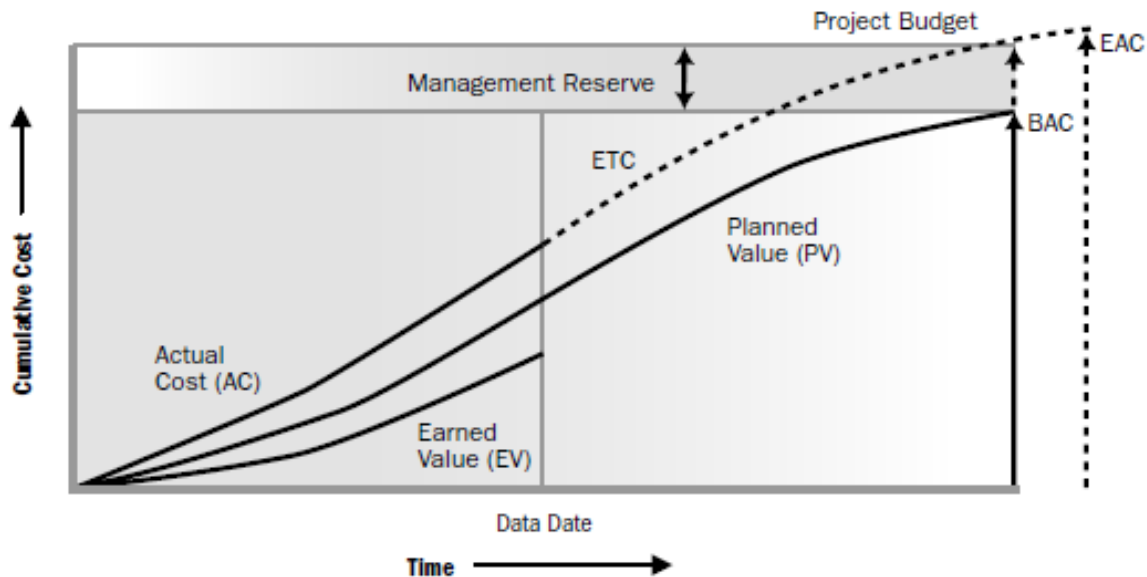


Figure 11 Project cost management, Earned Value Management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013, pg. 219

2.2.5.5 Quality management

Project quality management is defined as the “processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken” (A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013, p.227). Although quality is important in project management, there are still several indications that quality is not always present in project management and understanding what quality is, and to what extent it should be monitored is of importance.

Quality has been considered a fourth among the “triple constraints” of time, cost and scope, and this is most likely due to its close association with scope in relation to client requirements. Quality systems will ensure that projects are completed within the determined time and cost (Rose, H. Kenneth, “Project Quality Management- What, why and how”, second edition, J. Ross Publishing, 2014).

During project planning of the development of FGP-Completion of Project Management Plan for BE12 will reference and ensure to follow plan quality management process as depicted in **8.1 figure 12** below, .

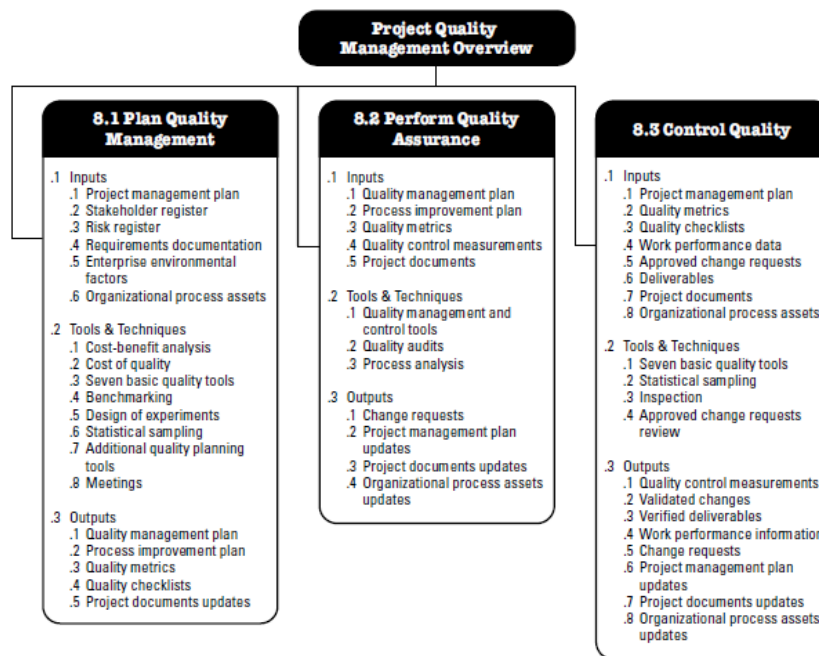


Figure 8-1. Project Quality Management Overview

Figure 12. Project quality management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013. pg. 230

2.2.5.6 Human resources management

Project human resources management refers to the “processes that organize, manage, and lead the project team” (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013, p.255).

For the planning of the Project Management plan 9.1: Plan human resource management will be considered for the FGP final deliverable. This process will identify and document all the details of the project team, found within the staffing management plan. Below figure 13 explains in detail this process in human resource project management.

- 9.1 Plan Human Resource Management**—The process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan.
- 9.2 Acquire Project Team**—The process of confirming human resource availability and obtaining the team necessary to complete project activities.
- 9.3 Develop Project Team**—The process of improving competencies, team member interaction, and overall team environment to enhance project performance.
- 9.4 Manage Project Team**—The process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

Figure 13 Project human resource management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013, pg. 255

2.2.5.7 Communications management

Project communication Management incorporates not only planning, but also managing communications and monitoring the communications among stakeholders from start to closure of the project.

Plan communication Management is “the process of developing an appropriate approach and plan for project communications” –taking into consideration stakeholder’s needs, and requirements” (Project Management Institute, p. 289).

Below in **figure 14** you can see the three main processes in Project communication management. For the planning management of the development of the Project Management Plan of BEI2, only 10.1 Plan communications Management will be considered. This entails the development of the communications method/s to be proposed within this subsidiary plan.

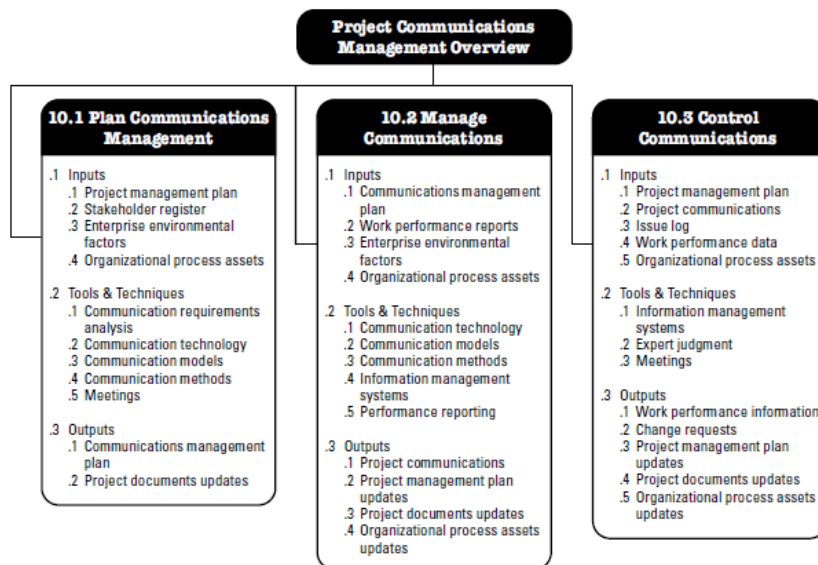


Figure 10-1. Project Communications Management Overview

Figure 14 Project communications resource management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013.pg. 288

2.2.5.8 Risk management

PMI defines a project risk as “an uncertain event or condition that if it occurs has a positive or negative effect on a project’s objectives” (Project Management Institute, p. 310). Several other definitions are highlighted in the Practice Standard for Risk Management (2009); however, all of them links to Project risk management being about identifying risks in advance so that the project team has enough time and ability to enact potential alternatives or solutions to mitigate its impact- if it’s negative, or to maximize if it is positive (Project Management Institute. (2009). *A Practice standard for Risk Management - , Project Management Institute, Inc., 2009*). It is essential that risks are considered as it relates to scope, quality, time, and cost, and the extent to which it impacts the project’s success. In addition to this we must be keen to ensure that risk isn’t confused with causes, as they may both seem the same. For this purpose, the development of Project Management Plan for BEI2 in relation to the project planning process group within risk

management will reference the processes starting from 11.1 plan risk management to 11.5 plan risk responses as indicated in **figure 15** below.

- 11.1 Plan Risk Management**—The process of defining how to conduct risk management activities for a project.
- 11.2 Identify Risks**—The process of determining which risks may affect the project and documenting their characteristics.
- 11.3 Perform Qualitative Risk Analysis**—The process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.
- 11.4 Perform Quantitative Risk Analysis**—The process of numerically analyzing the effect of identified risks on overall project objectives.
- 11.5 Plan Risk Responses**—The process of developing options and actions to enhance opportunities and to reduce threats to project objectives.
- 11.6 Control Risks**—The process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project.

Figure 15. Project risk management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013 pg. 309

2.2.5.9 Procurement management

Project Procurement Management “includes the necessary processes to purchase or acquire products, services, or results needed outside the project team” (Project Management Institute, P. 355).

Figure 16 highlights and explain each process related to this knowledge area of project management. For planning of the project, only 12.1: Plan procurement management will be referenced.

12.1 Plan Procurement Management—The process of documenting project procurement decisions, specifying the approach, and identifying potential sellers.

12.2 Conduct Procurements—The process of obtaining seller responses, selecting a seller, and awarding a contract.

12.3 Control Procurements—The process of managing procurement relationships, monitoring contract performance, and making changes and corrections as appropriate.

12.4 Close Procurements—The process of completing each project procurement.

Figure 16. Project procurement management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013, pg. 355

2.2.5.10 Stakeholder management

Stakeholder management is important as they influence the success or failure of a project. For the development of the Project management Plan of BEI2, stakeholders would have to be engaged to confirm, and share information and details of the plan. If information isn't available, or if stakeholders are not willing to share information, this may affect the accomplishment of the project's objectives. Stakeholders' needs must always be considered, and aligned to the project's scope. Once you keep stakeholders satisfied, it is more likely that they will influence your project positively.

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” (Project Management Institute, 2013, p. 391).

For project planning in the development of the BEI2 Project Management plan, the following will be referenced, that being: “13.1 identify stakeholders and 13.2 Plan stakeholder Management”. These two processes will contribute to the subsidiary plan of

stakeholder management to be completed. Once the plan is accepted, managing, engaging, and controlling stakeholders becomes more flexible.

Figure 17 below shares the different processes and its related inputs, tools and outputs.

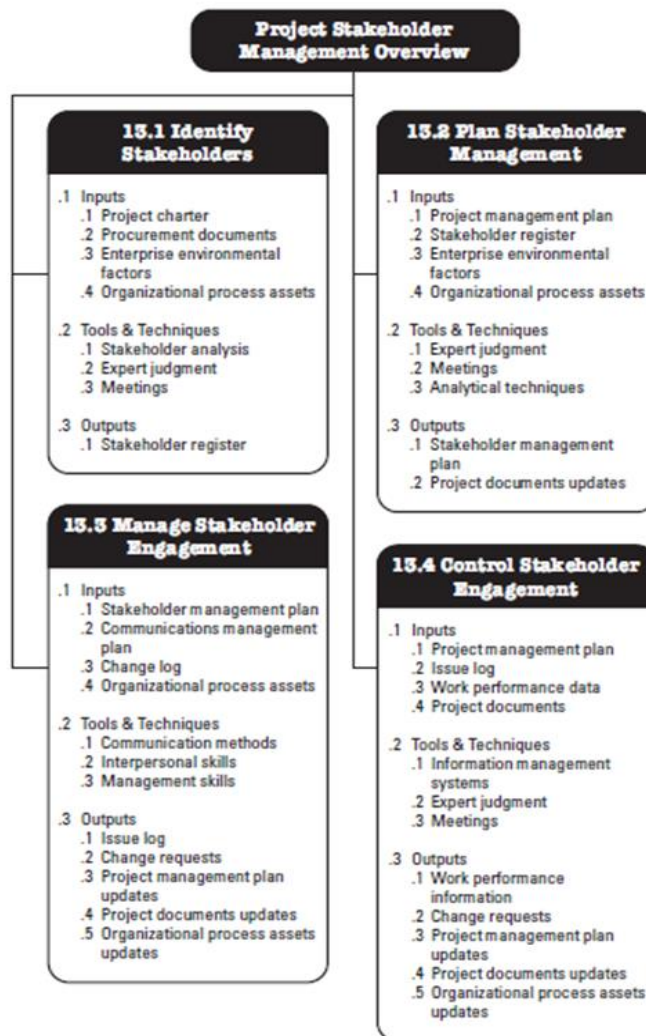


Figure 17. Project stakeholder management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013. pg. 392

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

1.3.1 Project Management Plan

The project management plan is the actual project document that will guide the project team to ensure that client requirements are met with relation to scope, time, quality, and cost. This will be on the basis of the analysis integrating the ten (10) knowledge areas and its respective subsidiary plans. This document has been referred as “the mother of all plans” (Rowley, Jerome, “PMBOK-fifth edition, Project Management Plan, retrieved from <https://4squareviews.com/2013/02/16/5th-edition-pmbok-guide-the-project-management-plan/>, July 16, 2017).

The Project Management Plan will be the primary document to be used by the project team to manage the construction of BEI2. Figure 17 highlights the different project documents associated to the Project Management Plan and its relevant components.

Table 4-1. Differentiation Between the Project Management Plan and Project Documents

Project Management Plan	Project Documents	
Change management plan	Activity attributes	Project staff assignments
Communications management plan	Activity cost estimates	Project statement of work
Configuration management plan	Activity duration estimates	Quality checklists
Cost baseline	Activity list	Quality control measurements
Cost management plan	Activity resource requirements	Quality metrics
Human resource management plan	Agreements	Requirements documentation
Process improvement plan	Basis of estimates	Requirements traceability matrix
Procurement management plan	Change log	Resource breakdown structure
Scope baseline • Project scope statement • WBS • WBS dictionary	Change requests	Resource calendars
Quality management plan	Forecasts • Cost forecast • Schedule forecast	Risk register
Requirements management plan	Issue log	Schedule data
Risk management plan	Milestone list	Seller proposals
Schedule baseline	Procurement documents	Source selection criteria
Schedule management plan	Procurement statement of work	Stakeholder register
Scope management plan	Project calendars	Team performance assessments
Stakeholder management plan	Project charter Project funding requirements Project schedule Project schedule network diagrams	Work performance data Work performance information Work performance reports

Figure 18. Project stakeholder management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition, Project Management Institute, Inc., 2013. pg. 78

The main benefit of the project management plan is that it represents a comprehensive and central document that “defines the basis for all project work” (Project Management Institute, 2013, p. 72).

METHODOLOGICAL FRAMEWORK

1.4 Information sources

Information is defined by Merriam Webster as “knowledge obtained from investigation, study or instruction” (retrieved from <https://www.merriam-webster.com/dictionary/information>, July 18, 2017). Information therefore provides an answer or solution to something that is being analyzed or studied.

Sources on the other hand is defined as the place where the information is retrieved from. The origin of information is therefore referred to as the source (Business dictionary, retrieved from <http://www.businessdictionary.com/definition/source.html>, July 18th, 2017). Information sources may be primary, secondary or tertiary (Author unkonw, <https://www.slideshare.net/joh5700/what-are-information-sources> 23796587, retrieved on July 18, 2017).

Below are the definitions of primary and secondary sources, which will be highly used throughout the development of the FGP.

3.1.1 Primary sources

Primary sources of information are defined as events, practices or conditions that provide first-hand accounts (*primary source village*, University of Illinois, retrieved from <http://www.library.illinois.edu/village/primarysource/mod1/pg1.htm>, July 18th, 2017). In other words, primary sources are first-hand information.

The primary sources to be used for the FGP are:

1. Stakeholder interviews and meetings- interviews with BELTRAIDE, Ministry of Economic Development, Petroleum, Investment, Trade and Commerce, Architect, BELTRAIDE staff
2. Meeting Minutes- the reports generated from the interviews and meetings that will contain information

3. Organizational assets, i.e. reports on BEI2, and other Project documents

3.1.2 Secondary sources

Secondary sources are defined as “is something written about a primary source. Secondary sources include comments on, interpretations of, or discussions about the original material” (definition, *Secondary sources*, Austin Peay State University, retrieved from http://libguides.apsu.edu/primary_sources, July 19th, 2017),

Examples of Secondary source materials can be information or articles in newspapers, magazines, or books, scholarly journals that evaluate or criticize someone else's research or work.

For the FGP the main secondary sources to be used will be *PMBOK® Guide* (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*), and articles found on Project Management Institute website.

Chart 1 Information sources (Source: Source: R. Nilda, *Author*, July, 2017)

Objectives	Information sources	
	Primary	Secondary
1. To create the project charter that will allow for the authorization of the project and grant the project manager with the authority to apply organizational resources to the project in order deliver the project's objectives, in this	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other	PMI PMI (2013) PMBOK Guide, Fifth edition and other editions for comparison

Objectives	Information sources	
	Primary	Secondary
case “ the project management plan”.	primary/direct stakeholders; existing organizational assets- i.e. BEI2 reports already documented	
2. To develop a scope management plan in order to document how the project construction scope will be defined as per the standards established in the PMI’s (2013) Project Management Book of Knowledge (PMBOK), fifth edition for project initiating and planning	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other primary/direct stakeholders; existing organizational assets- i.e. BEI2 reports already documented	PMI PMI’s (2013) PMBOK Guide, Fifth edition and other editions for comparison

Objectives	Information sources	
	Primary	Secondary
3. To develop a time management plan to establish the planning of the project schedule as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other primary/direct stakeholders; existing organizational assets- i.e. BEI2 reports already documented	PMI PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison
4. To develop a cost management plan to determine the costs associated with the project as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other	PMI PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison

Objectives	Information sources	
	Primary	Secondary
	<p>primary/direct stakeholders;</p> <p>existing organizational assets- i.e. BEI2 reports already documented</p>	
<p>5. To develop a quality management plan in order to identify quality requirements as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning</p>	<p>Interviews with direct and main stakeholders</p> <p>meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other primary/direct stakeholders;</p> <p>existing organizational assets- i.e. BEI2 reports already documented</p>	<p>PMI</p> <p>PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison</p>

Objectives	Information sources	
	Primary	Secondary
6. To develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of the project team as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other primary/direct stakeholders; existing organizational assets- i.e. BEI2 reports already documented	PMI PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison
7. To develop a communication management plan in order to establish the necessary communication to address stakedholder needs as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other	PMI PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison

Objectives	Information sources	
	Primary	Secondary
	<p>primary/direct stakeholders;</p> <p>existing organizational assets- i.e. BEI2 reports already documented</p>	
<p>8. To develop a risk management plan in order to plan, identify and document project risks as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning</p>	<p>Interviews with direct and main stakeholders</p> <p>meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other primary/direct stakeholders;</p> <p>existing organizational assets- i.e. BEI2 reports already documented</p>	<p>PMI</p> <p>PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison</p>

Objectives	Information sources	
	Primary	Secondary
9. To develop a procurement management plan to determine buying decisions as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other primary/direct stakeholders; existing organizational assets- i.e. BEI2 reports already documented	PMI PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison
10. To develop a stakeholder management plan to identify and analyze all stakeholders as per the standards established in the PMI's PMBOK, fifth edition for project initiating and planning	Interviews with direct and main stakeholders meeting minutes with project manager, architect, and other relevant BELTRAIDE and /or other	PMI PMI's (2013) PMBOK Guide, Fifth edition and other editions for comparison

Objectives	Information sources	
	Primary	Secondary
	primary/direct stakeholders; existing organizational assets- i.e. BEI2 reports already documented	

1.5 Research methods

Research is described by American Heritage as a “careful study of a given subject, field, or problem, undertaken to discover facts or principles.” It further indicates that research methods can be “the approach to study (something) thoroughly so as to present in a detailed, accurate manner” (American Heritage® Dictionary of the English Language, Fifth Edition. Copyright © 2016 by *Houghton Mifflin Harcourt Publishing Company*. Published by Houghton Mifflin Harcourt Publishing Company).

Other definitions that have been established for research methods is ‘*a strategy of enquiry which moves from the underlying philosophical assumption to the research design and data collection*’ (Myers and Avison, 2002, p. 7). Based on that definition we can state the research methods can be the procedure used to establish findings.

For the purpose of FGP, we will use an analytical method considering information is already available for further analysis and use.

3.2.1 Analytical method

Analytical method is somewhat of a cause and effect approach of study where the problem identification is the first step to analyze potential solutions. In other words, it can be a “an explanatory research where the research in question is intended to explain, rather than simply to describe, the phenomena studied”, (Given, Lisa, *The Sage Encyclopedia, published by Sage Publications, 2008*). In other words, the researcher collects the data, and analyzes based on objectives. The data is collected mainly through interviews, and from existing documentation.

Below is chart 2 research methods with the respective objectives as stated in the project charter with its corresponding research approach. It is essential to note that the research method selected is based on the scope of the FGP.

Chart 2 Research methods (Source: R. Nilda, *Author, July, 2017*)

Objectives	Analytical Research Method
1. To create the project charter that will allow for the authorization of the project and grant the project manager with the authority to apply organizational resources to the project in order deliver the project’s objectives, in this case “ the project management plan”.	This method will be used through the use of information from both primary and secondary sources as identified in Chart 1 sources of information. Main sources will be interviews with main stakeholders, and existing reports on the project.
2. To develop a scope management plan in order to document how the project construction scope will be defined as per the standards established in the PMI’s (2013) Project Management	This method will be used through the use of information from both primary and secondary sources as identified in Chart 1 deliverable 2 sources of information. Main sources will be

Objectives	Analytical Research Method
Book of Knowledge (PMBOK), fifth edition for project initiating and planning	interviews with main stakeholders, and existing reports on the project to develop the scope management plan.
3. To develop a time management plan to establish the planning of the project schedule as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	The Analytical method will be used through the use of information and facts from both primary and secondary sources as identified in Chart 1 for deliverable 3. Main sources will be interviews with main stakeholders-, BELTRAIDE, the Architect-Edge Partners to ensure that the appropriate information is analyzed. Additionally existing reports such as the bill of quantities and schedules on the project to develop the time management plan for the project management plan will be used.
4. To develop a cost management plan to determine the costs associated with the project as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	The Analytical method will be used through the use of information and facts from both primary and secondary sources as identified in Chart 1 for deliverable 4. Main sources will be interviews with main stakeholders-, BELTRAIDE, the Architect-Edge Partners to ensure that the appropriate

Objectives	Analytical Research Method
	information is analyzed. Additionally existing reports such as the bill of quantities on the project to develop the cost management plan for the project management plan will be used.
5. To develop a quality management plan in order to identify quality requirements as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	The Analytical method will be used through the use of information and facts from both primary and secondary sources as identified in Chart 1 for deliverable 5. Main sources will be interviews with main stakeholders-, BELTRAIDE, the Architect-Edge Partners, engineers, greet technology experts to ensure that the appropriate quality references are developed. Additionally existing reports on the project to develop the quality management plan for the project management plan will be used.
6. To develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of the project team as per the standards established in the PMI's (2013)	The Analytical method will be used through the use of information and facts from both primary and secondary sources as identified in Chart 1 for deliverable 6. Main sources will be interviews with main stakeholders- HR department, BELTRAIDE, the Architect-

Objectives	Analytical Research Method
PMBOK, fifth edition for project initiating and planning	Edge Partners to ensure that the right skills and Terms of references are developed. Additionally existing reports on the project to develop the subsidiary human resources plan for the project management plan will be used.
7. To develop a communication management plan in order to establish the necessary communication to address stakedholder needs as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	This method will be used through the use of information from both primary and secondary sources as identified in Chart 1 for deliverable 7. Main sources will be interviews with main stakeholders inclusive of the project team to ensure that needs and approaches on communication are properly identified. Additionally existing reports on the project to develop the subsidiary communication plan for the project management plan will be used.
8. To develop a risk management plan in order to plan, identify and document project risks as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	This method will be used through the use of information from both primary and secondary sources as identified in Chart 1 for deliverable 8. Main sources will be interviews with main stakeholders inclusive of the project team to ensure that risks on quality, time, schedule and scope are captured

Objectives	Analytical Research Method
	and addresses. Additionally existing reports on the project to develop the subsidiary risk management plan for the project management plan will be used.
9. To develop a procurement management plan to determine buying decisions as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	This method will be used through the use of information from both primary and secondary sources as identified in Chart 1 for deliverable 9. Main sources will be interviews, minutes and reports with stakeholders such as BELTRAIDE and suppliers, with the guidance of the Architect, and existing reports on the project to develop the subsidiary procurement plan for the project management plan.
10.To develop a stakeholder management plan to identify and analyze all stakeholders as per the standards established in the PMI's (2013) PMBOK, fifth edition for project initiating and planning	This method will be used through the use of information from both primary and secondary sources as identified in Chart 1 for deliverable 10. Main sources will be interviews with main stakeholders, and existing reports on the project to develop the subsidiary stakeholder management plan for the project management plan.

1.6 Tools

Tools are 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. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, p. 565). Tools; therefore, is a mechanism applied in the form of solid processes to generate an output.

For the FGP, the following tools will be used in the form of templates, or software:

1. Project Charter Template
2. Work Breakdown Schedule template
3. Work Breakdown Software- word smart tools or online software
4. Work Breakdown Dictionary
5. Scope verification matrix
6. Project scope statement
- 7. Scope management plan**
8. Requirements traceability matrix
9. Project management plan
10. Requirements management plan
11. Requirements documentation
12. Milestone list
13. Activity list
14. Activity resource requirements
15. Activity attributes
16. Activity cost estimates
17. Activity duration activities
18. Scheduling Software-Microsoft project 2016
19. Schedule network analysis tool
20. Project schedule
- 21. Schedule management plan**

- 22. Assumption and constraint log
- 23. Communications management plan**
- 24. Cost baseline
- 25. Cost estimating worksheet
- 26. Cost management plan**
- 27. Responsibility assignment matrix
- 28. Human resource management plan**
- 29. Resource breakdown structure
- 30. Source selection criteria
- 31. Procurement management plan**
- 32. Process improvement plan
- 33. Quality metrics
- 34. Quality management plan**
- 35. Probability and impact assessment and matrix
- 36. Risk data sheet
- 37. Risk register
- 38. Risk management plan**
- 39. Stakeholder analysis
- 40. Stakeholder register
- 41. Stakeholder management plan**

The summary of tools is found in **chart 3** below as per specific objectives.

Chart 3 Tools (Source: R. Nilda, *Author*, July, 2017)

Objectives	Tools
a) To create the project charter that will allow for the authorization of the project and grant the project manager with the	The tools used for this objective is the project charter- which is the tool that gives authority

Objectives	Tools
<p>authority to apply organizational resources to the project in order deliver the project's objectives, in this case " the project management plan".</p>	<p>to the project manager to use resources- it guides the project development. Additionally, the below will be used:</p> <ul style="list-style-type: none"> a) Work Breakdown Schedule Software- word smart tools or online software- allows for easy development of the work packages b) Work Breakdown Schedule template- develops the projects deliverables and work packages c) Work Breakdown Dictionary- lists the activities within each work package d) Project management plan- contains all the subsidiary plans that make up the project on the ten knowledge areas.
<p>b) To develop a scope management plan in order to document how the project construction scope will be defined as per the standards established in the PMI's (2013) Project Management Book of Knowledge (PMBOK), fifth edition) for project initiating and planning</p>	<p>Tools for this objective include:</p> <ul style="list-style-type: none"> a) Scope verification matrix b) Project scope statement c) Requirements traceability matrix d) Requirements management plan e) Requirements documentation f) Scope management plan
<p>c) To develop a time management plan to establish the planning of the project</p>	<p>Tools for this objective includes:</p> <ul style="list-style-type: none"> a) Milestone list

Objectives	Tools
<p>schedule as per the standards established in the PMBOK for project initiating and planning</p>	<ul style="list-style-type: none"> b) Activity list c) Milestone list d) Activity resource requirements e) Activity attributes f) Activity cost estimates g) Activity duration activities h) Scheduling Software-Microsoft project 2016 i) Schedule network analysis tool j) Assumption and constraint log k) Resource breakdown structure l) Schedule management plan
<p>d) To develop a cost management plan to determine the costs associated with the project as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>The tools for this objective includes:</p> <ul style="list-style-type: none"> a) Cost baseline b) Cost estimating worksheet c) Cost management plan
<p>e) To develop a quality management plan in order to identify quality requirements as per the standards established in the PMBOK (Project Management Institute.</p>	<p>The tools to be used for this objective is:</p> <ul style="list-style-type: none"> a) Quality management plan b) Quality metrics

Objectives	Tools
(2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning	
f) To develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of the project team as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning	<ul style="list-style-type: none"> a) Responsibility assignment matrix b) HR management plan
g) To develop a communication management plan in order to establish the necessary communication to address stakeholder needs as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning	Communications plan
h) To develop a risk management plan in order to plan, identify and document	<ul style="list-style-type: none"> a) Risk data sheet b) Probability and impact assessment

Objectives	Tools
<p>project risks as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>c) Probability and impact matrix d) Risk register e) Risk management plan</p>
<p>i) To develop a procurement management plan to determine buying decisions as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>a) Source selection criteria b) Procurement management plan</p>
<p>c) To develop a stakeholder management plan to identify and analyze all stakeholders as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>a) Stakeholder management plan b) Stakeholder analysis and register</p>

1.7 Assumptions and constraints

Assumptions is defined as “a belief of what you assume to be true in the future and are based on your knowledge, experience or the information available at hand”. In other words, “they are anticipated events or circumstances that are expected to happen during your projects life” (Fajad, Usmani, Project Management, *PM Study Circle; January 2013*, retrieved <https://pmstudycircle.com/2012/10/assumptions-and-constraints-in-project-management/>, July 2017)

Fajad also defined constraints as “limitations imposed on the project”. PMBOK Guide indicates that those limitations can be in relation to scope, cost, schedule, resource, risks, and quality known as the triple constraint but further elaborated (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, *Project Management Institute, Inc.*, 2013).

Chart 4 Assumptions and constraints (Source: R. Nilda, *Author*, July, 2017)

Objectives	Assumptions	Constraints
<p>1. To create the project charter that will allow for the authorization of the project and grant the project manager with the authority to apply organizational resources to the project in order deliver the project's objectives, in this case " the project management plan".</p>	<p>The project charter will be completed and approved</p>	<p>There is limited time to develop the project charter</p> <p>The amount of information required is essential and comes from different stakeholders</p>
<p>2. To develop a scope management plan in order to document how the project construction scope will be defined as per the standards established in the Project Management Book of Knowledge (PMBOK) (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>The stakeholders are available and willing to share the information</p> <p>The scope management plan will be finalized with all required elements</p>	<p>The Board of Directors have not approved final construction design and as such scope may change.</p>
<p>3. To develop a time management plan to establish the planning of the project schedule as per the standards established in the PMBOK</p>	<p>The time for the FGP development and its deliverables is adequate</p>	<p>The construction of BEI2 should not exceed 27 months</p>

Objectives	Assumptions	Constraints
<p>(Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>The time management plan will reflect the schedule as per stakeholders' specifications</p>	
<p>4. To develop a cost management plan to determine the costs associated with the project as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>The cost management plan will successfully be completed with the budget reflecting the financial resources allocated</p>	<p>The bill of quantities must not be iterated within the first 6 months of the construction and must not exceed the estimated budget</p>
<p>5. To develop a quality management plan in order to identify quality requirements as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>The information gathered will allow for the quality management plan to be completed identifying all quality related requirements</p>	<p>The building must employ green technology certification which is not offered in the country</p>

Objectives	Assumptions	Constraints
<p>6. To develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of the project team as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>The right amount and skills are available for the project to be completed</p>	<p>Specific expertise is required and must be allocated in the early stages of the project</p>
<p>7. To develop a communication management plan in order to establish the necessary communication to address stakedholder needs as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>The stakeholder needs can easily determine the communications approach/mediums to be employed in the communications management plan</p>	<p>Stakeholders vary in language, location and knowledge capacity</p>
<p>8. To develop a risk management plan in order to plan, identify and document project risks as per the</p>	<p>All project risks are identified with the information</p>	<p>Specific knowledge is required for risk</p>

Objectives	Assumptions	Constraints
standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning	provided by stakeholders	identification and analysis.
9. To develop a procurement management plan to determine buying decisions as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning	All suppliers are available for the initial and planning stages of the construction	International suppliers are needed because of the client specifications Procurement guidelines must be followed and should not affect schedule
10. To develop a stakeholder management plan to identify and analyze all stakeholders as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning	The stakeholders are identified and will be detailed in the stakeholder management plan	All stakeholders must be identified within the parameters of the project scope and specifications

1.8 Deliverables

A deliverable is “any unique and verifiable product, result or capability” and are usually “tangible components completed to meet the project objectives and can include elements of the project management plan” (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, p. 84).

Below the deliverables listed in Chart 5 for each specific objective.

Chart 5 Deliverables (Source: R. Nilda, *Author*, July, 2017)

Objectives	Deliverables
<p>1. To create the project charter that will allow for the authorization of the project and grant the project manager with the authority to apply organizational resources to the project in order deliver the project's objectives, in this case “ the project management plan”.</p>	<p>For objective 1 -The main deliverable will be Project charter</p>
<p>2. To develop a scope management plan in order to document how the project construction scope will be defined as per the standards established in the Project Management Book of Knowledge (PMBOK) (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>For objective 2 -The main deliverable will be:</p> <ul style="list-style-type: none"> • Work Breakdown schedule • Work breakdown Register-activity list • Requirements management plan • Scope Management Plan
<p>3. To develop a time management plan to establish the planning of the project</p>	<p>For objective 3 -The main deliverable will be:</p>

Objectives	Deliverables
<p>schedule as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<ul style="list-style-type: none"> • Project activity list • Project schedule with activity durations • Network diagram • Resource scheduling assignments • Time/schedule Management Plan
<p>4. To develop a cost management plan to determine the costs associated with the project as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>For objective 4 -The main deliverable will be:</p> <ul style="list-style-type: none"> • The project cost baseline • Cost estimating worksheet completed • Cost Management Plan
<p>5. To develop a quality management plan in order to identify quality requirements as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>For objective 5 -The main deliverable will be the Quality Management Plan</p>
<p>6. To develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of</p>	<p>For objective 6 -The main deliverable will be Human Resource schedule and Human Resource Plan</p>

Objectives	Deliverables
<p>the project team as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	
<p>7. To develop a communication management plan in order to establish the necessary communication to address stakeholder needs as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>For objective 7 -The main deliverable will be the Communications matrix and communications Plan</p>
<p>8. To develop a risk management plan in order to plan, identify and document project risks as per the standards established in the PMBOK for project initiating and planning</p>	<p>For objective 8 -The main deliverable will be the:</p> <ul style="list-style-type: none"> • Risk Breakdown Structure • Risk Register • Risk Management plan
<p>9. To develop a procurement management plan to determine buying decisions as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project initiating and planning</p>	<p>For objective 9 -The main deliverable will be the Procurement Management Plan</p>

Objectives	Deliverables
<p>10.To develop a stakeholder mangagement plan to identify and analyze all stakeholders as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (<i>PMBOK® Guide</i>) - Fifth Edition) for project iniaiting and planning</p>	<p>For objective 10 -The main deliverable will be the Stakeholder Management Plan which will derive from:</p> <ul style="list-style-type: none"> • Stakeholder register completed and the stakeholder analysis chart

RESULTS

4.1. Project Integration Management

The general objective of the final graduation proposal is to develop a Project Management Plan to facilitate the compliance with the construction requirements and functionality of BEI2 during the initiating and planning stage. The general objective is expected to be accomplished through the development of specific objectives related to knowledge areas of management starting from “Project Integration Management”. The first process is to create a “Project Charter” that would allow for the authorization of the project and grant the project manager with the authority to apply organizational resources to the project in order to deliver the project’s objectives.

According to PMBOK (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*), Pg.63) the first two processes for Project Integration in the initiating and planning phases is to develop a Project Charter and the second process is to develop a Project Management Plan. Figure 19 below illustrates and explains the two processes.

4.1 Develop Project Charter—The process of developing a document that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities.

4.2 Develop Project Management Plan—The process of defining, preparing, and coordinating all subsidiary plans and integrating them into a comprehensive project management plan. The project’s integrated baselines and subsidiary plans may be included within the project management plan.

Figure 19. Project integration management, Reprinted from Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Project Management Institute, Inc., 2013. pg. 63

4.1.1 Develop Project Charter

The project charter template utilized was obtained from University for International Cooperation (UCI, 2016) and modified to integrate the following components as per

PMBOK's ((Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) Pg. 72) description:

- Project's purpose or justification
- Measureable project's objectives
- High level requirements
- Assumptions and constraints
- High level project description
- High level risks
- Summary of milestones and schedules
- Summary budget
- Stakeholder list
- Project approval requirements
- Assigned project manager
- Name and authority of sponsor or person (s) who will approve project charter

The inputs used for the project charter were specifically the project statement of work, and organizational process assets (particularly documents that had been developed with the concept of BEI2- project charter; ENOVA business plan). BELTRAIDE believes that although a business case, enterprise environmental factors, and agreements are essential, due to the limited project management focus on this project at this stage, it isn't available. The business case for this project is in the form of a presentation done to the Board of Directors who approved the project. The presentation depicts what is BEI2, what value it will provide in the short and long term; however, it doesn't have a complete analysis of how it can be used to gauge the final product.

Expert judgement was utilized through interviews with the corresponding entities, particularly, Mr. Hilberto Riverol, Architect of Edge Partners, and Ms. Lejia Melanie Gideon, General Manager at BELTRAIDE. A brainstorming session was held as a facilitation technique with the General Manager of BELTRAIDE to develop the project

Charter. Although the inputs were not all available, the sessions held provided substantial information to develop the Project Charter for the Construction of BEI2.

CONSTRUCTION OF THE BELIZE ENTERPRISE AND INNOVATION INSTITUTE (BEI2)

Project Charter

BELTRAIDE
BELIZE CITY, BELIZ

9 SEPTEMBER, 2017

Revision Status: **Draft version 1**

Document Author: Nilda Riverol

Document Owner: Lejia Melanie Gideon

Project: **Construction of the Belize Enterprise and Innovation Institute (BEI2)**

Project Manager: Hilberto Riverol Jr., Architect and founder, Edge Partners Co. Ltd.

Document Approver(s): All approvers are required. Records of each approver must be maintained.

Approver Name	Role
Ms. Amparo Masson	CEO-and Chairman of BELTRAIDE's Board and who will

	approve final documents
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Document Reviewers: Records of each required reviewer must be maintained.

Reviewer Name	Role
Lejia Melanie Gideon	General Manager, BELTRAIDE- reviews all outputs before they are submitted to the Chairman who approves
Hilberto Riverol Jr.	Architect and will serve the role of Project Manager- for BEI2- validates information before it goes to Ms. Lejia Melanie Gideon

NOTE: All reviewers in the list are considered required unless explicitly listed as optional.

Summary of Changes:

To request a change to this document, contact the document author or owner. Changes to this document are summarized in the following table:

Revision	Date	Created By	Short Description of Changes
[0.0]	[9/14/2017]	Lejia Melanie Gideon	<i>Initial version of document</i>

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2.0 Appendix

1.0 Introduction

1.1 Project Purpose

The facility, being marked as the Belize Enterprise & Innovation Institute (BEI2), has been designed to inspire and to nurture entrepreneurship and innovation. BELTRAIDE's Small Business Development Centre, Belize (SBDCBelize) was launched in October 31st, 2012, and over the years the success and demand for its services has outgrown the current infrastructure in which it operates. The primary function of SBDCBelize is to build the competitiveness of entrepreneurs, and Micro, Small and Medium Sized Enterprises (MSMEs) by providing business advising, technical assistance and capacity building. BEI2 is expected to generate further value. Belize's economic prosperity is a key national priority, and it is imperative that entrepreneurs and business owners be successful in their business ventures. Their success will be accomplished through access to incubation services (access to physical space) accompanied by one to one business advising, business development trainings, access to the resource facility, networking and mentorship.

1.2 Project Scope and description

The project consists of the construction of a two floors building referred to as the Belize Enterprise & Innovation Institute (BEI2) and which will be 24,000 SQ FT. The building will consist of a:

1. First floor
2. Second Floor
3. Roof Deck Area

Project will not include:

- a. Sun Control and Shading Devices
- b. Decorative Building Aluminium Cladding System

- c. Security Surveillance System
- d. Ceiling Grid Systems

The specifications are further described in the Scope Management Plan.

Edge Partners Ltd. was contracted to design BEI2, being marked as the Belize Enterprise & Innovation Institute and which will be 24,000 SQ FT. Its design is to inspire and to nurture entrepreneurship and innovation. The facility's design should incorporate Green technology, suitable for sub-tropical climate, as well as taking advantage of SMART technologies. Functionally, BEI2 will provide for two (2) advising/meeting rooms (140 square feet each), two (2) training rooms (470 square feet each), space for eight (8) small business incubators (6000 square feet), and a resource Centre. BEI2 will headquarter both SBDCBelize and EXPORTBelize given their existing synergies. In addition, the construction of BEI2 will reinforce and strengthen the partnership with UB, considering the functionality and complementarity of the services that both institutions offer.

1.3 Project-High level objectives

- To build a structure that will integrate green technology and which will be constructed with the desired outcome of housing SBDCBelize, EXPORTBelize, Resource Centre, Incubators, and training facilities.
- To create a structure that is able to be adequately maintained in an environment exposed to salty-air, flooding and hurricane winds
- To build Belize's first green technology building that will serve as a hub for a bigger project referred to as "ENOVA" @UB-Entrepreneurship and Innovation at the University of Belize-

1.4 High level requirements

Requirements will mainly be the technical aspects of the product delivery. Product

requirements will focus on cost, quality and performance; while, project requirements will focus on the non -technical factors of delivering the project. Below the high level requirements of the project.

- The licenses and permits must be obtained at least 3 months prior to commencing construction
- The planning, evaluation, and reporting of the project progress should be documented and tracked using the tools specified.
- A meeting should be convened at least every month for reporting and tracking, and must be coordinated as a planned activity between the project manager and the project officer ensuring that main stakeholders are present.
- A site manager along with the contractor should always be on site during working hours, unless otherwise authorized
- The facility's design should incorporate Green technology, suitable for sub-tropical climate, as well as taking advantage of SMART technologies.
- Functionally, BEI2 should provide for a series of advising/meeting rooms at the specifications outlined,
- Functional small business incubators space
- A Resource Centre and training rooms as per specifications requested
- Must be constructed with materials that can resist the different environmental exposures such as sea-salt- considering its close to the sea.
- The building is exposed to flooding; therefore, it must be constructed with enough height as to prevent water from going into the building
- The building is exposed to flooding; therefore, it must be constructed 15 feet elevated above ground level as to prevent water from going into the building
- It must be constructed with a budget not exceeding \$USD 2.6 Million

1.5 Assumptions and constraints

1.5.1 Assumptions

Execution: (Funding)

- It is assumed that BELTRAIDE will have the funding available on time so as to not delay project construction phases

Execution (Communication):

- It is assumed that BELTRAIDE and stakeholders to collaborate with the contracted entity as necessary during the project execution

Execution (Scheduling):

- It is assumed that the time is adequate and will not exceed the projected time

Operational (Human Resources):

- It is assumed that all project stakeholders inclusive of the team for the construction are knowledgeable and reliable

Environmental:

- It is assumed that there will be no unforeseen circumstance that isn't projected such as hurricanes or heavy rainfalls that may delay project

Execution (Cost):

- It is assumed that the project will be completed in an acceptable manner within the budget of US\$2.6 million

Operational (Planning):

- It is assumed that the architect and project team will exercise and utilize all the tools necessary for successful completion of the project

1.5.2 Constraints

- Quality: Certification, plans and other necessary permits are obtained to

ensure compliance to requirements

- Cost- The BEI2 should not exceed the amount of USD \$2.6 Million
- Time: The construction of the building is to be performed within and not exceed a period of twenty-seven (27months) which is equivalent to 24 months' construction, and three months as reserve for completion of any pending items.
- Time: All the relevant project's stakeholders would need to be engaged within the time set to ensure the proper consultation is done for construction to be done on schedule, on time and quality

1.6 Project risks

- Planning-(Procurement) If suppliers don't collaborate and deliver supplies on a timely basis, it might affect the progress of the construction, impacting the timely delivery of outputs of the BEI2.
- Financial- If the sponsor doesn't approve project's financing on time, it might affect the progress of the construction, impacting the timely delivery of outputs of the BEI2 financing, procurement, change requests.
- Schedule- If sponsor don't approve project deliverable on time, it might affect the progress of the construction, impacting the timely delivery of outputs of the BEI2.
- Schedule and cost- If there are natural disasters or any other similar circumstance that wasn't projected, the delivery of outputs may be affected, impacting schedule and cost at the same time
- Planning- If permits or compliance with regulations are not as per requirements, it may affect the construction, impacting the quality of the building.

1.7 Summary of Milestones and schedule

List of activities and dates are listed below:

No.	TASK/MILESTONE	COMPLETION DATE
1	Initiation of Project	October 2nd 2017
2	Architect and Client Site Visit for Assessment	October 5th 2017
3	Site Testing by Engineering Company Commence	October 6th 2017
4	Initiation of Conceptual Design	October 10th 2017
5	Request for Environmental Impact Assessment	October 12th 2017
6	Client Final Design Signoff	October 27th 2017
7	Site Testing Results Completed	October 30th 2017
8	Approval of Project Charter by Board of Directors	November 8th 2017
9	Approval for Environmental Impact Assessment	November 10th 2017
10	Completion of Working Drawings Submittal to CBA for Permitting	December 15th 2017
11	Permits of No Objection to construction by CBA	December 29th 2017
12	Contractor Tendering Commence	January 3rd 2018
13	Contractor Tendering Complete	January 12th 2018
14	Awarding of Contracts	January 15th 2018
15	Procurement and Sourcing of Materials Commence	January 19th 2018
16	Commencement of Construction	January 29th 2018
17	Mobilization of Works Commence	January 30th 2018
18	Mobilization of Works Complete	February 2nd 2018
19	Site Set out and Piling Commence	February 12th 2018
20	First Floor Plumbing and Electrical Rough-In Commence	February 16th 2018
21	Piling Complete	March 30th 2018
22	First Floor Beam and Stub Column	April 27th 2018
23	First Floor Retention Wall	April 30th 2018
24	First Floor Slab, Beam and Column	June 28th 2018
25	First Floor CMU Walls Commence	July 15th 2018
26	First Floor Steps and Ramps Commence	July 20th 2018
27	First Floor Grey Works Complete	August 30th 2018
28	First Floor Tile Finish Commence	September 2nd 2018
29	First Floor Drywall Work Commence	September 15th 2018
30	First Floor Tile Work Complete	September 30th 2018
31	First Floor Drywall Complete	October 15th 2018
32	Second Floor Beams and Columns Commence	October 18th 2018
33	Exterior Works Commence	October 19th 2018
34	Second Floor Slab Commence	October 30th 2018
35	Second Floor Plumbing and Electrical Rough-In Commence	November 10th 2018
36	Second Floor Columns Commence	November 30th 2018
37	Second Floor Steps Commence	December 4th 2018

No.	TASK/MILESTONE	COMPLETION DATE
38	Second Floor CMU Walls Commence	December 30th 2018
39	Second Floor Gray Works Complete	January 10th 2019
40	Second Floor Tile Finish Commence	January 15th 2019
41	Second Floor Drywall Commence	January 30th 2019
42	Second Floor Tile Works Complete	February 30th 2019
43	Second Floor Drywall Work Complete	March 1st 2019
44	Roof Beams Commence	March 5th 2019
45	Roof Slab Commence	March 30th 2019
46	Roof Grey Works Complete	April 15th 2019
47	First Floor Drywall complete	April 20th 2019
48	Ground Floor Window / Door Installation	April 25th 2019
49	Second Floor Window / Door Installation	April 30th 2019
50	Electrical and Plumbing Finishes Installation	May 15th 2019
51	Main HVAC Installation	May 15th 2019
52	Interior Wall Finishes Commence	June 30th 2019
53	Exterior Wall Finishes Commence	June 30th 2019
54	Electrical and Plumbing Complete	July 30th 2019
55	Exterior Works Complete	September 30th 2019
56	Systems Test	October 15th 2019
57	Occupancy Certificate Issued	November 15th 2019

1.8 Summary budget

The High level Budget is outlined below:

NO.	ITEM	PROJECT COST (USD)
1	Development fees	215,000.00
2	Field Engineering	2,500.00
3	Excavation	18,800.00
4	Trenching	6,000.00
5	Formwork	4,000.00
6	Concrete	396,500.00
7	Steel	390,000.00
8	Masonry	195,000.00
9	Architectural Steel	26,500.00
10	Cabinetry	14,000.00
11	Roofing	117,000.00
12	Hardware	60,500.00
13	Fenestration	186,500.00

NO.	ITEM	PROJECT COST (USD)
14	Wall Finishes	304,500.00
15	Floors	82,500.00
16	Plumbing	64,000.00
17	Electrical	156,700.00
	Sub Total	2,240,000.00
19	GST Tax 12.5%	280,000.00
20	Management Reserve (3%)	28,000.00
	Cost baseline without reserves	2,587,000.00

1.9 Project Stakeholders

- Ministry of Economic Development, Petroleum, Investment, Trade and Commerce- Sponsor
- CEO of Ministry and Chairman-BELTRAIDE
- BELTRAIDE- Sponsor
- General Manager
- Finance Officer
- Sr. Projects Officer
- SBDCBelize
- Export Belize

Edge Partners Co. Ltd. – design and project management

- Architect
- Structural Engineer
- Mechanical Engineer
- Electrical Engineer
- Drafting technicians

Contracting company- Supervises work

- Contractor
- Foreman

- Site supervisor

Sub-Contractors- execute certain functions of construction

- Grey works contractor
- Electrical
- Plumbing
- Tiling
- Hvac –Heating and cooling AC
- Ceiling and walls
- Paint
- Furniture

Companies- Suppliers of materials and services needed for construction

- Maheia's Construction- Grey Work's
- Benny's HomeCenter- Electrical and plumbing
- York International- ACs
- Aluco Bon- Green supplies
- Aluver- Windows and claddings
- Bonazo- floor finishing's
- Carpenter- local

Construction and environmental agencies- approve licenses and permits for construction requirements

- Department of the Environment
- Central Building Authority-CBA
- Belize Electricity Limited- BEL
- Belize Telemedia Limited-BTL
- Local Building Authority- Belize City Council
- Belize Water Services Limited -BWSL

Consultants- stakeholders that will assist in expert related or specific areas of project

- LEED architect
- Structural Engineer
- University of Belize-Maintenance and Ground keeping Department
- Community - Residents
- Land Surveyor

2.0 Appendix

2.1 Preliminary List of Risks

<i>Risk Category</i>	<i>Risk</i>
<i>Operational- Planning</i>	<ul style="list-style-type: none"> • <i>Procurement delays,</i> • <i>Delays in output approvals by sponsors to advance in activity executions</i> • <i>Delays in approvals of permits/regulations</i>
<i>Environmental</i>	<ul style="list-style-type: none"> • <i>Environmental concerns (heavy rainfall, hurricanes, flooding)</i> • <i>Poor communication strategy between stakeholders</i>
<i>Execution</i>	<ul style="list-style-type: none"> • <i>Project delays due to external or internal factors (supplies delays, approvals of permits, financing, etc),</i> • <i>Scope changes,</i> • <i>Cost changes,</i> • <i>Recruitment and retention of skilled labor,</i> • <i>Employee safety</i>
<i>Market</i>	<i>Inaccurate projections</i>

Figure 20. BEI2 Project Charter, Reproduced from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition, Project Management Institute, Inc., 2013

4.1.2 Develop Project Management Plan

The second process of Project Integration management is to develop the Project Management Plan. This plan will utilize the Project Charter as the main input, as well as inputs from other processes and ensure to integrate all the subsidiary plans:

1. Scope Management Plan,
2. Time Management Plan,
3. Cost Management Plan,
4. Quality Management Plan,
5. Risk Management Plan,
6. Human Resources Management Plan,
7. Communications Management Plan,
8. Quality Management Plan; and,
9. Stakeholder Management Plan

4.2. Project Scope Management

According to PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) the Project Scope management includes the processes that encompasses the work required for the project to be completed in a successful manner.

Below the processes that will be integrated into this section.

- 5.1 Plan Scope Management**—The process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled.
- 5.2 Collect Requirements**—The process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives.
- 5.3 Define Scope**—The process of developing a detailed description of the project and product.
- 5.4 Create WBS**—The process of subdividing project deliverables and project work into smaller, more manageable components.

Figure 21. Project scope management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013. pg. 105

4.2.1 Plan Scope Management

The first step in developing the Planning of Scope Management for the Construction of BEI2 is to define the **Scope Management and Requirements Management Plans**. These two components of the Project Management Plan of the Construction of BEI2 will contribute to the phase to phase management of scope. The Project's Scope Management Plan will provide the documentation that will portray how the project will be defined, validated, and controlled. A modified version of A Scope Management Plan was adapted from an online source (retrieved from "www.tn.gov"). The Scope Management Plan provides the scope framework for the construction of BEI2. This plan documents the scope management approach; roles and responsibilities as they pertain to project scope; scope definition; verification and control measures; scope change control; and the project's work breakdown structure. Any project communication which pertains to the project's scope should adhere to the Scope Management Plan (retrieved from www.projectmanagementdocs.com, September, 2017).

Following the data flow diagram of PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) to develop the scope management plan, the main input that was used was the project charter. Furthermore, the tools that were utilized was expert judgement through meetings with the lead Architect of the BEI2 design who gave insights into the scope of the construction itself. The Scope Management plan, being a subsidiary document within the project management plan incorporates the Scope management approach, Roles and responsibilities, Scope definition, Project scope statement, Work breakdown structure, Scope verification, Scope Control, Scope change, and Acceptance.

SCOPE MANAGEMENT PLAN

BELTRAIDE
Construction of BEI2

9/18/2017

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- 7.0 Scope Verification
- 8.0 Scope Control
- 9.0 Scope Change
- 10.0 Acceptance

1.0 Introduction

The Scope Management Plan integrates all the processes used to ensure that the project includes all the relevant tasks required to complete the construction of the BEI2 project and at the same time it will ensure to identify the work that should be excluded because it is out of scope. Within the Scope Management Plan the project scope for the construction of BEI2 is defined, developed, and verified. The plan illustrates who is responsible for managing, and controlling the scope.

The development of the Scope Management Plan for the construction of BEI2 entails:

- 1) **Collecting Requirements** – Requirements needed to meet the construction of the BEI2 were documented. The inputs used for this is the BEI2 project charter and stakeholder register. This further assisted in the scope definition.
- 2) **Defining Scope**– The project’s objective is for Edge Partners Co. Ltd. to design and assist BELTRAIDE to oversee the construction of BEI2, being marked as the Belize Enterprise & Innovation Institute and which will be 24,000 SQ FT. Its design is to inspire and to nurture entrepreneurship and innovation. The facility’s design should incorporate Green technology, suitable for sub-tropical climate, as well as taking advantage of SMART technologies.
- 3) **Creating the Work Breakdown Structure (WBS)**– The deliverables for the construction of BEI2 were defined into smaller and more manageable components. Within this plan, the outline structure was used.

The Scope Management Plan incorporates the scope management approach, roles and responsibilities in relations to the project scope, the scope definition, verification and control measures, scope change control, and the project’s work breakdown structure. Any project communication which pertains to the project’s scope should adhere to the Scope Management Plan.

2.0 Scope Management Approach

For Construction of BEI2, scope management will be the responsibility of the Project Manager, who will report directly to the General Manager of BELTRAIDE. The scope

statement, Work Breakdown Structure, and WBS Dictionary will outline the scope for this project. The Project Manager- Edge Partners Co. Ltd., and Sponsor- BELTRAIDE and Ministry of Economic Development, Petroleum, Investment, Trade and Commerce-Belize, and the University of Belize will establish and approve documentation for measuring project scope, including quality checklists and performance measurements. Any scope changes may be initiated by the project manager or sponsor, but can only be executed upon approval by the Sponsor.

In construction, **change orders** are proposed indicating impact to quality, schedule and/or cost. For the Construction of BEI2, change orders will be assessed and submitted for approval by the project manager. The project sponsor- BELTRAIDE will submit the scope change request to the Change Control Board- comprised of the Ministry of Economic Development, Petroleum, Investment, Trade and Commerce CEO-and Chairman of BELTRAIDE, BELTRAIDE Project Officer, BELTRAIDE Finance Officer and UB. Upon approval of changes by the Board, BELTRIAD E and the Project Manager will update all project documents and communicate the scope change to all stakeholders-contractors, and the entire project team.

The project manager can make minor decisions on changes that may not impact the project's quality, cost, or schedule; however, the project sponsor accepts the final project deliverables, and only they can approve/disapprove major change order requests.

3.0 Roles and Responsibilities

The Project Manager, Sponsor and project team will be fully involved in managing the scope of BEI2's construction. The responsibilities of BELTRAIDE, Edge Partners Co. Ltd., and team members' is described in the below table. These responsibilities and roles will be exercised throughout the project's life, and will guide the scope management of this project.

Chart: Roles and Responsibilities (Source: Riverol, Nilda)

Stakeholder	Role	Description
BELTRAIDE	Project Sponsor	<ul style="list-style-type: none"> Provides financing for the project. Manages the project's budget

Stakeholder	Role	Description
		<ul style="list-style-type: none"> • Accepts project deliverables, then submit for final approval to respective Ministry • Evaluates scope change requests that impact cost, quality or schedule, then submit for final approval to the respective Ministry
Ministry of Economic Development, Petroleum, Investment, Trade and Commerce	Project Sponsor	<ul style="list-style-type: none"> • Accepts final project deliverables. • Accepts and approves major scope change requests
Edge Partners Co. Ltd.	Project Manager/Consultant	<ul style="list-style-type: none"> • Provides overall support to BELTRAIDE on the management of the project. • Responsible to manage the work plan as defined by the project's scope. • Ensures that procurement of resources is done following procurement guidelines. • Identifies and evaluates sub-contractors, delegating the work and insuring successful completion of project deliverables • All project team members report to the project manager, who reports to BELTRAIDE • Evaluates scope change requests and assesses impact to cost, quality, and/or schedule. • Submits change order requests to Sponsor for acceptance • Manages stakeholder relations, ensuring that communication is consistent where relevant. • Ensures that all licenses, permits, approvals for construction is done.
Luis Chaves	Team Member-Finance Officer	<ul style="list-style-type: none"> • Submits quarterly reports on budget disbursements and balances • Oversees and ensures that project is within budget
Debbie Alfaro	Team Member-Projects officer	<ul style="list-style-type: none"> • Responsible for the project's administrative duties-technical and non-technical • Assists in ensuring procurement guidelines is being followed

Stakeholder	Role	Description
		<ul style="list-style-type: none"> Ensures that contracts and TOR's for consultants', contractor's , sub-contractors or any other employee is drafted on time and within guidelines specified
University of Belize	Stakeholder	<ul style="list-style-type: none"> Communicates any project requirements considering the building will be in their land

4.0 Scope Definition

The scope for the Construction of BEI2 was developed by utilizing the requirements documentation. The assessment on the specifications of the project was done, this information was gathered from stakeholders, especially as it relates to the functionality of the building and what they consider feasible. A consultant was hired to develop a business plan of the concept. The University of Belize, as well as other stakeholders in the educational system, and a few Government Agencies provided feedback. Using this information, the project team comprising of projects officer, and lead architect of Edge Partners developed the project requirements documentation, the requirements management plan, and the requirements traceability matrix that the project must accomplish.

The project description for the “Construction of BEI2” and the respective accepted deliverables was developed based on the process outlined above – requirements development. Other inputs that played a key role was existing documentation that was developed prior. The tools and techniques consisted of primarily inputs and feedback from experts – Contractors, Lead Architect, the Sponsor. The members of the project team- finance officer and the projects officer also were involved in the one to one interviews for feedback in key areas of the project's requirements in different areas of the project. The scope definition leads to the project's scope statement being defined.

5.0 Project Scope Statement

The Construction of BEI2 scope statement provides a detailed description of the project, deliverables, constraints, exclusions, assumptions, and acceptance criteria.

5.1 Product Scope Description (In Scope), Project exclusions, project deliverables, and acceptance Criteria

The project consists of the construction of a two floors building referred to as the Belize Enterprise & Innovation Institute (BEI2) and which will be 24,000 SQ FT. The facility's design should incorporate Green technology, suitable for sub-tropical climate, as well as taking advantage of SMART technologies. During the construction the following deliverables are to completed within the scope:

Functionally, BEI2 will provide for two (2) advising/meeting rooms (140 square feet each), two (2) training rooms (470 square feet each), space for eight (8) small business incubators (6000 square feet), and a resource Centre. BEI2 will headquarter both SBDCBelize and EXPORTBelize.

5.1.1 Project Deliverables

The project includes the building of a two-storey contemporary design office building housing the following floors and storey details, (fabrication specifications and items excluded)

1. Floors & Storey Details

- a. **First Floor** – to be used primarily for incubators and general office areas including a lobby and shall be in L shaped layout (see figure 1), with eastern horizontal section of plan being 146' x 41' and western vertical section in plan being 46' x 71', covered extensions along perimeter of plan areas for sidewalks and rest areas, finish floor from ground level 4.00' (four feet). First floor finish level to Second level shall be 15.00' (fifteen feet). See layout for floor plan layout. This floor primary use will be for 3 types of incubators, BPO Incubators, Food Preparation, ICT and Music Incubators. Structural foundation system will be of pre-cast concrete piles with pile caps as per engineer's drawings. All structural elements will be cast in place of reinforced 4500 PSI concrete as per engineer's drawings.



Figure 1: First Floor Architectural Layout

- b. **Second Floor** – to be used primarily for SBDCBelize (Small Business Development Centre Belize) and Export Belize Offices will also include a research centre and training rooms and shall have a cross and L shape combined layout taking advantage of covered areas on first floor and have total area of 12,500 SF. The structural layout will be set out to maximize wide open work areas and finish floor to roof ceiling will have a height of 15.00'. This floor will have a maximum capacity of 250 people, all distributed in different areas that include the research centre, training rooms and the office areas. All structural elements will be cast in place of reinforced 4500 PSI concrete as per engineer's drawings.



Figure 2: Second Floor Architectural Layout

- c. **Roof Deck Area** – Shall be used for 2 different functions, social meeting areas in lower deck areas with a finish floor level of 33.00' (thirty-three feet) and to house HVAC systems on higher deck areas with a finish floor level of 40.00' (forty feet). The occupancy capacity of social meeting areas is of approximately 500 (five hundred) persons. There is no ceiling height. The primary roof deck will consist of a solid concrete cast in place as per structural engineer's drawings. The HVAC finish floor will have a foam insulation and will receive a 200 (two hundred) ton York Chill Water Cooling System.

2. Fabrication Specifications

- a. Building shall have a total area of 28,500 SQ FT of both liveable and exterior spaces.
- b. Building shall have the following floors: first floor, second floor and roof deck.
- c. Structure will comprise of cast in place concrete columns, beams and floor areas as per structural engineer's design drawings.
- d. All concrete beams and columns must be of tested 4500 PSI concrete and adhere to structural steel design as per engineer's design.

- e. Cast in place concrete floors will be of 4500 PSI concrete and will be of 6” thickness, rebar layout will be adhered to as per structural engineer’s design drawings.
- f. Fabricator to provide tile finish for all floors and must meet PEI 4 regulations. (ITTA Gris Ceramica)
- g. Fabricator to provide to 4” thick roof insulation and membrane bitumen sealer. (Texas Refinery Corporation)
- h. Fabricator to provide high impact Miami Dade standard aluminium frame windows and doors. Fabricator to provide shipping from Miami to Belize. (Assura Doors & Windows Co. LTD.)
- i. Fabricator to provide York Chiller System and BMS (Building Management System). Also, to provide shipping from Miami to Belize. (Johnston Controls and Systems)
- j. All Structural Steel shall meet ASTM (American Society for testing and materials) Standards and must be treated with a proper rust protectant and paint.
- k. Fabricator to have all structural designs prepared and signed off by a registered structural engineer in Belize and approved by CBA (Central Building Authority) of Belize.
- l. All cost shall be included in quotation; including construction insurances and GST (General Sales Tax)
- m. Balconies and stairs are included; stainless steel handrails by others.
- n. Handicap ramps and accessories included.
- o. Gutters and downspouts to be included, embedded in walls at areas designed by plumbing.
- p. Concrete must be tested before any major casting by suitable method and by registered Engineering Firm.
- q. Time Line for project shall also be provided
- r. Covered chiller and water umps area on roof deck to be included.
- s. Shipping Insurances shall also be provided by fabricators and supplier

5.1.2 Project Exclusions (Out of Scope)

Below the description of work that is not included in the project and outside of the scope

- e. Sun Control and Shading Devices
- f. Decorative Building Aluminium Cladding System
- g. Security Surveillance System
- h. Ceiling Grid Systems

5.1.3 Product Completion/Acceptance Criteria

The acceptance criteria are in accordance to the project and product requirements, and integrates the following:

- The licenses and permits must be obtained at least 3 months prior to commencing construction
- The planning, evaluation, and reporting of the project progress should be documented and tracked using the tools specified.
- A meeting should be convened at least every month for reporting and tracking, and must be coordinated as a planned activity between the project manager and the project officer ensuring that main stakeholders are present.
- The facility's design should incorporate Green technology, suitable for sub-tropical climate, as well as taking advantage of SMART technologies.
- Functionally, BEI2 should provide for a series of advising/meeting rooms at the specifications outlined,
- Should incorporate spaces for functional small business incubators,
- A Resource Centre and training rooms as per specifications requested
- BEI2 will headquarter both SBDCBelize and EXPORTBelize given their existing synergies
- Must be constructed with materials that can resist the different environmental exposures such as sea-salt- considering its close to the sea.
- The building is exposed to flooding; therefore, it must be constructed 15 feet elevated above ground level as to prevent water from going into the building
- The structure must be able to withstand strong winds- or at least a category 4 hurricane

5.2 Risk Assessment

Below is a set of risks and how the respective strategy to mitigate its impact. The Risk Management Plan will do the through assessment of the risks.

- Planning-(Procurement) If suppliers don't collaborate and deliver supplies on a timely basis, it might affect the progress of the construction, impacting the timely delivery of outputs of the BEI2E.
- Financial- If the sponsor doesn't approve project's financing on time, it might affect the progress of the construction, impacting the timely delivery of outputs of the BEI2 financing, procurement, change requests.
- Schedule- If sponsor don't approve project deliverable on time, it might affect the progress of the construction, impacting the timely delivery of outputs of the BEI2.
- Schedule and cost- If there are natural disasters or any other similar circumstance that wasn't projected, the delivery of outputs may be affected, impacting schedule and cost at the same time
- Planning- If permits or compliance with regulations are not as per requirements, it may affect the construction, impacting the quality of the building.

5.3 Project Constraints

Project constraints were identified in the areas of cost, quality, and scheduling.

- Quality: Certification, plans and other necessary permits are obtained to ensure compliance to requirements
- Cost- The BEI2 should not exceed the amount of BZD \$4.5 Million
- Time: The construction of the building is to be performed within and not exceed a period of twenty-seven (27months) which is equivalent to 24 months' construction, and three months as reserve for completion of any pending items.
- Time: All the relevant project's stakeholders would need to be engaged within the time set to ensure the proper consultation is done for construction to be

done on schedule, on time and quality

5.4 Dependency Linkages

The construction of BEI2 isn't dependent of another project's deliverables. Within the project, there are certain activities; however, that depend on each other like any project that has different phases.

5.5 Measures of Project Success

The metrics that are used as measures of project success are mainly reports that support the completion of the project in areas of cost (This will measure planned value vs. Earned value, and will look at actual cost as a result), Schedule (schedule variance) and quality. The quality, cost, performance and schedule metrics will be further guided by the Requirements documentation which will assist in ensuring that the stakeholders' expectations are met.

5.6 Project Assumptions

For the Construction of BEI2 It is assumed that BELTRAIDE will have the funding available on time so as to not delay project construction phase and that all stakeholders will collaborate with the contracted entity as necessary during the project execution. In addition, it is assumed that the time is adequate and will be completed within schedule. As it relates to cost, it shouldn't exceed \$ 2.25M US. It is also assumed that communication will exist in a positive and consistent manner between relevant stakeholders and that no unforeseen circumstance such as natural disasters delaying the project. Due to the expertise required, it is assumed that human resources in the expert areas will be available for hiring.

Other assumptions are listed below:

Weather:

- It is assumed since location of building is the tropics, rain is a risk factor, therefore the building has to be weather proof.
- It is assumed that there will be hurricanes, therefore building has to be reinforced to withstand up to a category 5 hurricane

- It is assumed that there will be hurricanes, therefore an adequate shutter system must be in place to withstand category 5 hurricane winds and must deflect projectiles at 185 mph (miles per hour)
- It is assumed that there will be high temperatures, therefore proper wall and ceiling insulation will be used.
- It is assumed that there will be moisture in the building, therefore an adequate well-designed HVAC (Heating, Ventilation, Air Conditioning) will be used.

Cost

- It is assumed that the client is funded sufficiently
- It is assumed since it is a Beltraide project there will be duty exemptions which will impact cost positively.

Workforce

- It is assumed that all work specialties will be carried out by licensed contractors
- It is assumed that all workers have a valid Belize Social Security Card
- It is assumed that there are sufficient qualified workers to carry out building task.

Planning

- It is assumed that building regulators will approve all building components as indicated on the drawings and schedule

6.0 Work Breakdown Structure

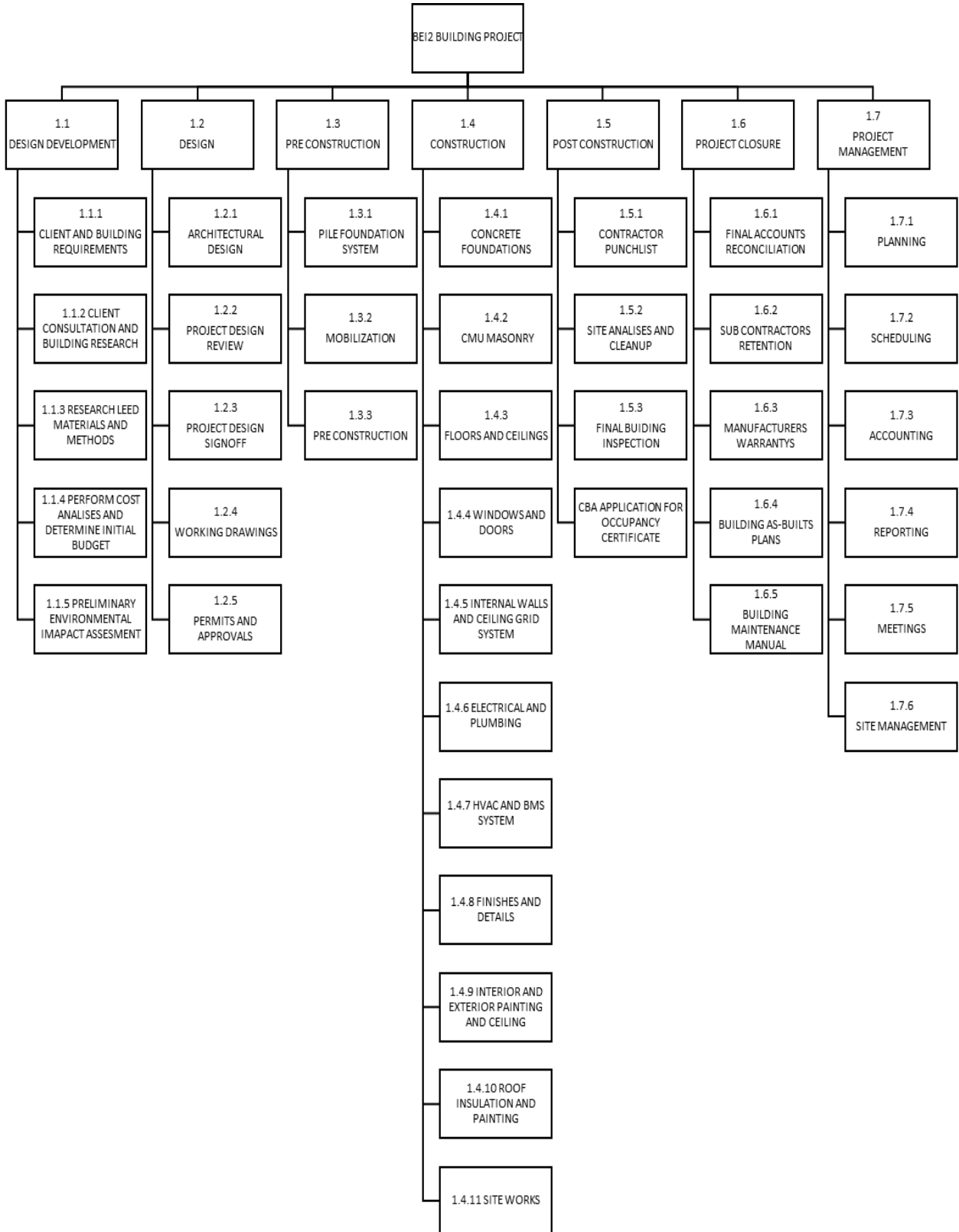
The work required to complete Construction of BEI2 will be subdivided into individual work packages not to exceed 40 hours of work a week (8 hours per day for 6 days, Monday to Friday). This will allow the Project Manager to more effectively manage the project's scope.

The project is broken down into seven (7) phases as per the project's work breakdown structure (WBS):

1. The design/concept development phase,
2. The design phase
3. The pre-construction phase
4. The construction phase
5. Post construction

6. Project Closure

7. Project Management



Construction of BEI2-Work Breakdown Structure

6.1 Work Breakdown dictionary for BEI2

Chart BEI2 Work Breakdown Dictionary

LEVEL	WBS CODE	ELEMENT NAME	DESCRIPTION OF WORK	DELIVERABLES	BUDGET (USD)	RESOURCES
1	1.1	DESIGN DEVELOPMENT	INITIATION OF ARCHITECTURAL CONCEPTUALIZATION		62,500.00	
2	1.1.1	CLIENT AND BUILDING REQUIREMENTS	MEETINGS SCHEDULED TO ASCERTAIN CLIENT AND REGULATORY NEEDS FOR THE BUILDING PROJECT	INITIAL REQUIREMENTS AND DOCUMENTATION FOR BUILDING PROJECT	15,000.00	COMPUTER, INTERNET, LITERATURE OF ARCHITECTURAL PROJECTS
2	1.1.2	CLIENT CONSULTATION AND BUILDING RESEARCH	MEETING WITH ARCHITECT, CONTRACTORS AND CONSULTANTS TO DESCRIBE AND UNDERSTAND THE SCOPE OF ARCHITECTURAL WORKS AND CONSTRUCTION	CLIENT DIRECTIVE	5,000.00	COMPUTER, INTERNET, LITERATURE OF ARCHITECTURAL PROJECTS
2	1.1.3	RESEARCH LEED MATERIALS AND METHODS	RESEARCH LEED CERTIFICATION, REQUIREMENTS, METHODOLOGIES AND ARCHITECTURAL STANDARDS THAT CAN BE USED FOR THE BUILDING PROJECT	PROJECT DOCUMENTATION	10,000.00	COMPUTER, INTERNET, LITERATURE OF LEED STANDARDS
2	1.1.4	PERFORM COST ANALYSES AND DETERMINE INITIAL BUDGET	CALCULATING THE TYPE OF FINANCIAL COMMITMENT NEEDED BASED ON THE REQUIREMENTS FROM THE CLIENT TO COMPLETE THE CONSTRUCTION OF THE BUILDING PROJECT	COST EVALUATION	10,000.00	PROJECT SCOPE
2	1.1.5	PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT	MINISTRY OF THE ENVIRONMENT TO ASSIGN AN ENVIRONMENTAL ENGINEER TO PERFORM ENVIRONMENTAL IMPACT	ENVIRONMENTAL IMPACT ASSESSMENT STUDY	22,500.00	PROPOSED SITE PLAN LOCATION FOR BUILDING PROJECT

LEVEL	WBS CODE	ELEMENT NAME	DESCRIPTION OF WORK	DELIVERABLES	BUDGET (USD)	RESOURCES
			ASSESSMENT OF PROJECT			
1	1.2	DESIGN	COLLABORATIVE EFFORT OF CONSULTATIONS			
2	1.2.1	ARCHITECTURAL DESIGN	VISUAL REPRESENTATION OF PROJECT	ARCHITECTURAL CONCEPTUAL IDEAS	2,500.00	3D VISUAL SOFTWARE (REVIT ARCHITECTURE)
2	1.2.2	PROJECT DESIGN REVIEW	PRELIMINARY ARCHITECTURAL DESIGN, SUB CONSULTANT DESIGNS TO INCLUDE STRUCTURAL ENGINEER, MECHANICAL, ELECTRICAL AND PLUMBING ENGINEER (MEP) LAND AND QUANTITY SURVEYOR	ARCHITECTURAL AND ENGINEERING DRAWINGS	5,000.00	REVIT ARCHITECTURE, TEKLA STRUCTURES AND CYPE ARQUIMIDES
2	1.2.3	PROJECT DESIGN SIGNOFF	ARCHITECTURAL DESIGN SIGNOFF BY CLIENT AND DIRECTORS (CLIENT)	DOCUMENTED ARCHITECTURAL PLANS SIGNED AND SEALED BY ARCHITECT AND OWNER	30,000.00	
2	1.2.4	WORKING DRAWINGS	COMPLETE SET OF ARCHITECTURAL AND ENGINEERING DRAWINGS BY ARCHITECTS AND ENGINEERS	FULL SET OF CONSTRUCTION DOCUMENTS	22,500.00	
2	1.2.4	PERMITS AND APPROVALS	APPLICATION FOR APPROVAL FOR PERMITS; APPROVED SET OF CONSTRUCTION DOCUMENTS APPROVAL FROM CENTRAL BUILDING AUTHORITY (CBA) PUBLIC UTILITIES COMMISSION ELECTRICAL PERMIT APPROVAL (PUC)	PERMITS TO PROCEED TO CONSTRUCTION AND TEMPORARY ELECTRICAL CONNECTION	12,500.00	ARCHITECTURAL, ENGINEERING AND MEP DRAWINGS REQUIRED

LEVEL	WBS CODE	ELEMENT NAME	DESCRIPTION OF WORK	DELIVERABLES	BUDGET (USD)	RESOURCES
1	1.3	PRE-CONSTRUCTION	CONTRACT PHASE WHERE DESIGN, DEVELOPMENT , CONSULTANT IDENTIFICATION AND AGREEMENTS WITH NECESSARY STAKEHOLDERS ARE ESTABLISHED		125,000.00	
2	1.3.1	PILE FOUNDATION SYSTEMS	MAHEIA'S UNITED IS IDENTIFIED AND CONTRACTED TO PRODUCE PRECAST CONCRETE PILES	REINFORCED CONCRETE PILES	75,000.00	PILE STRUCTURAL SPECIFICATIONS
2	1.3.2	MOBILIZATION	PROCESS OF PREPARING PROJECT SITE FOR WORKS TO COMMENCE	SITE PREPARATION INCLUDES: SITE SURVEY, SITE FENCING, SITE OFFICE, SITE TOILETS, TEMPORARY ELECTRICITY, TEMPORARY WATER, SAFETY SIGNS, WORKER SHEDS	35,000.00	CRANE, GRADER, CEMENT MIXER, ROUGH LUMBER, BASIC TOOLS
2	1.3.3	PRE-CONSTRUCTION	SETTING OUT FOR FOUNDATION SYSTEM, PILING WITH HYDRAULIC CRANE, CAPPING OF PILES, BACKFILL		15,000.00	CRANE, HYDRAULIC PILE BOOM
1	1.4	CONSTRUCTION	PROJECT EXECUTION COMMENCES		1,762,000.00	
2	1.4.1	CONCRETE FOUNDATIONS	INSTALLATION OF PILE FOUNDATION SYSTEM AS PER STRUCTURAL ENGINEER'S DESIGN	PILES, PILE CAPS, GROUND BEAMS	90,000.00	SURVEYOR, ENGINEER, SKILLED MASONS, MASON HELPERS, CONCRETE TRUCKS AND METAL FORMWORKS
2	1.4.2	CMU MASONRY	INSTALLATION OF CMU BLOCK UNITS, INSTALLATION IN PLACE CONCRETE BEAMS AND COLUMNS, LINTELS AND CONCRETE STAIRS WITH APPROPRIATE	PRIMARY STRUCTURE OF BUILDING	132,300.00	SKILLED MASON, MASON HELPERS, CONCRETE TRUCKS AND METAL FORMWORKS

LEVEL	WBS CODE	ELEMENT NAME	DESCRIPTION OF WORK	DELIVERABLES	BUDGET (USD)	RESOURCES
			CONCRETE AND SAND MIX			
2	1.4.3	FLOORS AND CEILINGS	INSTALLATION OF CAST IN PLACE REINFORCED CONCRETE FLOOR SYSTEM	USED FOR ALL FLOORS, SIDEWALKS AND ROOF	78,000.00	SKILLED MASON, MASON HELPERS, CONCRETE TRUCKS AND METAL FORMWORKS
2	1.4.4	WINDOWS AND DOORS	ASSURA WINDOWS AND DOORS SYSTEMS	USED FOR WINDOW AND DOOR OPENINGS	186,500.00	SUPPLIER QUOTES AND SUBCONTRACTOR S INSTALLATION QUOTE
2	1.4.5	INTERNAL WALL AND CEILING GRID SYSTEMS	DRYWALL AND METAL STUD SYSTEM	USED FOR ALL INTERIOR WALLS	375,000.00	SUPPLIER QUOTES AND SUBCONTRACTOR S INSTALLATION QUOTE
2	1.4.6	ELECTRICAL AND PLUMBING	ELECTRICAL POWER SUPPLY TO BUILDING (INCLUDING ALL FIXTURES)	ELECTRICITY	220,700.00	SUPPLIER QUOTES AND SUBCONTRACTOR S INSTALLATION QUOTE
2	1.4.7	HVAC AND BMS SYSTEM	YORK CHILL WATER SYSTEM WITH BMS CONTROLLER	AIR CONDITION SYSTEM AND SYSTEMS CONTROL	150,500.00	SUPPLIER QUOTES AND SUBCONTRACTOR S INSTALLATION QUOTE
2	1.4.8	FINISHES AND DETAILS	ITTA GRIS TILE SYSTEMS	FINISH FLOOR SYSTEMS, MUST HAVE PEI (PORCELAIN ENAMEL INSTITUTE) 4 STATUS	82,500.00	SUPPLIER QUOTES AND SUBCONTRACTOR S INSTALLATION QUOTE
2	1.4.9	INTERIOR AND EXTERIOR PAINTING AND CEILING	CORONADO SUPREME FINISH PAINT	FINAL PAINT COAT AFTER ADEQUATE PRIMER HAS BEEN APPLIED TO WALL AND CEILING FINISHES	304,500.00	SUPPLIER QUOTES AND SUBCONTRACTOR S INSTALLATION QUOTE
2	1.4.10	ROOF INSULATION AND PAINTING	TECAS REFINARY ROOF INSULATION SYSTEMS	USED TO INSULATE ROOF TO REDUCE HEAT GAIN IN BUILDING	117,000.00	SUPPLIER QUOTES AND SUBCONTRACTOR S INSTALLATION QUOTE

LEVEL	WBS CODE	ELEMENT NAME	DESCRIPTION OF WORK	DELIVERABLES	BUDGET (USD)	RESOURCES
	1.4.1 1	SITE WORKS	WORKS PERTAINING TO EXTERIOR ELEMENTS OF THE PROJECT SUCH AS PLANTER BOXES, PARKING LIGHT, PRERIMETER PARKING AND GENERAL LANDSCAPING		25,000.00	
1	1.5	POST CONSTRUCTION	PHASE THAT OCCURS AFTER SUBSTANTIAL COMPLETION		16,000.00	
2	1.5.1	CONTRACTOR PUNCHLIST	FINAL PUNCH LIST BY CONTRACTER AND OWNER (BUDGETED AS CONTINGENCY)	TO RECTIFY AND COMPLETE DEFECTED WORKS	3,000.00	PROJECT MANAGER AND ARCHITECT
2	1.5.2	SITE ANALISES AND CLEANUP	CLEANING UP OF SITE	CLEANED SITE	7,000.00	
2	1.5.3	FINAL BUILDING INSPECTION	FINAL BUILDING INSPECTION DONE BY FIRE DEPARTMENT, PROJECT MANAGER AND ARCHITECT	QUALITY CONTROL CHECKLIST, REQUIRED DOCUMENTATION	2,000.00	
2	1.5.4	CBA APPLICATION FOR OCCUPANCY CERTIFICATE	APPLICATION TO OCCUPY BUILDING FROM CENTRAL BUILDING AUTHORITY (CBA)	OCCUPANCY CERTIFICATE	1,000.00	CBA APPROVED BUILDING INSPECTOR
1	1.6	PROJECT CLOSURE	PHASE THAT SIGNIFIES COMPLETION OF PROJECT AND HANDING OVER OF BEI2 BUILDING		40,000.00	
2	1.6.1	FINAL ACCOUNTS RECONCILIATION	FINAL COST ANALISES FOR ALL SECTIONS OF BUILDINGS	WARRANTIES	5,000.00	
2	1.6.2	SUB-CONTRACTORS RETENTION	5% TOTAL CONTRACT SUM RETENTION FOR 3 MONTHS TO RECTIFY ANY FAULTS	WARRANTIES	10,000.00	

LEVEL	WBS CODE	ELEMENT NAME	DESCRIPTION OF WORK	DELIVERABLES	BUDGET (USD)	RESOURCES
2	1.6.3	MANUFACTURER'S WARRANTY	MANUFACTURERS GUARANTEE THAT IF THE PRODUCTS ARE DEFECTIVE, THEY WILL BE FIXED OR REPLACED WITHIN A PERIOD OF 3 MONTHS	WARRANTIES	25,000.00	
2	1.6.4	BUILDING AS-BUILT PLANS	ARCHITECT TO PROVIDE FINAL DRAWINGS OF ALL ELECTRICAL, PLUMBING, HVAC SYSTEMS AS ARE BUILT ON SITE	3 FULL SET AS BUILT DRAWINGS TO BE SUBMITTED TO OWNER	5,000.00	DETAILED SITE INSPECTION AND MEASUREMENTS
2	1.6.5	BUILDING MAINTENANCE MANUAL	CONTRACTORS OF ALL FIELDS TO PROVIDE A MAINTENANCE MANUALS FOR ALL FIELDS	MAINTENANCE MANUALS BY SPECIALTY, ELECTRICAL, PLUMBING AND HVAC	2,500.00	MANUALS
1	1.7	PROJECT MANAGEMENT	THE MANAGEMENT OF THE PLANNING, EXECUTION, MONITORING & CONTROLLING, CLOSURE OF THE PROJECT			
2	1.7.1	PLANNING	PLANNING AND UPDATING PROJECT ACTIVITIES THROUGHOUT PROJECT LIFECYCLE	PROJECT MANAGEMENT PLAN, QUANTITY SURVEYOR REPORT	22,000.00	
2	1.7.2	SCHEDULING	PLANNING OF PROJECT ACTIVITIES, ASSIGNING TIMELINE AND DATES TO DETERMINE AND CONTROL PROJECT DURATION	PROJECT SCHEDULE	5,000.00	
2	1.7.3	ACCOUNTING	MONITORING THE FINANCIAL EXPENDITURES OF THE PROJECT THROUGHOUT THE PROJECT LIFECYCLE	FINANCIAL REPORTS	8,000.00	

Sample Scope Verification Matrix

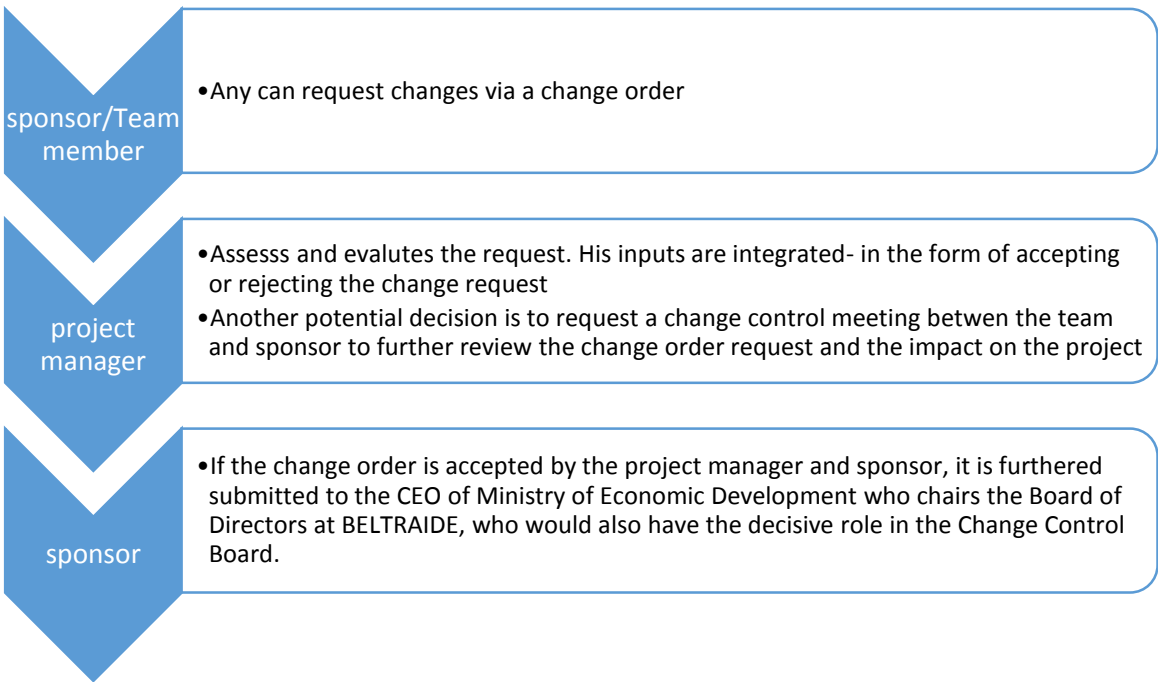
8.0 Scope Control

Due to the absence of existing documentation of projects of similar nature, during the construction of BEI2, the Project Manager and the project team will be the main stakeholders to control the scope of Construction of BEI2. The project team will influence the WBS Dictionary by using it as a statement of work for each WBS element.

The project manager will evaluate and ensure that the site manager and respective contractors ensure that the team accomplish only the work described in the WBS dictionary and deliver the deliverables for each WBS element. Scope measurement tools such as regular meetings and monthly/quarterly reports on activities as per schedule, cost and quality will be assessed.

9.0 Scope Change

If a change to Construction of BEI2 scope is needed, the process for recommending and estimating changes to the scope of the project must be carried out. The sponsor or any project team member can request changes to the project scope. All change requests must be submitted to the Project Manager in the form of a **Change Order**.



Scope Change process flow (Author, Riverol, Nilda)

Once the CEO and other members of the Change Control Board (also comprised of the Minister or State, Minister Tracy Panton, Responsible for the portfolio of Investment, and Trade in the Ministry of Economic Development, Finance Officer of BELTRAIDE, Project's officer) approves the scope change, the Project manager is notified by BELTRAIDE, who formally accept the change by signing the change order request form document. Once this is finalized, Project Manager is responsible to update all project documents and communicate the scope change to all project team members' stakeholders using the methods and approaches specified in the Communications Management Plan.

10.0 Acceptance

Approved by:

_____ Date: _____
 Amparo Masson
 Chair, Board of Directors, Enterprise and Innovation, BELTRAIDE
 And CEO Ministry of Economic Development, Petroleum, Investment, Trade and Commerce
 Chair, Change Control Board, BEI2 Project

_____ Date: _____
 Lejia Melanie Gideon
 General Manager, Enterprise and Innovation, BELTRAIDE
 Construction of BEI2 Primary Sponsor

Figure 22, BEI2 Project Scope Management plan, template retrieved from project-management.magt.biz, September, 2017

PROJECT REQUIREMENTS PLAN

CONSTRUCTION OF BEI2

BELTRAIDE

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- 1.0 Acceptance
- 2.0 Requirements Management Approach
- 3.0 Requirements Analysis
- 4.0 Categorization
- 5.0 Product Metrics

- 7.0 Prioritization
- 7.0 Validation and Acceptance
- 8.0 Requirements Documentation

1.0 Acceptance-Project Sponsor Approval

Prepared by:	Reviewed by:	Approved by Proj. Sponsor:
Place, dd/mm/yyyy	Place, dd/mm/yyyy	Place, dd/mm/yyyy
Edge Partners Co. Ltd.	BELTRAIDE	Ministry of Economic Development, Petroleum, Investment, Trade and Commerce
01/10/2017	05/10/2017	13/10/2017
Nilda Riverol MPM Student	Igideon General Manager	amasson CEO

2.0 Requirements Management Approach

The Requirements Management Plan is a tool for establishing how requirements will be “collected, analyzed, documented, and managed” throughout the lifecycle of a project (PMBOK, fifth edition, 2013, pg. 110). The Construction of BEI2 will adhere to project and product requirements. The requirements management approach for BEI2 will adhere to a standard approach that will assist the project team to identify, analyze, document, and manage the project’s requirements. Therefore, the purpose of the Requirements Management Plan is to create understanding among stakeholders and the project team in how requirements will be identified, analyzed, documented, and managed for the Construction of BEI2 project.

The inputs for the requirements management plan include the BEI2 Project Charter, and Stakeholder Register, and organizational asset. The techniques were mainly meetings, and expert judgement.

3.0 Requirements Analysis

Prioritizing requirements is an important part of requirements management. Clients do not always understand the scope, time, and cost impacts of their requirements on a project; therefore, communication and collaboration among all stakeholders is an integral aspect of

establishing project requirement priorities. If any changes need to be made to scope, time, or cost, this list of priorities will provide a better understanding to the team. In the following requirement analysis will include:

- ✓ Categorization- categories of requirements

In the latter part of the plan, the product metrics will be explained which will integrate the prioritization, validation, acceptance, and requirements documentation.

4.0 Categorization

Requirements for BEI2 will be divided into two categories: **project requirements and product requirements**. Project requirements are **non-technical requirements** that will meet the needs of the project and guarantee its completion or readiness to start. Product requirements, on the other hand are the requirements identified to meet **the technical specifications of the product**: the BEI2 building, inclusive of quality requirements.

4.1 Project Deliverables

The project includes the building of a two-storey contemporary design office building housing the following floors and storey details, (fabrication specifications and items excluded)

3. Floors & Storey Details

- a. **First Floor** – to be used primarily for incubators and general office areas including a lobby and shall be in L shaped layout (see figure 1), with eastern horizontal section of plan being 146' x 41' and western vertical section in plan being 46' x 71', covered extensions along perimeter of plan areas for sidewalks and rest areas, finish floor from ground level 4.00' (four feet). First floor finish level to Second level shall be 15.00' (fifteen feet). See layout for floor plan layout. This floor primary use will be for 3 types of incubators, BPO Incubators, Food Preparation Incubators and music Incubators. Structural foundation system will be of pre-cast concrete piles with pile caps as per engineer's drawings. All structural elements will be cast in place of reinforced 4500 PSI concrete as per engineer's drawings.



First Floor Architectural Layout

- b. **Second Floor** – to be used primarily for SBDCBelize (Small Business Development Centre Belize) and Export Belize Offices will also include a research centre and training rooms and shall have a cross and L shape combined layout taking advantage of covered areas on first floor and have total area of 12,500 SF. The structural layout will be set out to maximize wide open work areas and finish floor to roof ceiling will have a height of 15.00'. This floor will have a maximum capacity of 250 people, all distributed in different areas that include the research centre, training rooms and the office areas. All structural elements will be cast in place of reinforced 4500 PSI concrete as per engineer's drawings.



Second Floor Architectural Layout

- c. **Roof Deck Area** – Shall be used for 2 different functions, social meeting areas in lower deck areas with a finish floor level of 33.00’ (thirty-three feet) and to house HVAC systems on higher deck areas with a finish floor level of 40.00’ (forty feet). The occupancy capacity of social meeting areas is of approximately 500 (five hundred) persons. There is no ceiling height. The primary roof deck will consist of a solid concrete cast in place as per structural engineer’s drawings. The HVAC finish floor will have a foam insulation and will receive a 200 (two hundred) ton York Chill Water Cooling System.

5.0 Product Metrics

Product metrics for the BEI2 project will be mainly be based on cost, quality, and performance requirements in order to meet the scope of the project. Project success for the construction of BEI2 will be accepted as successful once the following metrics are met or exceeded.

Req. ID	Requirement name
001	Solution/ Product-Technical Requirements 1. Cost

	2. Quality 3. Performance
002	Project Requirements 1. product specifications, planning, and schedule
003	Stakeholder 2. communication and reporting

Requirements checklist

1. solution requirements

Cost:

- BEI2 must cost less than 2.6 million USD. The building must not exceed 100 USD per square foot construction cost. This does not include site and landscape design.
- All cost for construction shall be included in quotation; including construction insurances and GST (General Sales Tax)

Quality:

- The building must be able to withstand category 4-5 hurricanes
- The building final finish must have a life of no less than 20 years.
- The building must meet to self-sustain itself for a period of 2 weeks in case of any natural disaster.
- Structure will comprise of cast in place concrete columns, beams and floor areas as per structural engineer's design drawings.
- All concrete beams and columns must be of tested 4500 PSI concrete and adhere to structural steel design as per engineer's design.
- Cast in place concrete floors will be of 4500 PSI concrete and will be of 6" thickness, rebar layout will be adhered to as per structural engineer's design drawings.
- Fabricator to provide tile finish for all floors and must meet PEI 4 regulations. (ITTA Gris Ceramica)
- Fabricator to provide to 4" thick roof insulation and membrane bitumen sealer. (Texas Refinery Corporation)

- Fabricator to provide high impact Miami Dade standard aluminium frame windows and doors. Fabricator to provide shipping from Miami to Belize. (Assura Doors & Windows Co. LTD.)
- Fabricator to provide York Chiller System and BMS (Building Management System). Also, to provide shipping from Miami to Belize. (Johnston Controls and Systems)
- All Structural Steel shall meet ASTM (American Society for testing and materials) Standards and must be treated with a proper rust protectant and paint.
- Concrete must be tested before any major casting by suitable method and by registered Engineering Firm.

Performance:

- The building must be able to efficiently recycle gray waters for use in landscape
- The building must be able to efficiently have cost energy savings of less than 5 thousand (\$5000) monthly
- The building HVAC (York Chilled Water) system must efficiently keep building at constant temperature of 75 degrees Fahrenheit for daily human comfort.
- Building shall have a total area of 28,500 SF of both liveable and exterior spaces
- Balconies and stairs are included; stainless steel handrails by others.
- Handicap ramps and accessories included.
- Gutters and downspouts to be included, embedded in walls at areas designed by plumbing.

2. project requirements-(non-technical)

The non-technical factors for project requirements are in the areas of project specifications, schedule, and planning, as listed below:

- Fabricator to have all structural designs prepared and signed off by a registered structural engineer in Belize and approved by CBA (Central Building Authority) of Belize.
- Time Line for project shall also be provided

- Covered chiller and water pumps area on roof deck to be included.
- Shipping Insurances shall also be provided by fabricators and suppliers.
- The licenses and permits must be obtained at least 3 months prior to commencing construction
- The planning, evaluation, and reporting of the project progress should be documented and tracked using the tools specified.
- The Building must obtain Leadership in Energy and Environmental Design (LEED) Certification by the end of the project life

3. stakeholder requirements

These requirements are along the line of reporting and communication.

- A meeting should be convened at least every month for reporting and tracking, and must be coordinated as a planned activity between the project manager and the project officer ensuring that main stakeholders are present.
- A Quarterly report to be shared with stakeholders as a means of verifying scope accomplishment.

6.0 Prioritization

Requirements must be prioritized in order for the project team and stakeholder to understand what requirements must be achieved, which ones are not as urgent to meet. For the Construction of BE12, the Project Manager will coordinate meetings among stakeholders to ensure that feedback is received from all of them as it relates to priorities for the project requirements. The chart below illustrates the levels and describes how requirements will be prioritized.

Priority level	Definition	Result
High	<ul style="list-style-type: none"> • These requirements are critical. • Project/product success cannot be accepted and 	Mandatory/Critical

Priority level	Definition	Result
	transitioned into the following phase	
Medium	<ul style="list-style-type: none"> These requirements can be delayed and completed in another phase- may be product/process oriented 	May be necessary for functionality
Low	<ul style="list-style-type: none"> These requirements may be quality and/functional in nature and are not necessary if resources don't allow it 	Not Necessary for functionality (Nice to have)

Prioritization of requirements guide

As the project advances and should other constraints not documented be identified in any of the project's triple constraint it may be necessary for the project team and stakeholders to meet in order to determine what requirements must be achieved, which can be re-baselined, or which can be omitted. The chart above is to be used as a guide to make the decisions. As any changes in requirements are made, all project documentation must be updated and communicated to all project stakeholders.

7.0 Validation and Acceptance

For the construction of BEI2, the following criteria for validation must be performed:

1. Inspection- the project manager will inspect construction site work daily for 2 hours- in the morning and evening. In addition, when major requirements are being executed especially if they are high priority, the project manager, site manager, construction manager should be on site inspecting until the job is completed.

2. Workgroup Validation- Meetings will be held to audit the documentation provided to confirm requirement compliance
3. Process Audit- assessments of planned vs. actual of project deliverables using a checklist and the requirements documentation

For the requirements documentation, once the stakeholder agree to the requirements, it is considered to be validated. The validated documentation is then accepted the by the relevant stakeholders as acceptable requirements for the construction of BEI2.

8.0 Requirement's documentation

Below the requirements documentation.

Req. ID	Requirement Name	Requirement Objective	Required by (stakeholder)	Category	Priority	Acceptance Criteria	Validation Method
001	Cost	BEI2 must cost less than 2.6 million USD. The building must not exceed 100 USD per square foot construction cost. This does not include site and landscape design.	BELTRAIDE-Sponsor	Product	High		Inspection
		All cost for construction shall be included in quotation; including construction insurances and GST (General Sales Tax)	BELTTRAIDE-Sponsor	Product	High		Audit
002	Quality	The building must be able to withstand category 4-5 hurricanes	BELTRAIDE-Sponsor; Structural Engineer	Product	High		Inspection
		The building final finish must have a life of no less than 20 years.	BELTRAIDE-Sponsor	Product	Medium		Inspection
		The building must meet to self-sustain itself for a period of 2 weeks in case of any natural disaster.	Sponsor and University of Belize	Product	Medium		Inspection
		Structure will comprise of cast in place concrete columns, beams and floor areas as per structural engineer's design drawings.	BELTRAIDE-Sponsor; structural engineer	Product	High		Inspection
		All concrete beams and columns must be of tested 4500 PSI concrete and adhere to structural steel design as per engineer's design.	BELTRAIDE-Sponsor	Product	Medium		Inspection
		Cast in place concrete floors will be of 4500 PSI concrete and will be of 6" thickness, rebar layout will be adhered to as per structural engineer's design drawings.	BELTRAIDE-Sponsor ; structural Engineer	Product	Medium		Inspection
		Fabricator to provide tile finish for all floors and must meet PEI 4 regulations. (ITTA Gris Ceramica)	BELTRAIDE-Sponsor	Product	Medium		Inspection

Req. ID	Requirement Name	Requirement Objective	Required by (stakeholder)	Category	Priority	Acceptance Criteria	Validation Method
		Fabricator to provide to 4" thick roof insulation and membrane bitumen sealer. (Texas Refinery Corporation)	BELTRAIDE-Sponsor LEED certification body	Product	Medium		Inspection
		Fabricator to provide high impact Miami Dade standard aluminium frame windows and doors. Fabricator to provide shipping from Miami to Belize. (Assura Doors & Windows Co. LTD.)	BELTRAIDE-sponsor LEED certification body	Product-technical	Medium		Inspection
		Fabricator to provide York Chiller System and BMS (Building Management System). Also, to provide shipping from Miami to Belize. (Johnston Controls and Systems)	BELTRAIDE-Sponsor	Product-technical	Medium		inspection
003	Performance	The building must be able to efficiently recycle gray waters for use in landscape	Department of the Environment LEED certification body	Product-technical	Medium		Inspection
		The building must be able to efficiently have cost energy savings of less than 5 thousand (\$5000) monthly	LEED certification body	Product-technical	Low		Audit
		The building HVAC (York Chilled Water) system must efficiently keep building at constant temperature of 75 degrees Fahrenheit for daily human comfort.	Engineer	Product - technical	High		Inspection
		Building shall have a total area of 28,500 SF of both liveable and exterior spaces	Sponsor	Product-Technical	High		inspection
		Balconies and stairs are included; stainless steel handrails by others.	Central Building Authority	Product-technical	High		Inspection

Req. ID	Requirement Name	Requirement Objective	Required by (stakeholder)	Category	Priority	Acceptance Criteria	Validation Method
004	Product specs, planning, and schedule	Fabricator to have all structural designs prepared and signed off by a registered structural engineer in Belize and approved by CBA (Central Building Authority) of Belize.	Central Building Authority	Project-non technical	High		Meetings-reports
		Time Line for project shall also be provided	Project team members and consultants	Project-Non Technical	Medium		Meetings-reports
		Covered chiller and water pumps area on roof deck to be included.	BELTRAIDE-Sponsor	Project-Non Technical	Medium		inspection
		Shipping Insurances shall also be provided by fabricators and suppliers.	Project Manager	Project-Not Technical	Medium		Inspection or audit
		All licenses and permits must be obtained at least 3 months prior to commencing construction	Project Manager	Project-Non Technical	High		Inspection
005	Reporting and Communication	A meeting should be convened at least every month for reporting and tracking, and must be coordinated as a planned activity between the project manager and the project officer ensuring that main stakeholders are present.	BELTRAIDE-Sponsor	Stakeholder	Medium		Meetings-reports
		A Quarterly report to be shared with stakeholders as a means of verifying scope accomplishment.	BELTRAIDE-Sponsor	Stakeholder	Medium		Inspection Group Workshops

Figure 23 BEI2 Project Requirements Management plan, template retrieved from project-management.magt.biz, September,2017

4.3. Project Time Management

Time management is essential for project management as it incorporates the processes necessary to effectively manage the time completion of deliverables for a project. PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) establishes seven (7) processes within time management. These are listed in the below figure:

- 6.1 Plan Schedule Management**—The process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.
- 6.2 Define Activities**—The process of identifying and documenting the specific actions to be performed to produce the project deliverables.
- 6.3 Sequence Activities**—The process of identifying and documenting relationships among the project activities.
- 6.4 Estimate Activity Resources**—The process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity.
- 6.5 Estimate Activity Durations**—The process of estimating the number of work periods needed to complete individual activities with estimated resources.
- 6.6 Develop Schedule**—The process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model.
- 6.7 Control Schedule**—The process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan.

Figure 24 BEI2 Project Time management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013. Pg. 141

The inputs and tools used to develop the Time Management Plan and relevant processes was mainly expert judgement and meetings with the Sponsor, and architects of Edge Partners Co. Ltd. Below a breakdown of each process and respective inputs, tools, and outputs for the Construction of BEI2.

4.3.1 Plan Time Management

The Plan Time Management yielded the output of Time Management Plan for the Construction of BEI2. The template used to develop the plan was derived from an online source(www.tn.gov/assets/entities/finance/attachments/TBSMScheduleManagementPlan; September, 2017), and adapted accordingly to the project.

The project schedule was developed based on information received through meetings with core project team and also the consultant, as well as plans received from all project deliverable team leads. The schedule outlines activities and durations required to complete the agreed deliverables as per the project WBS. The importance of this step is that it will guide and direct the project team in the management of the project schedule throughout the project

TIME MANAGEMENT PLAN

BELTRAIDE

CONSTRUCTION OF BEI2

9/25/2017

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- 1.0 Introduction
- 2.0 Schedule Management Approach
- 3.0 Schedule Control and Reporting
- 4.0 Schedule Changes
- 5.0 Scope Change
- 6.0 Acceptance

1.0 Introduction

The project schedule is the roadmap for how the project will be executed. Schedules are an important part of any project as they provide the project team, sponsor, and stakeholders a picture of the project's status at any given time. The purpose of the Schedule Management Plan is to define the approach the project team will use in creating the project schedule. This plan also includes how the team will monitor the project schedule and manage changes after the baseline schedule has been approved. This includes identifying, analyzing, documenting, prioritizing, approving or rejecting, and publishing all schedule-related changes.

2.0 Schedule Management Approach

The Construction of BEI2 project schedule was created with a standard scheduling tool using the projects WBS, and WBS dictionary as inputs. The activity definition will describe the respective work packages which should be executed to ensure delivery of milestones/deliverables. An additional element is the sequencing of activities which will determine the relationship between activities and order of the work packages. Activity duration will estimate the work periods necessary to complete the project's work packages. Resource estimating is necessary to assign resources to the respective project's work packages.

BELTRAIDE, as the project sponsor reviews the preliminary schedule, and endorses the respective tasks, and expected durations, inclusive of resources assigned, prior to submission to the Board of Directors for final approval.

The following will be designated as milestones for the project schedule:

1. Initiation of Project
2. Architect and Client Site Visit for Assessment
3. Site Testing by Engineering Company Commence
4. Initiation of Conceptual Design
5. Request for Environmental Impact Assessment
6. Client Final Design Signoff
7. Site Testing Results Completed
8. Project Management Plan Completed
9. Approval of Project Charter by Board of Directors
10. Approval for Environmental Impact Assessment
11. Completion of Working Drawings Submittal to CBA for Permitting
12. Permits of No Objection to construction by CBA
13. Contractor Tendering Commence
14. Contractor Tendering Complete
15. Awarding of Contracts
16. Procurement and Sourcing of Materials Commence
17. Commencement of Construction
18. Mobilization of Works Commence
19. Mobilization of Works Complete
20. Site Set out and Piling Commence
21. First Floor Plumbing and Electrical Rough-In Commence
22. Piling Complete
23. First Floor Beam and Stub Column
24. First Floor Retention Wall
25. First Floor Slab, Beam and Column
26. First Floor CMU Walls Commence

27. First Floor Steps and Ramps Commence
28. First Floor Grey Works Complete
29. First Floor Tile Finish Commence
30. First Floor Drywall Work Commence
31. First Floor Tile Work Complete
32. First Floor Drywall Complete
33. Second Floor Beams and Columns Commence
34. Exterior Works Commence
35. Second Floor Slab Commence
36. Second Floor Plumbing and Electrical Rough-In Commence
37. Second Floor Columns Commence
38. Second Floor Steps Commence
39. Second Floor CMU Walls Commence
40. Second Floor Gray Works Complete
41. Second Floor Tile Finish Commence
42. Second Floor Drywall Commence
43. Second Floor Tile Works Complete
44. Second Floor Drywall Work Complete
45. Roof Beams Commence
46. Roof Slab Commence
47. Roof Grey Works Complete
48. First Floor Drywall complete
49. Ground Floor Window / Door Installation
50. Second Floor Window / Door Installation
51. Electrical and Plumbing Finishes Installation
52. Main HVAC Installation
53. Interior Wall Finishes Commence
54. Exterior Wall Finishes Commence
55. Electrical and Plumbing Complete
56. Exterior Works Complete
57. Systems Test

58. Occupancy Certificate Issued

2.1 Roles and responsibilities for schedule development are as follows:

The project manager, being headed by the architect who design the concept, will be responsible for facilitating work package definition, sequencing, and estimating duration and resources with the project team. He will also facilitate the creation of the project schedule using the respective tool, and proceed to validate the schedule with the project team, stakeholders, and the Project Sponsor. The project manager will obtain necessary approvals from the Project Sponsor and baseline the schedule.

Certain members of the project team are responsible for participating in work package definition, sequencing, and duration and resource estimating. In particular, the Sr. Projects officer, managers of the two functional units at BELTRAIDE who will be primary users of the BEI2, the Finance Officer, and The General Manager of BELTRAIDE. The Board of Directors as the highest authority at BELTRIADE will participate in reviews of the proposed schedule and approve the final schedule before it is baselined.

3.0 Schedule Control and Reporting

The project schedule will be reviewed and updated on at least a monthly basis with respective start, finish, and completion percentages. The project manager is responsible for holding bi-weekly schedule reviews with respective updates; determining impacts of schedule changes; submitting change requests related to schedule; and reporting schedule status in accordance with the project's Communication Plan. The project team is to be part of this review meetings so they may input feedback.

4.0 Schedule changes

It is fundamental to remain within Schedule so that the project deliverables aren't substantially affected. Minor Schedule changes that may fall within the threshold for project timeline can be approved by the project manager. Other major schedule changes that may impact cost, or scope, are to be approved by the Project Sponsor and will only

be considered under circumstances that could be justified such as “due to natural disasters happening” or due to unforeseen risks that may have not been predicted. Consideration of the impact on the project as it relates to cost and scope will be undertaken. The project manager must present a completed analysis of schedule, cost, and scope implications and changes for approval.

5.0 Scope Change

Any changes in the project scope, which have been approved by the Project Sponsor, will require the project team to evaluate the effect of the scope change on the current schedule. If the impact on the schedule requires significant changes, it is necessary for the Project Manager to re-baseline the schedule accordingly, and report such changes as needed.

6.0 ACCEPTANCE

Approved by:

Date: _____

Amparo Mason
Chairman, BOD, BELTRAIDE
CEO, Ministry of Economic Development, Petroleum, Investment, Trade and Commerce

Date: _____

Lejia Melanie Gideon
General Manager, Enterprise and Innovation Division, BELTRAIDE

Figure 25 BEI2 Project Time management Plan,, template retrieved from www.tn.gov/assets/entities/finance/attachments/TBSMScheduleManagementPlan; September, 2017

4.3.2 Activity list, sequencing resourcing, and duration estimates

Trying to estimate the duration of activities is one the most challenging aspects of planning a project. Duration estimate is the fact of using different techniques and tools to determine how long it will take to perform an activity. It is a very important aspect of the

project because unrealistically duration estimates can cause an activity to take longer than necessary or to not have sufficient time to be executed, which in turn will have impacts on the deliverables, on the duration, the resource, and the budget of a project.

This process's outputs include: the activity list and activity attributes inclusive of the milestone list. The inputs used for this process was the Schedule Management Plan, the Scope Baseline and tools used was meetings and expert judgement with the architect and Manager of BELTRAIDE.

4.3.2.1 Activity List

The activity list was developed following meetings with project team and consultant as well as reviewing lessons learned, standardized processes, activity lists from previous projects and existing guidelines. In addition, the scope baseline, and schedule management plan was used as inputs. The WBS was examined and the activities which affect each other were evaluated. The importance of this process is it will break down work into smaller packages which will act as the basis for costing, scheduling, executing, monitoring and controlling the project work. Below the activity attributes list.

Chart 6: Activity List for the Construction of BEI2 (source: Riverol, Nilda, Author, September, 2017)

Activity ID	Activity Name	Description of Work
1.1	DESIGN DEVELOPMENT	INITIATION OF ARCHITECTURAL CONCEPTUALIZATION
1.1.1	CLIENT AND BUILDING REQUIREMENTS	MEETINGS SCHEDULED TO ASCERTAIN CLIENT AND REGULATORY NEEDS FOR THE BUILDING PROJECT
1.1.2	CLIENT CONSULTATION AND BUILDING RESEARCH	MEETING WITH ARCHITECT, CONTRACTORS AND CONSULTANTS TO DESCRIBE AND UNDERSTAND THE SCOPE OF ARCHITECTURAL WORKS AND CONSTRUCTION
1.1.3	RESEARCH LEED MATERIALS AND METHODS	RESEARCH LEED CERTIFICATION, REQUIREMENTS, METHODOLOGIES AND ARCHITECTURAL STANDARDS THAT CAN BE USED FOR THE BUILDING PROJECT
1.1.4	PERFORM COST ANALYSES AND DETERMINE INITIAL BUDGET	CALCULATING THE TYPE OF FINANCIAL COMMITMENT NEEDED BASED ON THE REQUIREMENTS FROM THE CLIENT TO COMPLETE THE CONSTRUCTION OF THE BUILDING PROJECT
1.1.5	PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT	MINISTRY OF THE ENVIRONMENT TO ASSIGN AN ENVIRONMENTAL ENGINEER TO PERFORM ENVIRONMENTAL IMPACT ASSESSMENT OF PROJECT

Activity ID	Activity Name	Description of Work
1.2	DESIGN	COLLABORATIVE EFFORT OF CONSULTATIONS
1.2.1	ARCHITECTURAL DESIGN	VISUAL REPRESENTATION OF PROJECT
1.2.2	PROJECT DESIGN REVIEW	PRELIMINARY ARCHITECTURAL DESIGN, SUB CONSULTANT DESIGNS TO INCLUDE STRUCTURAL ENGINEER, MECHANICAL, ELECTRICAL AND PLUMBING ENGINEER (MEP) LAND AND QUANTITY SURVEYOR
1.2.3	PROJECT DESIGN SIGNOFF	ARCHITECTURAL DESIGN SIGNOFF BY CLIENT AND DIRECTORS (CLIENT)
1.2.4	WORKING DRAWINGS	COMPLETE SET OF ARCHITECTURAL AND ENGINEERING DRAWINGS BY ARCHITECTS AND ENGINEERS
1.2.4	PERMITS AND APPROVALS	APPLICATION FOR APPROVAL FOR PERMITS; APPROVED SET OF CONSTRUCTION DOCUMENTS APPROVAL FROM CENTRAL BUILDING AUTHORITY (CBA) PUBLIC UTILITIES COMMISSION ELECTRICAL PERMIT APPROVAL (PUC)
1.3	PRE-CONSTRUCTION	CONTRACT PHASE WHERE DESIGN, DEVELOPMENT , CONSULTANT IDENTIFICATION AND AGREEMENTS WITH NECESSARY STAKEHOLDERS ARE ESTABLISHED
1.3.1	PILE FOUNDATION SYSTEMS	MAHEIA'S UNITED IS IDENTIFIED AND CONTRACTED TO PRODUCE PRECAST CONCRETE PILES
1.3.2	MOBILIZATION	PROCESS OF PREPARING PROJECT SITE FOR WORKS TO COMMENCE
1.3.3	PRE-CONSTRUCTION	SETTING OUT FOR FOUNDATION SYSTEM, PILING WITH HYDRAULIC CRANE, CAPPING OF PILES, BACKFILL
1.4	CONSTRUCTION	PROJECT EXECUTION COMMENCES
1.4.1	CONCRETE FOUNDATIONS	INSTALLATION OF PILE FOUNDATION SYSTEM AS PER STRUCTURAL ENGINEER'S DESIGN
1.4.2	CMU MASONRY	INSTALLATION OF CMU BLOCK UNITS, INSTALLATION IN PLACE CONCRETE BEAMS AND COLUMNS, LINTELS AND CONCRETE STAIRS WITH APPROPRIATE CONCRETE AND SAND MIX
1.4.3	FLOORS AND CEILINGS	INSTALLATION OF CAST IN PLACE REINFORCED CONCRETE FLOOR SYSTEM
1.4.4	WINDOWS AND DOORS	ASSURA WINDOWS AND DOORS SYSTEMS
1.4.5	INTERNAL WALL AND CEILING GRID SYSTEMS	DRYWALL AND METAL STUD SYSTEM
1.4.6	ELECTRICAL AND PLUMBING	ELECTRICAL POWER SUPPLY TO BUILDING (INCLUDING ALL FIXTURES)
1.4.7	HVAC AND BMS SYSTEM	YORK CHILL WATER SYSTEM WITH BMS CONTROLLER
1.4.8	FINISHES AND DETAILS	ITTA GRIS TILE SYSTEMS
1.4.9	INTERIOR AND EXTERIOR PAINTING AND CEILING	CORONADO SUPREME FINISH PAINT
1.4.10	ROOF INSULATION AND PAINTING	TECAS REFINERY ROOF INSULATION SYSTEMS
1.4.11	SITE WORKS	WORKS PERTAINING TO EXTERIOR ELEMENTS OF THE PROJECT SUCH AS PLANTER BOXES, PARKING LIGHT, PERIMETER PARKING AND GENERAL LANDSCAPING
1.5	POST CONSTRUCTION	PHASE THAT OCCURS AFTER SUBSTANTIAL COMPLETION

Activity ID	Activity Name	Description of Work
1.5.1	CONTRACTOR PUNCH LIST	FINAL PUNCH LIST BY CONTRACTOR AND OWNER (BUDGETED AS CONTINGENCY)
1.5.2	SITE ANALYSES AND CLEANUP	CLEANING UP OF SITE
1.5.3	FINAL BUILDING INSPECTION	FINAL BUILDING INSPECTION DONE BY FIRE DEPARTMENT, PROJECT MANAGER AND ARCHITECT
1.5.4	CBA APPLICATION FOR OCCUPANCY CERTIFICATE	APPLICATION TO OCCUPY BUILDING FROM CENTRAL BUILDING AUTHORITY (CBA)
1.6	PROJECT CLOSURE	PHASE THAT SIGNIFIES COMPLETION OF PROJECT AND HANDING OVER OF BEI2 BUILDING
1.6.1	FINAL ACCOUNTS RECONCILIATION	FINAL COST ANALYSES FOR ALL SECTIONS OF BUILDINGS
1.6.2	SUB-CONTRACTORS RETENTION	5% TOTAL CONTRACT SUM RETENTION FOR 3 MONTHS TO RECTIFY ANY FAULTS
1.6.3	MANUFACTURER'S WARRANTY	MANUFACTURERS GUARANTEE THAT IF THE PRODUCTS ARE DEFECTIVE, THEY WILL BE FIXED OR REPLACED WITHIN A PERIOD OF 3 MONTHS
1.6.4	BUILDING AS-BUILT PLANS	ARCHITECT TO PROVIDE FINAL DRAWINGS OF ALL ELECTRICAL, PLUMBING, HVAC SYSTEMS AS ARE BUILT ON SITE
1.6.5	BUILDING MAINTENANCE MANUAL	CONTRACTORS OF ALL FIELDS TO PROVIDE A MAINTENANCE MANUALS FOR ALL FIELDS
1.7	PROJECT MANAGEMENT	THE MANAGEMENT OF THE PLANNING, EXECUTION, MONITORING & CONTROLLING, CLOSURE OF THE PROJECT
1.7.1	PLANNING	PLANNING AND UPDATING PROJECT ACTIVITIES THROUGHOUT PROJECT LIFECYCLE
1.7.2	SCHEDULING	PLANNING OF PROJECT ACTIVITIES, ASSIGNING TIMELINE AND DATES TO DETERMINE AND CONTROL PROJECT DURATION
1.7.3	ACCOUNTING	MONITORING THE FINANCIAL EXPENDITURES OF THE PROJECT THROUGHOUT THE PROJECT LIFECYCLE
1.7.4	REPORTING	DOCUMENTING PROJECT ACTIVITIES, PREPARING REPORTS AND PRESENTING TO THE APPROPRIATE STAKEHOLDERS
1.7.5	MEETINGS	ENGINE FOR THE MANAGEMENT OF THE PROJECT
1.7.6	SITE MANAGEMENT	MANAGEMENT OF THE DAY TO DAY ON SITE RUNNING ON A CONSTRUCTION PROJECT

After the Activity List was generated and Milestones defined, which are highlighted in the table below, the third process of time management was performed 'Sequencing activities'. The project sponsor requested for a Schedule Network Diagram to be developed. This diagram was developed using Microsoft Visio 2016. The inputs used for this was the schedule management plan, the activity list and respective attributes,

milestone list highlighted in the schedule management plan, and the project scope statement.

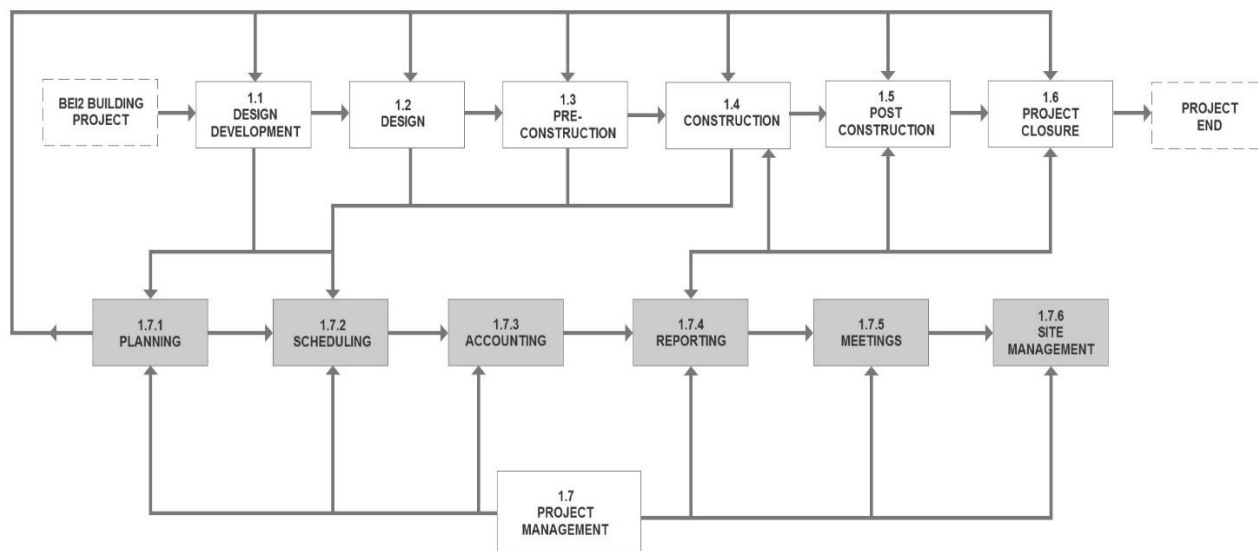


Figure 26 Construction of BEI2 Schedule Network Diagram (source: Riverol, Nilda, Microsoft Visio 2016, September, 2017)

4.3.2.2 Activity list chart - Milestone, Resource type, Duration

The fourth process of time management is estimating activity resources. For the purpose of this project, only the resources were assigned without the RBS being developed at this stage. The inputs used for this was schedule management plan, activity list, activity attributes, the risk register, activity cost estimates information. Expert judgment and respective project management software were used to develop this. The same inputs and tools were used for most of these outputs. The Chart includes coding, activity name, milestones, brief activity description, predecessors/successors list, required resources per activity.

Chart 7 Milestone, Resourcing, and Durations for Construction of BEI2 (Source: Riverol, Nilda, Author, September, 2017)

Task Name	Duration	Start	Finish	Predecessors	Resource Names
BEI2 BUILDING PROJECT	774 days	Mon 02/10/17	Thu 17/09/20		
Initiation of Project	121 days	Mon 02/10/17	Mon 19/03/18		

Task Name	Duration	Start	Finish	Predecessors	Resource Names
Architect and Client Site Visit for Assessment	0 days	Mon 02/10/17	Mon 02/10/17		Architect, Sponsor; Project Manager
Site Testing by Engineering Company Commence	2 wks	Mon 02/10/17	Fri 13/10/17	3	Structural Engineer; Technicians
Initiation of Conceptual Design	4 wks	Mon 16/10/17	Fri 10/11/17	4	Architect
Request for Environmental Impact Assessment	3 wks	Mon 13/11/17	Fri 01/12/17	5	Project Manager
Client Final Design Signoff	0 days	Fri 01/12/17	Fri 01/12/17	6	Architect; Owner; Project Manager
Approval of Project Charter by Board of Directors	0 days	Fri 01/12/17	Fri 01/12/17	7	Owner
Working Drawings	8 wks	Mon 04/12/17	Fri 26/01/18	8	Architect; Technicians
Permits of No Objection to construction by CBA	2 wks	Mon 29/01/18	Fri 09/02/18	9	Architect
Contractor Tendering	4 wks	Mon 12/02/18	Fri 09/03/18	10	Project Manager
Awarding of Contracts	1 day	Mon 12/03/18	Mon 12/03/18	11	Project Manager
Procurement and Sourcing of Materials Commence	1 wk	Tue 13/03/18	Mon 19/03/18	12	Architect; Contractor; Project Manager
Commencement of Construction	658 days	Tue 13/03/18	Thu 17/09/20	9	
Mobilization of Works Commence	2 wks	Tue 13/03/18	Mon 26/03/18	12	Contractor; Site Foreman

Task Name	Duration	Start	Finish	Predecessors	Resource Names
Site Set out and Piling Commence	6 wks	Tue 27/03/18	Mon 07/05/18	15	Site Foreman; Structural Engineer; Technicians; Foreman
First Floor Plumbing and Electrical Rough-In	1 wk	Tue 08/05/18	Mon 14/05/18	16	Plumbing Engineer; Technicians
First Floor Beam and Stub Column	8 wks	Tue 15/05/18	Mon 09/07/18	17	Contractor; Foreman
First Floor Retention Wall	6 wks	Tue 10/07/18	Mon 20/08/18	18	Contractor; Foreman; Masonry Workers
First Floor Slab, Beam and Column	10 wks	Tue 21/08/18	Mon 29/10/18	19	Foreman; Masonry Workers
First Floor CMU Walls	5 wks	Tue 30/10/18	Mon 03/12/18	20	Foreman; Masonry Workers
First Floor Steps and Ramps	2 wks	Tue 04/12/18	Mon 17/12/18	21	Contractor; Foreman; Masonry Workers
First Floor Tile Finish	4 wks	Tue 18/12/18	Mon 14/01/19	22	Masonry Workers; Tile Contractor
First Floor Drywall Work	8 wks	Tue 15/01/19	Mon 11/03/19	23	Contractor; Masonry Workers
Second Floor Beams and Columns	10 wks	Tue 12/03/19	Mon 20/05/19	24	Contractor; Masonry Workers
Second Floor Slab	4 wks	Tue 21/05/19	Mon 17/06/19	25	Contractor; Masonry Workers
Second Floor Plumbing and Electrical Rough-In	2 wks	Tue 18/06/19	Mon 01/07/19	26	Plumbing Contractor; Plumbing Engineer; Technicians
Second Floor Columns	6 wks	Tue 02/07/19	Mon 12/08/19	27	Foreman; Masonry Workers
Second Floor Steps	3 wks	Tue 13/08/19	Mon 02/09/19	28	Foreman; Masonry Workers
Second Floor CMU Walls	6 wks	Tue 03/09/19	Mon 14/10/19	29	Foreman; Masonry Workers

Task Name	Duration	Start	Finish	Predecessors	Resource Names
Second Floor Tile Finish	4 wks	Tue 15/10/19	Mon 11/11/19	30	Masonry Workers; Tile Contractor
Second Floor Drywall Commence	6 wks	Tue 12/11/19	Mon 23/12/19	31	Drywall Contractor
Roof Beams	6 wks	Tue 24/12/19	Mon 03/02/20	32	Foreman; Masonry Workers
Roof Slab Commence	6 wks	Tue 04/02/20	Mon 16/03/20	33	Foreman; Masonry Workers
Roof Grey Works	3 wks	Tue 17/03/20	Mon 06/04/20	34	Foreman; Masonry Workers
Ground Floor Window / Door Installation	2 wks	Tue 07/04/20	Mon 20/04/20	35	Foreman; Window Door Installer
Second Floor Window / Door Installation	2 wks	Tue 21/04/20	Mon 04/05/20	36	Door Installer, Foreman; Window Installer
Electrical and Plumbing Finishes Installation	4 wks	Tue 05/05/20	Mon 01/06/20	37	Electrical Contractor; Plumbing Engineer; Technicians
Main HVAC Intallation Installation	6 wks	Tue 02/06/20	Mon 13/07/20	38	Mechanical Contractor; Technicians
Interior Wall Finishes	3 wks	Tue 14/07/20	Mon 03/08/20	39	Drywall Contractor; Foreman
Exterior Wall Finishes Commence	4 wks	Tue 04/08/20	Mon 31/08/20	40	Foreman; Paint Contractor
Exterior Works	2 wks	Tue 01/09/20	Mon 14/09/20	41	Foreman; Masonry Workers
Systems Test	3 days	Tue 15/09/20	Thu 17/09/20	42	Contractor; Foreman; Technicians
Occupancy Certificate Issued	0 days	Thu 17/09/20	Thu 17/09/20	43	Project Manager

4.3.2.3 Reserve analysis including justification

Reserve analysis also called contingency is one of the techniques used in the duration estimates of activities. This technique allows using time reserves (or buffers) to define and protect duration estimates in case any risk occurs such as task delays, breaks and other undesired variations. This technique helps to preserve the completion time of the project.

In this case, the duration estimates are based not only on expert judgment but also on historical records. Indeed, this project is an expansion of a project that has been executed. In this way, information regarding all the processes from the former project has been used in the planning of the new one. This is the reason why the project manager judged that the duration estimates realized by the team are strong enough, and he only assigned a rate of the 10% as reserve to the duration of each activity as it is shown in the table above.

4.3.3 Project Schedule

The project schedule is the deliverable from the develop schedule process and involves analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model. The schedule is an important time management tool as it creates a schedule model with dates for completing project activities. The schedule is then used as the baseline for controlling the project duration and resources.

The project schedule was the main output for the sixth process. See summary of milestone project schedule below outline main outputs. The overall project document schedule will be shared with the project team using the Microsoft project tool.

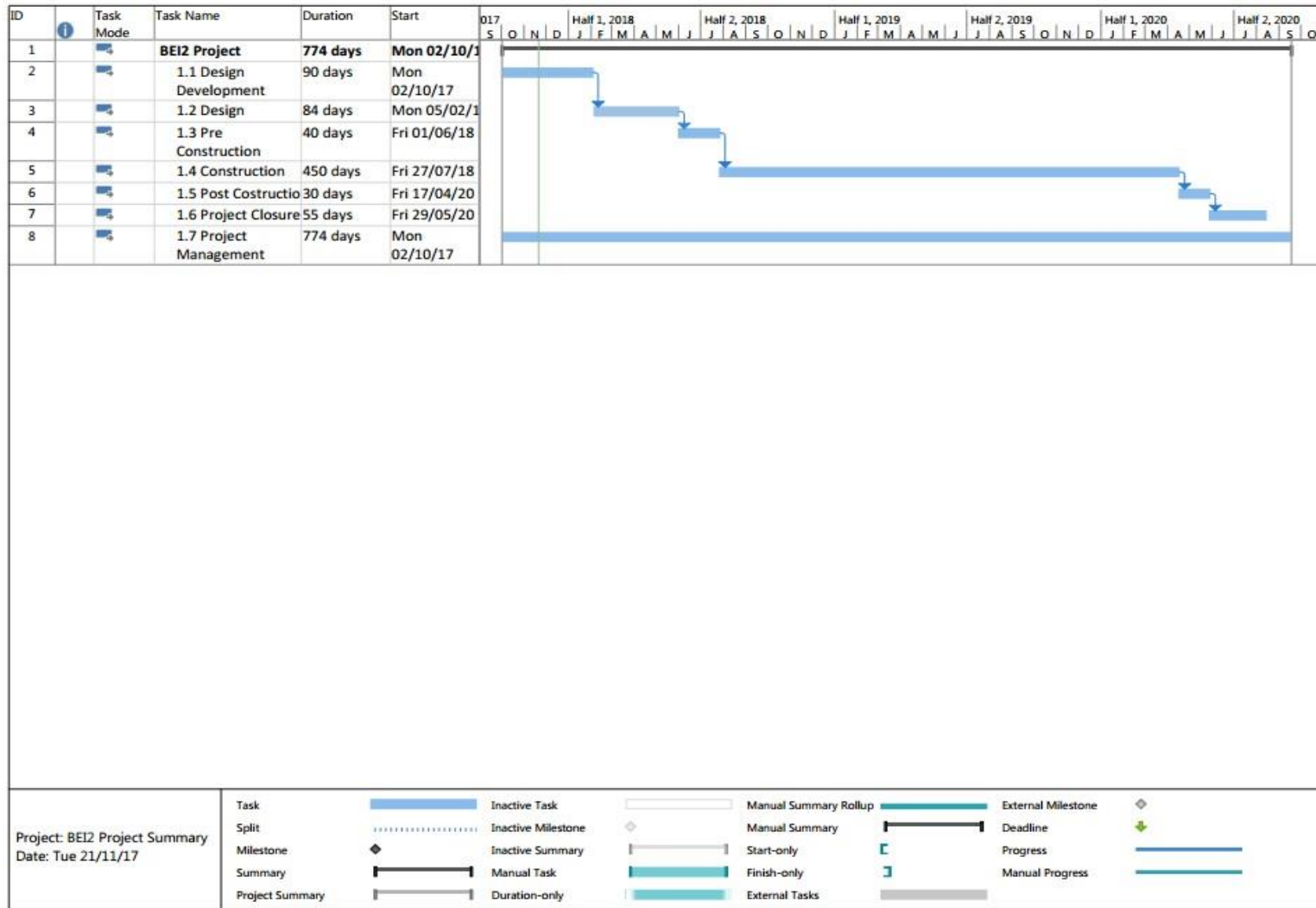


Figure 27 Construction of BEI2 Summary of Milestones Schedule (Source: Riverol, Nilda, Author, September, 2017)

4.3.4 Schedule control procedure

The Schedule control procedure involves “monitoring the status of project activities to update project progress and manage changes to schedule baseline to achieve the plan”. The importance of the Schedule procedure is to manage changes as they are taking place, determine if schedule changes have occurred and to determine the current status of the project and if it is aligned with the project schedule. This process is focused on where the project is at present and what the performance has been to date. The schedule will be managed by firstly referencing the following documents; the Project Management Plan, which should describe how the schedule plan would be managed and controlled.

The most recent approved Project Schedule will be needed to allow for the start and finish dates of activities to be known and whether they are completed or updated. The Work Performance Data as well as the Schedule Data and Project Calendar too will provide data on the project activities as well as be updated. The Organization’s Process Assets will allow or the use of any control tools, methods of monitoring and reporting as well as any policies, procedures and guidelines regarding controlling the project schedule during the control schedule phase.

4.4. Project Cost Management

The Project Cost Management according to PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs for projects, so that it may be completed within the cost allocated for deliverables (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Pg. 193).

The first process is Plan Cost Management which will have as an output the Cost Management Plan. This will then be used as an input for the second process which is estimating costs. The third process is determining budget. Controlling costs will not be thoroughly explored as the FGP focuses mainly on the initiating and Planning phases; however, it will be briefly described.

4.4.1 Plan Cost Management

Plan Cost Management is the process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs (PMBOK, Fifth Edition, Pg. 193) This process will use the Project Charter as the main input; however, it will also use some of the subsidiary plans within the Project Management Plan for the Construction of BEI2. These includes Scope Baseline, risk management plan and Schedule. The main tools used for this process was Expert Judgment and Meetings. The output was the Cost Management Plan. The template was used from an online Source (www.tn.gov; Cost Management Plan; September, 2017).

COST MANAGEMENT PLAN

BELTRAIDE CONSTRUCTION OF BEI2

9/29/2017

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- 1.0 Introduction
- 2.0 Project Cost Management Approach
- 3.0 Cost Estimation
- 4.0 Budget Determination
- 5.0 Roles and Responsibilities
- 6.0 Cost Performance Measurement
- 7.0 Cost Variance Response Process
- 8.0 Cost Change Control Process
- 9.0 Acceptance

1.0 Introduction

The Project Management Book of Knowledge (PMBOK, pg. 193) defines the three project cost management processes as follows:

- Plan cost management- the process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs.
- Estimate Costs – process of developing an approximation of the monetary resources needed for project activities
- Determine Budget - Aggregation of costs and activities to determine a cost baseline
- Control Costs - Monitoring project status to update budget and manage changes to the cost baseline

The Cost Management Plan will describe how the costs will be planned, structured and controlled (PMBOK, Pg. 198). The main purpose of this Cost Management Plan is to define the methodology by which costs associated with Construction of BEI2 will be managed throughout the project lifecycle.

This Cost Management Plan will:

- Outline the overall project cost management approach
- Outline how the project cost, budget and source of funding will be determined
- Identify who is responsible for managing costs, including who has the authority to approve changes to the project, its budget or sources of funding

2.0 Project Cost Management Approach

The Cost Management Plan approach for Construction of BEI2 requires that the project resources assist in establishing and managing the total cost of ownership of the project. It is essential that estimated budget be established, and subsequently, the measuring of actual spending against the planned budget.

The project manager and the Project Sponsor(s) for Construction of BEI2 will jointly create the cost baseline and the Cost Management Plan. Beginning with the preliminary cost estimates identified in the Initiation phase, the project manager will develop updated cost estimates to perform the work included in the revised schedule.

3.0 Cost Estimation

Cost estimation involves developing an approximation of the monetary resources needed to complete project activities. These estimates were predicted based on expert judgement as well as using information on past construction projects quoted by Edge Partners Col. Ltd. Costs are estimated for all resources that will be needed or used by the project, within the framework of its scope. This includes, but is not limited to labor, materials, equipment, hardware, software, services, and facilities.

Inputs into the cost estimation process include:

- Scope baseline
- Project schedule
- Human resource plan
- Risk register
- Enterprise environmental factors
- Organizational process assets

Outputs of the cost estimation process include:

- Estimates of cost for all project activities
- Documentation of the basis for the cost estimates
- Updates to project documents as necessary

The Cost Management Plan for Construction of BEI2 documents the methods to be used to manage and control the many internal and external cost components. These cost components include:

Internal

- Project management/project team resources
- Recruiting and hiring for additional staffing
- Hardware, software and other equipment
- Any software/ permits/licenses
- Training if needed

- Housing and facilities/ Security

External

- Vendor/supplier contract costs
- Construction costs
- Consultancies

A 'bottom-up' approach will be used for preparing a detailed cost estimate of each cost component involved with each project activity.

4.0 Budget Determination

Once the needs of the Construction of BEI2 have been determined, the project team will finalize the resource and staffing requirements necessary for the successful completion of the project. The Project Manager apply the respective costs for control accounts and staff labor categories as per each WBS element. The duration and labor costs are the two components to determine the estimates. WBS element costs will then be totaled and verified against the allotted project budget. Once all allocations have been reviewed and approved by the Project Manager, the project budget will be baselined. The project budget baseline may only be changed with authorization by the Project Sponsor.

5.0 Cost Management Roles & Responsibilities

The project manager will work with the Project Sponsor to define various roles and expectations for resources involved in managing the overall project cost. The project manager will ensure that the project is delivered on time and within budget. He will ensure to hold monthly reviews of cost and establish the necessary communication to project sponsors and team members as needed during the life of the project. Additional, during the monthly project status meeting, the cost performance for current month and that of the upcoming month will be discussed.

Performance will be measured using earned value, as defined below. The project manager is responsible for accounting for cost deviations and presenting the Project Sponsor, Project Steering Committee and Change Control Board with options for

resolving project budget differences (whether it is over or under). Only the Project Sponsor has the authority to make changes to the project to bring it back within budget.

6.0 Cost Performance Measurement

The project manager will build a total cost of ownership model for Construction of BEI2. This will capture all procurement and implementation costs, plus internal costs for staffing and related administrative and overhead costs, infrastructure, resources and other hardware needs. It will establish the total project baseline budget and a time-phased baseline budget by month and fiscal year for the development and implementation phases. Inputs are contract deliverable payments, project team staffing costs, budgeted amounts for infrastructure/construction costs, and all other anticipated costs to the project.

The approach for cost performance measurement is to use Earned Value Management (EVM) for measuring and controlling the project costs. EVM integrates project scope, cost, and schedule measures to help the project management team assess and measure project performance and progress.

7.0 Control Thresholds Established for Construction of BEI2:

Project team members will advise the Project Manager of any requests for expenditure to ensure all monies spent have been authorized and are within budget. All budget authority and decisions, to include budget changes, reside with the Project Sponsor. The project team has decided that it will be using earned value management method to control the project's budget. The four earned value metrics that will be used to measure the project's cost performance:

- Schedule Performance Index (SPI)
- Cost Variance (CV)
- Cost Performance Index (CPI)
- Schedule Variance (SV)

Details are listed further in the analysis.

8.0 Cost Change Control Process

The cost change control process will generally follow the established project change request process which generally entails submitting requests to the project sponsor who will review and present it to the Board of Directors.

ACCEPTANCE

Approved by:

Date: _____

Amparo Mason

Chairman, BOD, BELTRAIDE

CEO, Ministry of Economic Development, Petroleum, Investment, Trade and Commerce

Date: _____

Lejia Melanie Gideon

General Manager, Enterprise and Innovation Division, BELTRAIDE

Figure 28 BEI2 Project Cost Management Plan,, template retrieved from www.tn.gov/assets/entities/finance/attachments/TBSCostManagementPlan; September, 2017

4.4.2 Estimate Costs

Activity Cost estimate is an output of the Estimate Cost Process. Estimating cost is the process of developing an approximate monetary value of resources needed to complete project activities. Cost is estimated based on information known at the time of estimation, therefore estimates would tend to be broad at first and more specific as the project continues. This is because at the start of the project life cycle very little information would be available, however as the project progresses and more information become available estimations can be more defined more specific at a given time. Therefore, Information is gathered from other knowledge areas' outputs in order to inform the cost estimates.

In activity cost estimates, costs of all resources required to complete project activities should be included. This may include Direct Labor, Materials, IT, Facilities, allowance, exchange rates and Contingency reserves. To develop cost estimates, documentation of how estimates are developed, of assumptions, constraints as well as ranges and

confidence levels of estimates are needed.

4.4.2.1 Activity cost estimates for each activity

The activity cost estimates are expressed in United States Dollars (USD), and time to be worked is expressed in staff hours for standardization. Limited information is available to give a define cost estimate of work to be performed. Information was researched based on local market pricing as well as taking into consideration local minimum per hour rates as per labor law.

The information gathered suggested the least to the most and the suggested overtime cost per hour of hiring a professional. For example, the Project Manager according to Pay Scale would work from between \$47.50 to \$75.00 per hour. The least was used as the Optimistic cost, the most is used as the Mostly Cost and overtime being \$62.00 per hour is used as the Pessimistic Cost; the Program Evaluation and Review Technique (PERT) formula was used to calculate the Probability cost. The Project Team cost was calculated as a sum of the Project manager, Financial Manager, Modeler, Control Manager, Resource Manager and the Public Relations Manager's hourly cost (Please see following chart 8).

Chart 8 Estimated Resource Cost per hour (Source: Riverol, Hilberto, Architect, Edge Partners Co. Ltd.)

Resource Name	Cost per hour (Optimistic)	Cost/hour (Most Likely)	Cost per Hour (Pessimistic)	Probability Cost
Architect	\$25.00	\$37.50	\$95.00	\$47.50
Project Manager	\$47.50	\$62.50	\$75.00	\$62.00
Contractor	\$22.50	\$30.00	\$37.50	\$30.00
Accountant	\$37.50	\$50.00	\$62.50	\$50.00
Electrical	\$17.50	\$25.00	\$32.50	\$25.00

Resource Name	Cost per hour (Optimistic)	Cost/hour (Most Likely)	Cost per Hour (Pessimistic)	Probability Cost
Engineer				
Structural Engineer	\$47.50	\$67.50	\$72.50	\$65.00
Mechanical Engineer	\$47.50	\$67.50	\$72.50	\$65.00
Plumbing Engineer	\$25.00	\$37.50	\$50.00	\$37.50
Quantity Surveyor	\$17.50	\$25.00	\$32.50	\$25.00
Land Surveyor	\$37.50	\$50.00	\$62.50	\$50.00
Gofer	\$17.50	\$20.00	\$22.50	\$20.00
Foreman	\$25.00	\$37.50	\$42.50	\$36.50
Draftsman	\$17.50	\$25.00	\$37.50	\$26.00
Electrical Subcontractor	\$25.00	\$37.50	\$50.00	\$37.50
Plumbing Subcontractor	\$25.00	\$37.50	\$50.00	\$37.50
Tiling Subcontract	\$32.50	\$42.50	\$47.50	\$41.50

Resource Name	Cost per hour (Optimistic)	Cost/hour (Most Likely)	Cost per Hour (Pessimistic)	Probability Cost
or				
Window/Do or Subcontract or	\$25.00	\$37.50	\$42.50	\$36.50

Chart 9: Estimated Cost per Activity, and durations (Source: Riverol, Hilberto, Architect, Edge Partners. Co. Ltd)

Task Name	Time	Durations	Totals per activity
1.1 Design Development	438 hrs.	90 days	
1.1.1 Client and Building Req.	48 hrs.	17 days	\$15,000.00
1.1.2 Client Consultation and Building Research	48 hrs.	15 days	\$5000.00
1.1.3 Research Leed Materials and Methods	80 hrs.	14 days	\$5000.00
1.1.4 Perform Cost Analyses and Determine Initial Budget	140 hrs.	18 days	\$10,000
1.1.5 Preliminary Environmental Impact Assessment	50 hrs.	26 days	\$22,500

Task Name	Time	Durations	Totals per activity
1.2 Design	802 hrs.	84 days	
1.2.1 Architectural Design	500 hrs.	40 days	\$2,500.00
1.2.2 Project Design Review	10 hrs.	5 days	\$5000.00
1.2.3 Project Design Signoff	4 hrs.	2 days	\$25,000.00
1.2.4 Working Drawings	240 hrs.	25 days	\$22,500.00
1.2.5 Permits and Approvals	48 hrs.	12 days	\$12,500.00
1.3 Pre Construction	424 hrs.	40 days	
1.3.1 Pile Foundation Systems	240hrs	20 days	\$97,500
1.3.2 Mobilization	48 hrs.	10 days	\$30,000.00
1.3.3 Pre Construction	136 hrs.	10 days	\$15,000.00
1.4 Construction	4068hrs.	450 days	
1.4.1 Concrete Foundations	504 hrs.	40 days	\$90,000.00
1.4.2 CMU Masonry	875 hrs.	48 days	\$555,300.00
1.4.3 Floors and Ceilings	345 hrs.	35days	\$78,000.00
1.4.4 Windows and Doors	87 hrs.	14days	\$186,500.00
1.4.5 Internal Walls and Ceiling Grid Systems	195 hrs.	28days	\$375,000.00
1.4.6 Electrical and	236 hrs.	100 days	\$220,700.00

Task Name	Time	Durations	Totals per activity
Plumbing			
1.4.7 HVAC and BMS System	186 hrs.	60 days	\$150,500.00
1.4.8 Finishes and Details	863 hrs.	48 days	\$82,500.00
1.4.9 Interior and Exterior Painting and Ceiling	245 hrs.	56 days	\$279,500.00
1.4.10 Roof Insulation and Painting	450 hrs.	35 days	\$117,000.00
1.4.11 Site Works	82 hrs.	18 days	\$25,000.00
1.5 Post Construction	298 hrs.	30 days	
1.5.1 Contractor Punch list	232 hrs.	18 days	\$3000.00
1.5.2 Site Analyses and Cleanup	50 hrs.	9 days	\$7000.00
1.5.3 Final Building Inspection	10 hrs.	2 days	\$2,000.00
1.5.4 CBA Application for Occupancy Certificate	6 hrs.	1 days	\$1000.00
1.6 Project Closure	238 hrs.	55 days	
1.6.1 Final Accounts Reconciliation	30 hrs.	5 days	\$5000.00
1.6.2 Sub-Contractors Retention	48 hrs.	10 days	\$10,000.00
1.6.3 Manufacturer's Warranty	50 hrs.	15 days	\$15,000.00

Task Name	Time	Durations	Totals per activity
1.6.4 Building As-Built	50 hrs.	20 days	\$5,000.00
1.6.5 Building Maintenance Manual	60 hrs.	5 days	\$2,500.00
1.7 Project Management	171 hrs.	25 days	
1.7.1 Planning	40 hrs.	5 days	\$17,000.00
1.7.2 Scheduling	24 hrs.	4 days	\$5000.00
1.7.3 Accounting	48 hrs.	5 days	\$8,000.00
1.7.4 Reporting	20 hrs.	5 days	\$2000.00
1.7.5 Meetings	24 hrs.	4 days	\$5000.00
1.7.6 Site Management	15 hrs.	2 days	\$5000.00
Project End	0 hrs.	0 days	

4.4.3 Project budget

4.4.3.1 Process description and importance

This process involves determining the project budget which involves combining the estimated costs of the individual activities in the project to establish a cost baseline. Several key documents will be used to develop the budget including but not limited to the activity cost estimates, project schedule and scope baseline. Cost aggregation and reserve analysis will be used to provide the approved cost baseline of the project.

4.4.3.2 Project budget chart

The budget Includes: coding, activity name, cost, total project cost, reserves (contingency reserve and management reserve including the justification for both).

The activities in the Construction of BEI2 Design, and Construction are given a contingency reserve as estimated in the risk assessment. Management reserve of 3% of the total cost of the project will be used to cover all unforeseen risk that could affect the project budget cost.

See table 4 below for the details of the budget

Chart 10 Construction of BEI2 Project Budget Details (Source: Riverol, Hilberto, Architect, Edge Partners. Co. Ltd)

Activity Code	Task Name	Work	Duration	Cost	Totals	Contingency Reserve to mitigate risks
	BEI2 Building Project	13,265 hrs	774 days			
1.1	Design Development	438 hrs	90 days		\$57,500.00	\$1,000.00
1.1.1	Client and Building Requirements	48 hrs	17 days	\$15,000.00		
1.1.2	Client Consultation and Building Research	120 hrs	15 days	\$5,000.00		
1.1.3	Research LEED Materials and Methods	80 hrs	14 days	\$5,000.00		
1.1.4	Perform Cost Analyses and Determine Initial Budget	140 hrs	18 days	\$10,000.00		
1.1.5	Preliminary Environmental Impact Assessment	50 hrs	26 days	\$22,500.00		
1.2	Design	802 hrs	84 days		\$67,500.00	
1.2.1	Architectural Design	500 hrs	40 days	\$2,500.00		
1.2.2	Project Design Review	10 hrs	5 days	\$5,000.00		
1.2.3	Project Design Signoff	4 hrs	2 days	\$25,000.00		
1.2.4	Working Drawings	240 hrs	25 days	\$22,500.00		
1.2.5	Permits and Approvals	48 hrs	12 days	\$12,500.00		
1.3	Pre-Construction	424 hrs	40 days		\$142,500.00	4500
1.3.1	Pile Foundation System	240 hrs	20 days	\$97,500.00		
1.3.2	Mobilization	48 hrs	10 days	\$30,000.00		
1.3.3	Pre-Construction	136 hrs	10 days	\$15,000.00		

Activity Code	Task Name	Work	Duration	Cost	Totals	Contingency Reserve to mitigate risks
1.4	Construction	4068 hrs	450 days		\$2,160,000.00	\$28,400.00
1.4.1	Concrete Foundations	504 hrs	40 days	\$90,000.00		
1.4.2	CMU Masonry	875 hrs	48 days	\$555,300.00		
1.4.3	Floors and Ceilings	345 hrs	35 days	\$78,000.00		
1.4.4	Windows and Doors	87 hrs	14 days	\$186,500.00		
1.4.5	Internal Walls and Ceiling Grid System	195 hrs	28 days	\$375,000.00		
1.4.6	Electrical and Plumbing	236 hrs	100 days	\$220,700.00		
1.4.7	HVAC and BMS System	186 hrs	60 days	\$150,500.00		
1.4.8	Finishes and Details	863 hrs	48 days	\$82,500.00		
1.4.9	Interior and Exterior Painting and Ceiling	245 hrs	56 days	\$279,500.00		
1.4.10	Roof Insulation and Painting	450 hrs	35 days	\$117,000.00		
1.4.11	Site Works	82 hrs	18 days	\$25,000.00		
1.5	Post Construction	298 hrs	30 days		\$13,000.00	
1.5.1	Contractor Punch list	232 hrs	18 days	\$3,000.00		
1.5.2	Site Analyses and Cleanup	50 hrs	9 days	\$7,000.00		
1.5.3	Final Building Inspection	10 hrs	2 days	\$2000.00		
1.5.4	CBA Application for Occupancy Certificate	6 hrs	1 day	\$1000.00		
1.6	Project Closure	238 hrs	55 days		\$37,500.00	
1.6.1	Final Accounts Reconciliation	30 hrs	5 days	\$5,000.00		
1.6.2	Sub-Contractors Retention	48 hrs	10 days	\$10,000.00		
1.6.3	Manufacturer's Warranty	50 hrs	15 days	\$15,000.00		
1.6.4	Building As-Builts	50 hrs	20 days	\$5,000.00		

Activity Code	Task Name	Work	Duration	Cost	Totals	Contingency Reserve to mitigate risks
1.6.5	Building Maintenance Manual	60 hrs	5 days	\$2,500.00		
1.7	Project Management	171 hrs	25 days		\$42,000.00	
1.7.1	Planning	40 hrs	5 days	\$17,000.00		
1.7.2	Scheduling	24 hrs	4 days	\$5,000.00		
1.7.3	Accounting	48 hrs	5 days	\$8000.00		
1.7.4	Reporting	20 hrs	5 days	\$2,000.00		
1.7.5	Meetings	24 hrs	4 days	\$5000.00		
1.7.6	Site Management	15 hrs	2 days	\$5,000.00		
	Project End	0 hrs	0 days	\$0.00		
				Total	\$2,520,000.00	\$33,900

4.4.4 Cost control procedure

The cost control process ensures the status of the project is monitored in order to update costs and manage changes to the cost baseline. The project team is cognizant that the cost control process manages the factors that create changes to the cost baseline to ensure that changes are beneficial, verifies if there have been changes to the cost baseline, and manages the actual changes when and as they occur.

4.4.4.1 Detailed description of how the project budget is to be controlled

Project team members will advise the Project Manager of any requests for expenditure to ensure all monies spent have been authorized and are within budget. All budget authority and decisions, to include budget changes, reside with the Project Sponsor. The project team has decided that it will be using earned value management method to control the project's budget. The four earned value metrics that will be used to measure the project's cost performance:

- Schedule Performance Index (SPI)
- Cost Variance (CV)
- Cost Performance Index (CPI)
- Schedule Variance (SV)

The Project Manager will apply earned value calculations to account for cost deviations and present the Project Sponsor with options for getting the project back on budget. Cost and Schedule Performance Index (CPI and SPI respectively) will be reported on a monthly basis by the Project Manager to the Project Sponsor. Variances of 10% or +/- 0.1 in the cost and schedule performance indexes will be reported and if it's determined that there is no or minimal impact on the project's cost or schedule baseline then there may be no action required. Cost variances of 20%, or +/- 0.2 in the cost and schedule performance indexes will also be reported and require corrective action from the Project Manager in order to bring the cost and/or schedule performance indexes back in line with the allowable variance. Any corrective actions will require a project change request and be must approved by the

Steering Committee before it can be implemented.

Microsoft Projects will be used for monitoring the Earned Value dimensions (Planned Value (PV), Earned Value (EV) and Actual Cost (AC)), displaying graphical trends and for forecasting possible project outcomes.

2.4.3. Cost change management process description

The project team will use a cost change control system to manage changes to cost baseline. Any corrective action to the project cost will require a project change request that must be approved by the Steering Committee or the Project Sponsor before it can be applied within the scope of the project. The management reserve is to be authorized by the project sponsor when and if the amounts allocated there need to be used.

3. Deliverable conclusions

Below is a summary of the project budget inclusive of cost baseline, contingency and management reserve. The management reserve was calculated at 3% of budget cost baseline considering the project has a low risk and based on expert judgement and company regulations, this percentage is within an acceptable range.

Chart 11: Summary of BEI2 Construction Budget (source: Riverol, Nilda, Author, September, 2017)

Construction of BEI2	
Design Development	\$57,500.00
Design	\$67,500.00
Pre-Construction	\$142,500.00
Construction	\$2,160,000.00
Post Construction	\$13,000.00
Project Closure	\$37,500.00
Project Management	\$42,000.00

Construction of BEI2	
Cost Baseline	\$2,520,000
Contingency reserve	\$33,900
Management Reserve (3%)	\$67,200.00
Total Project Budget	\$2,621,100.00

The total project budget inclusive of the contingency reserves and management reserve is \$2,621,100.00.

4.5. Project Quality Management

Quality Management is defined as the processes and activities that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Pg. 227). In the context of quality management for the Construction of BEI2, the following process will be developed:

Plan Quality Management: This is the process of identifying quality requirements and/or standards for the project and its deliverables. In addition, the process documents how the project will demonstrate compliance with quality requirements and/or standards (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition Pg. 227).

The template used for the quality management plan was adapted from an online source (<http://project-management.magt.biz/templates>, **October, 2017**). The template was further modified to fit the context of the construction of BEI2 Project. The expertise of BELTRAIDE as it relates to construction projects is limited; therefore, the quality management plan will be essential to developing a good framework to ensure compliance with deliverables.

The inputs used for the development of the quality management plan was the stakeholder register, the risk register, requirements listed under the scope management plan. The tools will mainly be meetings, and checklists considering BELTRAIDE has requested an easy to understand approach for the plans considering the limited know how of Construction projects.

PROJECT QUALITY MANAGEMENT PLAN

BELTRAIDE

CONSTRUCTION OF BEI2

10/12/2017

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- 7.0 Quality Measurement and Tools

1.0 Introduction

The Quality Management Plan (QMP) for the Construction of BEI2 project will identify mainly the activities and procedures for ensuring a that the end product is within the quality demands by the customer. These quality is expected to be executed and maintained throughout the life of the project. The main purpose of the quality management plan is to define quality; however, it also includes outlining how quality will be managed, determine the quality assurance activities, activities for quality control and to determine what are the acceptable quality standards.

The purpose of the Construction of BEI2 Quality Management Plan is to establish the objectives/goals, procedures, and responsibilities/tasks that will be necessary for the oversight of the construction from start to finish. This QMP defines how the Construction and overall Project Team will implement, support, and communicate project quality practices for use with the Construction of BEI2 Project.

2.0 Quality Management Approach

The quality management approach for Construction of BEI2 will help ensure quality is planned for both the product and processes. The main approach for quality management is ensuring that stakeholders and quality assurance team members are engaged from the start of project. This will minimize or prevent many quality related issues. The Construction of BEI2 project will also use weekly and monthly project quality measurement reports as a tool to communicate any quality risks or issues that arise.

In the subsequent sections of this document, the following quality management approach elements are described and defined:

- Quality Planning, Quality Assurance, and Quality Control
- Quality activities & standards relevant to Construction of BEI2
- Appropriate quality metrics and measures
- Roles and responsibilities
- Tools for quality

3.0 Quality Planning

Quality planning is the process of identifying quality requirements and/or standards for the project and its deliverables (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Pg. 231). This includes documenting how the project will ensure compliance to the expectations set for the project.

The QMP is created during the Planning Phase of the project and for which the intended audience is the project manager, the project team members, the Project Sponsor and any other key stakeholder who need to support the implementation of the plan. All project members have a responsibility to ensure compliance in the Implementation of the QMP. Technical staff is to ensure that communication is consistent with all relevant stakeholders, and the project manager is to ensure that quality metrics are clearly understood by all members of the team and key stakeholders.

4.0 Quality Assurance

Quality assurance for the construction of BEI2 will be iterative considering it is crucial that information, procedures, processes, and metrics throughout the life of the project be adhered to as per standards set within the plan. To identify, assess, respond to, monitor, and control project quality, all relevant stakeholders will be involved.

The project manager will schedule regularly meetings to review the findings of the quality assurance activities, and in these meetings the sponsor is to be present so that process improvement can be integrated in the discussion if it's necessary. All decisions made in relation to process improvement efforts must be **documented**, implemented, and communicated to all team members and relevant stakeholders.

It is important to mention that within the scope the specific details of what the requirements for the project are in relation to the specifications. Inspections is a cost of conformance but which will be integrated within this project. The building has

specific requirements it must meet and quality will not be accepted unless the construction parameters as highlighted in the requirements management plan is adhered to.

The matrix below describes the quality assurance standards for the Construction of BEI2 project:

Chart Quality Assurance Standards for the Construction of BEI2 (Source: Riverol, Hilberto)

Project Process	Quality Assurance Standard	Inputs needed:
Project Schedule Management	<ul style="list-style-type: none"> • <u>Objective:</u> Verification that Project Schedule Management activities are performed as per the agreements within the Schedule Management Plan. • <u>BEI2 Project Schedule Management Plan:</u> <ul style="list-style-type: none"> • Project schedule review meetings occur • Project schedule review meetings are well attended and that the key and relevant stakeholders are present • Modifications to the project schedule approved and tracked • Action items from review meetings are documented and tracked to completion 	<ul style="list-style-type: none"> • Schedule Management Plan • Project Schedule Standards • Project documents

Project Process	Quality Assurance Standard	Inputs needed:
BEI2 Design Review	<ul style="list-style-type: none"> • <u>Objective</u>: Verification that Design Review activities are performed via a documented process. • <u>Per Design Review standards document</u>: <ul style="list-style-type: none"> • Design review meetings occur and are well attended (this means that majority of the key stakeholders are present) • Modifications to the design documents are approved, tracked, and documented appropriately • A process is in place to communicate design changes • Executive review and analysis of design quality, based on checklists, occurs on schedule and approvals are all secured on time 	<ul style="list-style-type: none"> • Local Design Standards and regulations • Design Review Process Document
Change Management	<ul style="list-style-type: none"> • <u>Objective</u>: Verification that Change Management activities are performed via a documented process. • <u>Per Change Management Plan</u>: <ul style="list-style-type: none"> • Change Management meetings are well attended • Agenda created for each meeting and distributed at least 24 hours' prior via a communications method that is accessible and reliable • Minutes for each meeting are generated and are shared at least within 48 hours since its inception • Roles and responsibilities are well defined • Communication of changes process established 	<ul style="list-style-type: none"> • Project Management Plan

Project Process	Quality Assurance Standard	Inputs needed:
<p>Test and inspection Management (Product and process functionality testing and validation)</p>	<ul style="list-style-type: none"> • <u>Objective:</u> Verification that Test Management activities for the product and processes for the Construction of BIE2 are performed via a documented process. • <u>Per Test Management Plan:</u> <ul style="list-style-type: none"> • Test review procedures for either construction process or product testing or inspection are well-defined • Rigorous inspections methods in place and being used consistently and logged weekly and/or as they happen • Procedures for testing of quality are user friendly (content is easy to understand and implement by all team members) • Inspection results and/or changes to the product or process are tracked in the inspection log • Concrete testing should be done to meet desired pounds per square inch (psi) as recommended by structural Engineer (BEI2 should have a minimum of 4500psi) • Concrete blocks must be tested to determine block density and water absorption • Onsite steel inspection should be conducted to ensure all steel meet American Society for Testing and Materials (ASTM) standards • Windows should meet Miami Dade Specifications 	<ul style="list-style-type: none"> • Testing and inspection Standards and Guidelines • Testing and inspection of construction Management Plan & Approach i.e quality assurance log tools; quality control log tools • Lab and test results for concrete • ASTM standards for steel testing • Miami Dade specifications for windows

5.0 Quality Control

Based on PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition), control quality

(QC) is the process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes (Pg. 248). The Construction of BEI2 QC process will involve verification, validating and monitoring of work processes, and products and ensure compliance to scope and quality requirements. This will entail inspection activities and ensuring that deliverables inspected are in accordance to the standards set by stakeholders. The construction standards have been determined and BETRAIDE have explained the functionality standards expected; therefore, the project manager with the assistance of the Contractor and Site Foreman will ensure that the relevant standards are compliant during the life of the project as the activities occur.

Quality control will be done on related project products such as project schedule inspections with the main standard being resources to not exceed the project's allocated amounts, and if any change orders are to occur for it to be properly reflected on the schedule. Additionally, it is imperative that audits be done on the requirements of the construction of BEI2. The project team will ensure that all performance standards are adhered to on the construction site. The quality assurance and quality control logs are to be used. In addition, checklists will be used as needed.

6.0 Quality Management Roles and Responsibilities

All members of the Construction of BEI2 project team will play a role in quality management

Quality roles and responsibilities for the Construction of BEI2 Project are as follows:

Construction of BEI2 Project Sponsor

- Responsible for developing along with the project key technical and non-technical stakeholders approving all quality standards for the Construction of BEI2 Project
- Review quality reports and assist in resolution of escalated issues
- Sign off authority on the final acceptance of the project deliverables

Construction of BEI2 Project Manager

- Provide overall leadership of quality management activities, including managing quality reviews and overseeing follow-on corrective actions
- Generate and maintain a schedule of software through Building Information Modelling (BIM) quality assurance activities
- Schedule and perform evaluations of process quality assurance reviews
- Escalate non-compliance issues to the project sponsor.
- Update the Quality Management Plan and maintain the overall quality standards for the Construction of BEI2.
- Perform QA activities and QC inspections as appropriate
- Communicate results from assessments with relevant stakeholders
- Identify lessons learned that could improve processes for future products

Construction of BEI2 Contractor

- Participate in quality management meeting reviews as required
- Ensure resolution of non-compliance instances and escalate any issues that cannot be resolved within the project

Construction of BEI2 Site foreman

- Oversee and support the application of quality standards for the Construction of BEI2 Project processes and products to their respective team members
- Participate in quality management meeting reviews as required
- Create and maintain Quality Control and Assurance Logs throughout the project
- Conduct process and product assessments, as described within this plan, using objective criteria
- Provide oversight to the closure of corrective actions arising from quality reviews

Construction of BEI2 Engineers/Architects/Consultants

- Oversee and support the application of quality standards for the Construction of BEI2 Project processes to their assigned processes
- Recommend tools and methodologies for tracking quality and standards to establish acceptable quality levels
- Participate in quality management reviews if required

7.0 Quality Tools and Measurements for BEI2

The Construction of BEI2 products and processes identified in the quality planning sections of this document must be measured and should fall within the established standards.

The tables below are examples of quality assurance/quality control logs that may be used by the Construction of BEI2 Project Team. These logs will also be retained as supporting documentation.

7.1 BEI2 Quality Control Log

PROJECT DELIVERABLE ID #	Review Date	Deliverable Reviewed/inspected	Findings	Resolution	Acceptance (Y/N)	Date accepted or resolved
BEI2-QC-1						

7.2 BEI2 Quality Assurance Log

PROJECT PROCESS ID #	Review Date	Process Reviewed/tested/inspected	Findings	Resolution	Acceptance (Y/N)	Date accepted or resolved
BEI2-QA-1						

The Construction of BEI2 team may use many different tools when performing quality management activities for the project. These tools are listed below:

7.3 Software Quality Tools

- Microsoft Office Tools (i.e. Project, Word, Excel, and PowerPoint)

- BIM 360 field

8.0 Acceptance

Approved by:

_____ Date: _____

Amparo Masson
Construction of BEI2
BELTRAIDE BOD Chairman and CEO of Ministry of Economic Development,
Petroleum, Investment, Trade and Commerce

_____ Date: _____

Lejia Melanie Gideon
Construction of BEI2 Sponsor
General Manager, BELTRAIDE

Figure 29 BEI2 Project Quality Management Plan, template retrieved from <http://project-management.magt.biz/templates>, project quality management plan, October, 2017

4.6. Project Human Resources Management

Human Resources Management (HRM) is defined by PMBOK as the processes that organize, manage, and lead the project team (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition Pg. 255). This plan has the following processes:

9.1 Plan Human Resource Management—The process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan.

9.2 Acquire Project Team—The process of confirming human resource availability and obtaining the team necessary to complete project activities.

9.3 Develop Project Team—The process of improving competencies, team member interaction, and overall team environment to enhance project performance.

9.4 Manage Project Team—The process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

Figure 30 Project Human Resources management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013. Pg. 255

For the context of The Construction of BEI2 we are going to focus on plan human resource management, and the inputs and tools used for the development of the HRM plan as the main output of this process was mostly expert judgement and meetings as the tools and the inputs were activity resource requirements to ensure that all considerations for staffing was identified. The template used was downloaded from an online source (<http://www.projectmanagementdocs.com/project-planning-templates.html#axzz4tTWUESrm>) and adapted to the context of the project under analysis.

4.6.1 Plan Human Resource Management

This process is described by PMBOK as the process of identifying and documenting project roles, responsibilities, required skills, reporting relationships and creating a staffing management plan. The following Human Resource Management Plan will include:

- **Roles and responsibilities**
 - Authority
 - Responsibilities
 - Competency
- **Project organizational chart**
- **Staffing management plan**
 - Staff acquisition
 - Resource calendars
 - Staff release
 - Training needs
 - Recognition and rewards
 - Compliance
 - Safety

HUMAN RESOURCES MANAGEMENT PLAN

BELTRAIDE
Construction of BEI2

11/15/2017

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- 1.0 Introduction
- 2.0 Roles and Responsibilities
- 3.0 Project Organizational Chart
- 4.0 Staffing Management
- 5.0 Project Team Training
- 6.0 Acceptance

1.0 Introduction

Organizing and identifying the personnel that is qualified for the Construction of BEI2 is crucial. Therefore, the main purpose of the Construction of BEI2 Human Resource Plan is to achieve project success by guaranteeing the suitable human resources with the required skills, Another reason is to ensure that team activities are managed efficiently. It is expected that the HR plan become a tool to aid in the management of human resource activities throughout the Construction of BEI2 until closure.

This plan includes information regarding the following topics:

The following Human Resource Management Plan will include:

- **Roles and responsibilities**
 - Authority
 - Responsibilities
 - Competency
- **Project organizational chart**
- **Staffing management plan**
 - Staff acquisition

- Resource calendars
- Staff release
- Training needs
- Recognition and rewards
- Compliance
- Safety

2.0 Roles and Responsibilities

The roles and responsibilities for the Project team of the BEI2 building are essential to execute a successful project. The roles and responsibilities of all team members must be clearly defined and understood to successfully carry out their responsibilities in the project. The BEI2 project will have the following team members with their determined roles and responsibilities.

Architect (A), (1 position): The architect is the main interface for the building owner, the architect will develop the owner's facility program and assemble a design team. He will be responsible for how smart and eco-friendly the building will be. The architect will develop a facility program in collaboration with specialized facility programmers, engineers, consultants, facility managers, contractors and manufacturers. He will have to meet the owner's objectives, values and preferences, and identify the needs and considerations related to the aesthetics, economics, regulatory issues, energy, sustainability, and functionality of the BEI2 building.

Project Manager (PM- who will be Edge Partners Co. Ltd. as Consultant for BELTRAIDE), (1 position): The main responsibility for this position is the overall success of the project, the PM will have the overall responsibility for the successful planning, execution, monitoring, control and closure of the BEI2 project, he must be able to perform effectively within tight time-scales, keep within budget and create a positive owner environment such that the owner remains in a good relationship throughout the project. The PM will manage a set of deliverables, which must be achieved on time to ensure all activities in the schedule are completed in time, the

PM must be able to show initiative and find ways to best adapt a situation to provide a successful overall critical path analysis. It is expected that the PM support the development of the leadership, both on site and in the office. The PM must possess the following skills, leadership/management, budgeting, scheduling, and effective communication.

Contractor- (CO), (1 position): The main role of the contractor is to manage the site on a day by day basis, he is to delegate all task to sub-contractors and make sure all construction standards and being followed as specified by Architect and Engineer. Must hold site visits daily with sub-contractors and meet bi-monthly with Architect to discuss project plan forward, reports directly to Project Manager. The contractor must be able to communicate diligently with all involved stakeholders and must keep daily work site diary of works being carried out

Accountant/Finance officer (AC/FO), (1 position): The main role of the accountant is the responsibility of all financial transactions and financial reporting pertaining to the BEI2 project.

Electrical Engineer (EE), (1 position): The EE is responsible to acquire the proper permits from Public Utilities Commission (PUC) for the energizing of the BEI2 building, he is responsible for ensuring that the building operates at an optimum and efficient electrical capacity. The EE has to design and calculate all electrical loads and produce power supply plan, lighting layouts location and installation requirements for all electrical panels and sub panels, these must be submitted to architect for review and approval.

Structural Engineer (SE), (1 position): The responsibility of the SE is to design the structural integrity of the building and at the same time taking into consideration the use of eco-friendly materials and structural design systems, he must ensure that the building meets hurricane maximum wind requirements, there must be constant communication with the architect to ensure that structural design does not affect

aesthetics of building design, structural calculations and plans must be presented to architect for approval.

Mechanical Engineer (ME), (1 position): The responsibility of the ME is to design the Air-Conditioning System, the design must be an eco-friendly system with a high efficiency, the recommended use of chill water system (CWS) must be considered in design. He must to proper load calculations for all areas to provide the necessary cooling capacities to maintain proper airflow measured in cubic feet per minute (CFM) and comfortable working temperatures. Design of ducting air supply and returns, air handler sizes and capacities, chilled water pipes and variable speed pumps and Building Management System (BMS) must be submitted to architect for review and approval.

Plumbing Engineer (PE), (1 position): The responsibility of the PE is to design and layout engineering drawings within the plumbing specialty. He must complete calculations including water supply, storm water and equipment sizes. The plumbing systems must include sanitary waste, vent, storm, water distribution system, and potable purified water systems. He must design and specify schedules, sizes and plumbing component systems and equipment's. he must be able to assist in developing and maintaining plumbing schedules and budgets. He must produce design of all plumbing locations and specifications and resent to architect for review and approval.

Quantity Surveyor (QS), (1 position): The main responsibility of the QS at the construction phase of the project is to keep the project cost on track, the QS can make in terms of value-addition in project delivery. Apart from measuring and estimating of quantities and cost of the building project, he must also play a part in the project management, contract administration, dispute resolutions, and insurance valuation. The QS must be involved in Pre-contract advising to include preliminary cost and procurement advice and post-contract to focus mainly on contractual administration and financial management, cost reporting and cost control.

Land Surveyor (LS), (1 position): The responsibilities of the LS are to develop work plans, methods and procedures to perform surveying task. He must collect and analyse field data, perform complex survey and engineering computations. The LS must conduct surveys to determine precise location of building and measurements of points, elevations, areas and contours to ensure proper site drainage. He must be able to keep accurate notes, records and sketches to describe and certify works performed by contractors.

Gofer (G), (1 position): The responsibility of the gofer is to run the day to day errands for the project, there is no skilled task assigned to gofer unless requested by project manager, duties mainly include errand runs for site office.

Foreman (F), (1 position): Equivalent to a site manager. The main responsibilities of the foreman are to provide leadership and supervising that result in a safe work culture, is directly responsible and accountable for the safety of the crew under his/her direction, and must understand and accept the legal liability of the role. The foreman coordinates the crew, and must understand and consistently apply the general foreman's policies, he is required to be involved and supportive of any day by day disciplinary decisions. The foreman is accountable for following project plans and schedules ensuring that crews under his/her direction perform daily and weekly activities to meet production goals as per schedules. The foreman must champion an inclusive employee culture, is accountable for the adherence to policies and procedures by the crew to ensure respectful and inclusive work environment. The foreman is accountable for ensuring that the completed work meets quality standards and preparation of reports as required by PM.

Draftsman (D), (1 position): The responsibilities of the foreman include the revision and red-lining of construction document sets. Must be able to work in 2D and 3D detailing of drawings requested by architect. Will also be responsible to design

details based on change orders and addendums requested by contractors and architect.

Electrical Subcontractor (ES), (1 position): Responsible for the proper understanding of electrical plans as issued by electrical engineer, responsible for the installation and maintenance of all electrical systems, including wiring, breaker boxes, switched and other machinery that require power supply.

Plumbing Subcontractor (PS), (1 position): Responsible for the proper understanding of plumbing plans as issued by plumbing engineer, responsible for the installation and maintenance of all plumbing systems, including installation of all piping and sanitary fittings, ensure pressure testing on all water supply systems and testing of all gray and storm water discharges.

Tiling Subcontractor (TS), (1 position): Responsible for the proper understanding of tile layout plans as issued by architect, responsible for the installation of tiles as per specifications, ensure along with surveyor that all finish levels are in accordance with building sectional elevations.

Windows and Doors Subcontractor (WDS), (1 position): Responsible along with site foreman that all window and door openings meet specifications as specified by window and door supplier. Ensure the proper installation of all windows and doors with specified fixing methods, ensure that all ironmongery and are in good operational condition, ensure that installation is carried out as per schedule.

Project Stakeholders Roles & Responsibilities

Listed below are the roles and responsibilities for the Construction of BEI2 project main stakeholders:

Project Sponsor-BELTRAIDE and Ministry of Economic Development, Petroleum, Investment, Trade and Commerce

- Provides the necessary guidance, inclusive of the vision, direction, and policy leadership for the project
- Facilitates the removing of barriers and supports change requests management initiatives
- Participates in the Steering Committee, and provides support to this group as needed
- Has overall authority for the project
- Responsible for ensuring that the project team through the effective supervision of the PM are executing and meeting deliverables as defined in the Project Charter and subsequent project plans
- Provides high-level project direction, receives project status updates, and addresses and resolves issues, risks, or change requests

Steering Committee

- The steering committee comprises of the project sponsor-BELTRIADE General Manager, and CEO of Ministry who represents the Board of Directors, and key BELTRAIDE members of staff such as Sr. Project's officer, SBDCBelize Manager, ExportBelize Manager, Finance Officer
- Ensures that the deliverables and functionality of the project are achieved as defined in the project initiation documents and subsequent project management plans

3.0 Project Organizational Charts

The below chart illustrates the information that highlights the reporting structure and responsibilities of team members as they relate to the project. The Responsible/Accountable/Consulted/Informed (RACI) matrix or Responsibility Assignment Matrix (RAM) will be used to aid in communicating roles and responsibilities for the project team.

The graphic below provides a representation of the reporting structure for the Construction of BEI2.

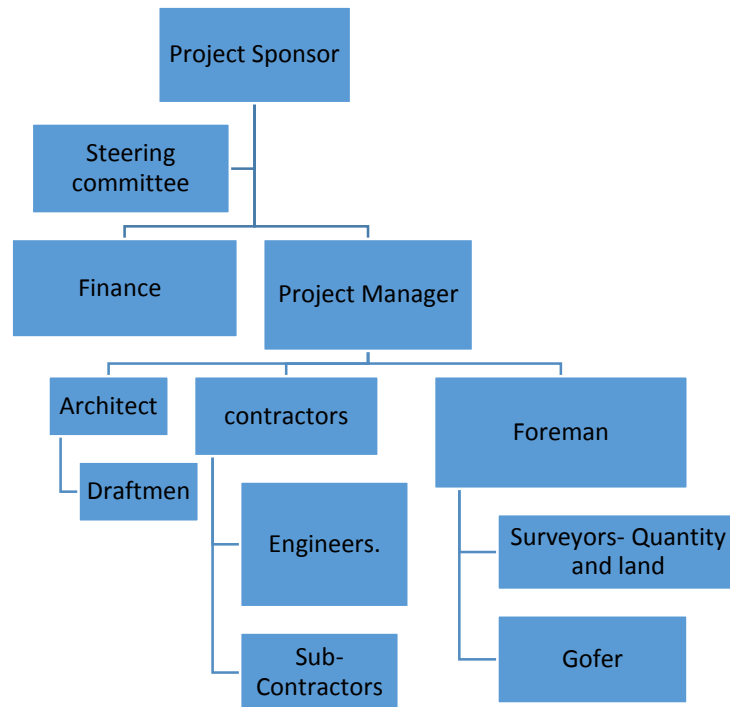


Figure: Organizational Chart- BEI2 Construction Project

The following RACI chart shows the relationship between project tasks and team members.

Activity	Project Sponsor	Project Manager	Steering Committee	Finance Officer	Contractor	Architect	Mechanical Engineer	Structural Engineer	Electrical Engineer	Plumbing Engineer	Quantity Surveyor	Land Surveyor	Gofer	Foreman	Draftsmen	Sub-contractors
Approval for Environmental Impact Assessment	I	R	I	I	I	I										
Completion of Working Drawings Submittal to CBA for Permitting	I	A	I	I		R										
Permits of No Objection to construction by CBA	I	A; R	I	I		R; A										
Contractor Tendering Commence	C; I	R	C; I	C												
Contractor Tendering Complete	C; I	R	C; I	C	I											
Awarding of Contracts	R	I	C; A	C; I	I											
Procurement and Sourcing of Materials Commence	C; I	A	C; I	I	A									C; I		I
Commencement of Construction	I	A	C; I	I	R	R					R	R	R	R		I
Mobilization of Works Commence	I	A	C; I	I	R						I	I	I	R		I
Site Set out and Piling Commence	I	A		I	R							R; A		R		

Activity	Project Sponsor	Project Manager	Steering Committee	Finance Officer	Contractor	Architect	Mechanical Engineer	Structural Engineer	Electrical Engineer	Plumbing Engineer	Quantity Surveyor	Land Surveyor	Gofer	Foreman	Draftsmen	Sub-contractors
First Floor Plumbing and Electrical Rough-In Commence	I	A		I	R				R; A	R; A				R		
First Floor Beam and Stub Column	I	I		I	R		C	C	C	C				A		A
First Floor Retention Wall	I	I		I	R			C						A		A
First Floor Slab, Beam and Column	I	I		I	R		C	C	C	C				A		C
First Floor CMU Walls	I	I		I	C		C		C	C				A		R
First Floor Steps and Ramps	I	I		I	R			C						I		C
First Floor Tile Finish	I	I		I	C							C		I		R
First Floor Drywall Work	I	I		I	C		C		C	C				I		R
Second Floor Beams and Columns Commence	I	I		I	R			C		C				I		C
Second Floor Slab	I			I										I		
Second Floor Plumbing and Electrical Rough-In	I	I		I	C					C				I		R
Second Floor Columns	I	I		I	R									I		R
Second Floor Steps	I	I		I	C			C				C		I		R
Second Floor CMU Walls	I	I		I	C									I		R

Activity	Project Sponsor	Project Manager	Steering Committee	Finance Officer	Contractor	Architect	Mechanical Engineer	Structural Engineer	Electrical Engineer	Plumbing Engineer	Quantity Surveyor	Land Surveyor	Gofer	Foreman	Draftsmen	Sub-contractors
Second Floor Tile Finish	I	I		I	C						C			I		R
Second Floor Drywall	I	I		I	C				C	C				I		R
Roof Beams	I	I		I	R			C		C				I		C
Roof Slab	I	I		I	R			C		C		C		I		C
Ground Floor Window / Door Installation	I	I		I	C									I		R
Second Floor Window / Door Installation	I	I		I	C									I		R
Electrical and Plumbing Finishes Installation	I	I		I	C					C						R
Main HVAC Intallation Installation	I	I		I	C		C			C						R
Interior Wall Finishes	I	I		I	C											R
Exterior Wall Finishes	I	I		I												R
Exterior Works	I	I		I	C							R				R
Systems Test	I	I		I	C		R	R	R	R						C
Occupancy Certificate Issued	I	R				I										

RACI Matrix for Construction of BEI2 (Source: Riverol, Nilda, Author)

Key: R – Responsible for completing the work; A – Accountable for ensuring task completion/sign off; C – Consulted before any decisions are made; I – Informed of when an action/decision has been made

4.0 Staffing Management

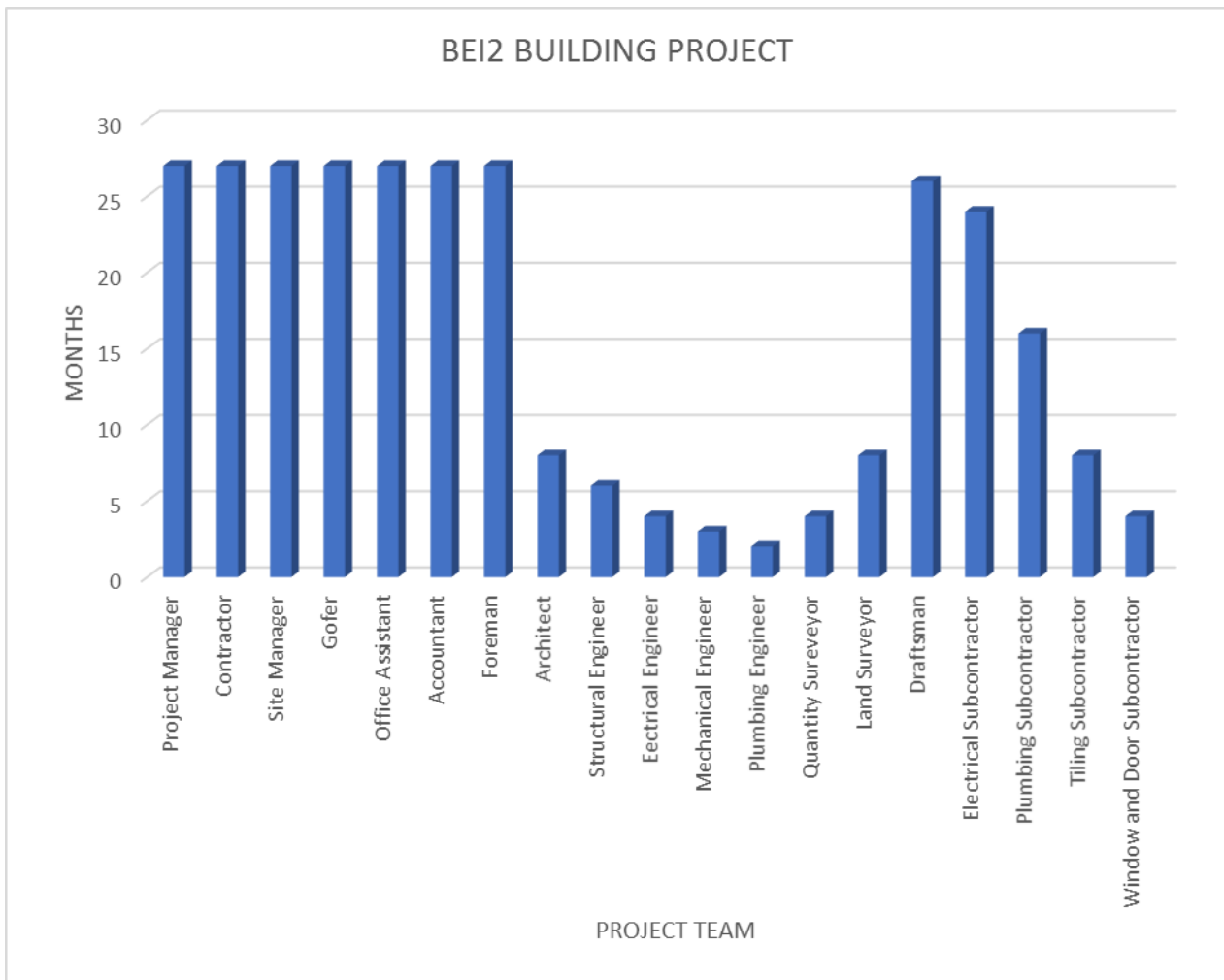
Staffing management relates to all of the reasons staffing is needed. The day-to-day management of the project staff for Construction of BEI2 is the responsibility of the project manager with the assistance of the foreman and contractor. Performance and quality assurance, performance issues and recognition, and disciplinary actions are overseen by the Project manager on a case by case basis. Performance evaluations aren't common because the nature of the work is contracted. What will be done is an evaluation of deliverables as per RACI and approved and agreed upon tasks.

4.1 Staff Acquisition

The Project Manager will make recommendations based on procurement guidelines to the Project Sponsors who with the support of the steering committee will negotiate to identify and assign resources in accordance with the project organizational structure approved. This plan shall also identify various external sourcing mechanisms to hire new project resources. The project team must be located at the Construction Site.

4.2 Resource Calendars

The Construction of BEI2 will last for twenty-four (24) months, with three (3) additional months as reserve. The chart below provides an estimate of the number of resources required per month for the project.



Construction of BEI2 Resource Calendar (source, Riverol, Hilberto, Architect, October, 2017)

5.0 Project Team Training

Due to the nature of the project, minimal training is involved. The only training aspect to be considering is at the initiation of the project with the technical leads. Below a more detailed description.

5.1 Staff Training

When new staff joins the project, the Site Foreman (or delegated project staff) will provide a project construction site orientation. The orientation should include discussions related to the following topics:

- Background of the Construction Project
- Current Status of the work execution

- Specific Job Duties and Expectations
- Introduction to the project team members on and off site
- Overview of the Facility and Infrastructure
- Overview of the Project Processes, including time reporting, attendance, and status meetings

5.2 Performance Reviews

The respective contractor will review the respective work assigned and agreed upon. In the case of the sub- contracting works done, the lead contractor is responsible to ensure that timely and quality delivery of work is done. The foreman will ensure that resources and other needed requirements are available on site to not delay any contractor from doing his/her job. The project manager will receive reports from the lead contractor and foreman throughout the project to evaluate status, and performance and how effectively completion of assigned work is being done. Prior to releasing project resources, the project manager will meet with the respective team members and provide feedback on where the project is and to address concerns.

5.3 Recognition and Rewards

Due to the nature of the scope of this project, there is no monetary rewards, however, it is essential that the project manager and respective contractors and site manager have their own individual planned recognition and reward items for project team members. The project sponsor however doesn't allocate for these considering work packages are executed by external sources.

6.0 Acceptance

Approved by:

Date: _____

Amparo Masson

CEO, Ministry of Economic Development, Petroleum, Investment, Trade and Commerce, and Executive Chairman, BELTRAIDE

Date: _____

Lejia Melanie Gideon
General Manager, Enterprise and Innovation, BELTRAIDE

Figure 31 BEI2 Project Human Resources management plan, template retrieved from <http://www.projectmanagementdocs.com/project-planning-templates.html#axzz4tTWUESrm>, human resource management plan, October, 2017

4.7. Project Communications Management

The template used to develop the BEI2 Construction Project's communication Management Plan was downloaded from an online source (projectmanagementdocs.com) and adopted to the context of the project under construction. According to PMBOK (fifth edition, 2013), communication management includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring and the ultimate disposition of project information (pg. 287).

The communication management plan takes into consideration the needs of each stakeholder, and the best mediums of communication to utilize, taking into consideration the differences in needs and expectations. This subsidiary plan has three processes; however, for the Context of the Project Management Plan for the Construction of BEI2, only the plan communications process will be developed

4.7.1 Plan Communications Management

The process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements and available organizational assets (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Fifth Edition, Pg. 287)

The main inputs used for the development of this plan was the Stakeholder Register, and project management plan. Other inputs were organizational assets. The main

tool used was meetings with respective stakeholders, in particular EDGE Partners, and BELTRAIDE. Below the Communications Management Plan for BEI2.

COMMUNICATIONS MANAGEMENT PLAN CONSTRUCTION OF BEI2

**BELTRAIDE
4 ORCHID GARDEN
BELMOPAN CITY**

6/11/2017

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1.0 Introduction

This Communications Management Plan for the Construction of BEI2 sets the communications structure to be utilized to engage and keep stakeholders informed. This plan will outline the rules and procedures throughout the project's life and will be updated as needed. Furthermore, the Communications Management Plan

classifies and describes the roles of each member and individual that form part of the project. A communications matrix is integrated, which highlights the communication requirements of the Construction of BEI2 Project. A comprehensive guide for conducting meetings is also included in this plan. At the initiating phase, it is essential to engage key and important stakeholders; therefore, a project team directory is included, which will provide contact information for all stakeholders directly involved in the project.

2.0 Communications Management Approach

One of the key roles that the Project Manager for BEI2 will take a proactive role in is to ensure that communications happen in an effective and efficient manner. He will ensure that the communications happen as per the communications requirements listed in the Communications Matrix. The Communications Matrix will be the guide that will illustrate what information to communicate, who is to do the communicating, when to communicate it and to whom it will be communicated.

As the project progresses in its life cycle, changes be required; therefore, any changes or updates accepted or required will be integrated accordingly. These Changes or updates may be necessary due to changes in personnel, scope, budget, or other factors impacting the project. The project manager is responsible for managing all proposed and approved changes to the communications management plan. Once the changes undertake the necessary approval process, the project manager will update the plan and supporting documentation and will distribute the updates to the project team and all stakeholders. It is very important that all stakeholders be informed and aware of any changes made to the plan.

3.0 Communications Management Constraints

It is essential to ensure that communication activities consider remaining within the project's schedule, allocated budget and overall resources assigned. The project manager will ensure that all activities are executed as per the requirements in the Communications matrix. Any deviations in execution of activities within the

communication's guide that may impact cost or schedule due to timelines not be adhered to, will require the necessary approval from the project sponsor.

Although BELTRAIDE don't have a detailed communication organizational policy, within its Personnel Policy Manual, it clearly states that where applicable, standardized formats and templates must be used for all formal communications, and this applies to this project. The details of these policy requirements are provided in the section titled "Standardization of Communication". As it relates to the distribution of Confidential information related to this project, only the General Manager of BELTRAIDE, or upon approval, an assigned person in the project's team is allowed to distribute such information. In any case, only relevant stakeholders should be informed, and the General Manager should be copied in all correspondences.

4.0 Stakeholder Communication Requirements

The stakeholder register and analysis indicated that stakeholders have divergent interests and different levels of influence on a project. This certainly applies to the Construction of BEI2; therefore, it is crucial that project teams determine the communication requirements of these stakeholders in order to communicate information appropriately. It is very important that the stakeholder's needs be thoroughly identified, and understood considering it is essential to effectively manage their interest, expectations, and different influence with the objective to guarantee success in the project's execution.

The project manager will be responsible to engage and communicate with each stakeholder in order to determine their preferred frequency and method of communication. This activity was conducted, and relevant feedback will be maintained by the project manager in the project's Stakeholder Register. **The communications matrix** will indicate the standard project communications guidelines; however, if stakeholder communication requirements demand it, individual communication is also acceptable. Additionally, to communication

preferences by stakeholders, the stakeholder communications requirements must identify **the necessary communications' channels** and ensure that they are accessible and adequate for the stakeholders.

Once all stakeholders have been identified and communication requirements are established, the project team will maintain this information in the project's Stakeholder Register and use this, along with the project communication matrix as the main outputs for communications throughout the project's life cycle.

4.1 Roles

Project Sponsor-Ministry of Economic Development, Petroleum, Investment, Trade, and Commerce and BELTRAIDE

These two stakeholders as the project sponsors champion the project and authorized the project by signing the project charter. This person is responsible for the funding of the project and is ultimately responsible for its success. Considering Project Sponsor is at the executive level, all communications should be presented in summary format unless they request more detailed communications.

Project Manager

The Project Manager oversees the project and is responsible to oversee the project's execution to ensure it is within schedule, cost and quality requirements. The Project Manager manages day to day resources, provides project guidance and monitors and reports on the projects metrics as defined in the Project Management Plan. This person is responsible to provide all the required information to project sponsor, and will also require detailed communications from project team members- finance, projects officer, and other relevant stakeholders. This person also communicates relevant information to key stakeholders within the framework of the communications management plan.

Key Stakeholders

This is a subset of stakeholders with whom we need to communicate with and are not included in the other roles defined in this section. The Key Stakeholders includes executive management with an interest in the project and key users identified for participation in the project.

Change Control Board

The Change Control Board is a designated group which reviews technical specifications and authorizes changes within the organizations infrastructure. Examples of documents that are to be approved may include for example: Technical design documents, and implementation strategies are typical of the types of communication this group requires.

Customer

The customer for this project is BELTRAIDE. As the customer they will be accepting the final deliverable. They will be informed of the project status including potential impacts to the schedule, cost, or scope of the project. BELTRAIDE will be involved in reviewing prototypes, approval of designs and implementation stages and acceptance of the final project the project generates.

Project Team

The Project Team is comprised of all persons who have a role performing work on the project. The project sponsor, the project's finance officer, the project officer, and architect form part of the project team. Additionally, the site manager, and contractor form part of the team and as such needs to have a clear understanding of the work to be completed and the framework in which the project is to be executed. The Project Team requires a detailed level of communications which is achieved through day to day interactions with the Project Manager and other team members along with weekly, and general monthly team meetings to discuss project milestones and goals, constraints, or other implementation and control strategies.

Steering Committee

The Steering Committee includes management representing the departments which make up the organization. The Steering Committee provides strategic oversight for changes which impact the overall organization. The purpose of the Steering Committee is to ensure that changes within the organization are effected in such a way that it benefits the organization as a whole. The Steering Committee requires communication on matters which will change the scope of the project and its deliverables.

Technical Lead- Projects Officer

The projects officer is one of the technical leads on the Project Team who is designated to be responsible for ensuring that all technical aspects of the project are addressed and that the project is implemented in a technically sound manner. The projects officer will assist in contract development, procurement and other technical aspects. The Technical Lead requires close communications with the Project Manager and the Project Team.

5.0 Project Team Directory

The following table presents contact information for all persons identified in this communications management plan. The email addresses and phone numbers in this table will be used to communicate with these people.

Chart Project Team Directory for the Construction of BEI2

Role	Name	Title	Organization/ Department	Email	Phone
Project Sponsor	Amparo Masson	CEO	Ministry of Economic Development, Petroleum, Investment, Trade and Commerce		
Project Sponsor	Melanie Gideon	General Manager	BELTRAIDE, Enterprise and Innovation Division	melanie@belizeinvest.org.bz	(501) 223
Project Manager	Hilberto Riverol Jr.	Project Manager	Edge Partners Co. Ltd.	bze.design@gmail.com	(501) 610-4002

Role	Name	Title	Organization/ Department	Email	Phone
Project Stakeholders	See Stakeholder Register	See Stakeholder Register	See Stakeholder Register	See Stakeholder Register	See Stakeholder Register
Customer	Melanie Gideon	General Manager	BELTRAIDE	melanie@belizeinvest.org.bz	(501)6101995
Project Team	Luis Chavez Jr. See Stakeholder register for list of other team members	Finance Officer	BELTRAIDE	luis@belizeinvest.org.bz	(501) 822-3737/0175
Technical Lead	Debbie Alfaro	Sr. Projects Officer	BELTRAIDE	debbie@belizeinvest.org.bz	(501) 822-3737/0175

6.0 Communication Methods and Technologies

The approaches and different technologies to be used to communicate over the life cycle of the project is crucial. Considering the accessibility of these technologies by the stakeholders it is important to ensure that the message is being delivered. There are some instances where members of a project team may have access to video conferencing and others only have telephone and email capabilities. Therefore; the technology used must be adopted to ensure that it is accessible. The section of stakeholder communication requirements highlights the analysis of which technologies to be used.

The project team will determine, in accordance with BELTRAIDE's organizational policy, the communication methods and technologies based on the following factors:

- stakeholder communication requirements,
- available technologies (internal and external), and;

- applicable conditions in the organization's Personnel Policy Manual

BELTRAIDE maintains an internal shared network within the institution where all departments, inclusive of the Project's Sub Unit can use to provide updates, archive various reports, and conduct project communications where applicable. However, this is only accessible and available to the team members at BELTRAIDE and as such will be used only as a means of the project's team communicating with senior management.

Online technologies such as Google Drive, and Drop Box are often used to communicate with external stakeholders. These platforms have allowed for communication to flow in previous projects and will be used once again for the Construction of BE12. These will be used between the project manager, senior management at BELTRAIDE and other key stakeholders, as needed. These will be used mainly where feedback and contributions are needed for reports or other project documentation.

Because the project team and number of key stakeholders is small, the project manager is responsible for ensuring all project communications and documentation are copied to drop box, and shared via email. Follow up calls, and meetings to be arranged as necessary.

BELTRAIDEs maintains software licenses for MS Project software, and the team is responsible for developing, maintaining, and communicating schedules using this software. Microsoft Excel, Smart Sheets, and Visio are three other alternatives to MS Project. Basic and simple spreadsheet formats are preferred for communicating schedules to stakeholders. The project schedule will be maintained on Google Drive.

The Project's Sub Unit at BELTRAIDE will be responsible to ensure that all documentation is properly archived on the internal shared drive and for it to be labeled properly for identification.

7.0 Communications Matrix

The following table identifies the communications requirements for this project.

Chart Construction of BEI2 Communications Matrix (Source: Author, Riverol, Nilda)

Communication Type	Objective of Communication	Medium	Frequency	Audience	Owner	Deliverable	Format
Inception Meeting	<ol style="list-style-type: none"> 1. Present the objectives, and expectations of the project (scope, quality, cost, schedule) 2. Introduce the project team 3. Assess project objectives and management approach and establish rules and procedures - answer questions from project team. 	<ul style="list-style-type: none"> • Face to Face 	Once	<ul style="list-style-type: none"> • Project Sponsor • Project Team • Stakeholders- University of Belize; 	Project Manager	<ul style="list-style-type: none"> • Agenda • Meeting Minutes report 	<ul style="list-style-type: none"> • Electronic copy of agenda and minutes archived on project shared platform-
Project team meetings	Review status of the project with the team, and assign respective tasks	<ul style="list-style-type: none"> • Face to Face • Conference Call via Whats App; or skype • Telephone call 	Weekly-usually on a Fridays	<ul style="list-style-type: none"> • Project Team members 	Project Mgr.	<ul style="list-style-type: none"> • Agenda • Meeting Minutes report • Attendance register • Project schedule 	<ul style="list-style-type: none"> • Minutes of meeting shared with all members via email; however, most of these meetings are verbal communication with a physical checklist of duties for the

Communication Type	Objective of Communication	Medium	Frequency	Audience	Owner	Deliverable	Format
							week provided to the site foreman and contractor
Technical Design Meetings	Discuss and develop technical design solutions for the project.	<ul style="list-style-type: none"> • Face to Face 	As Needed	<ul style="list-style-type: none"> • Project Technical Staff 	Architect and project manager	<ul style="list-style-type: none"> • Agenda • Meeting Minutes 	<ul style="list-style-type: none"> • Electronic copy of agenda and minutes archived on project shared platform
Monthly Project Status Meetings	Report on the status of the project to BELTRAID E's management and to the Ministry of Econ. Dev.	<ul style="list-style-type: none"> • Face to Face • Conference Call (skype, Whats App call or regular telephone) 	Monthly	<ul style="list-style-type: none"> • Project stakeholders- BELTRAID E; Ministry of Economic Dev. 	Project Mgr.	<ul style="list-style-type: none"> • project updates using reports specified- simple spreadsheets with the requirement information • Project schedule 	<ul style="list-style-type: none"> • Electronic copy of agenda and minutes archived on project shared platform- • Shared with team via email or other means
Project Status Reports	Report the status of the project including activities, progress, costs and issues.	<ul style="list-style-type: none"> • Email • Face to face • presentations 	Monthly	<ul style="list-style-type: none"> • Ministry • Beltraide BOD • Beltraide upper management and project's unit • Project Team • Key Stakeholders 	Project Mgr.	<ul style="list-style-type: none"> • Project Status Reports/slides • Project schedule 	<ul style="list-style-type: none"> • Shared with team via email or other means
Compliance reports	Reports on compliance as per requirements expected for the construction of BE12 (design, licenses, permits, local building requirements, etc.	<ul style="list-style-type: none"> • Email 	Monthly	<ul style="list-style-type: none"> • Ministry • Beltraide BOD • Beltraide upper management and project's unit • Project Team • Key Stakeholders 	Project Mgr.	<ul style="list-style-type: none"> • Compliance report 	<ul style="list-style-type: none"> • Shared via established communication platform or via email

Communication Type	Objective of Communication	Medium	Frequency	Audience	Owner	Deliverable	Format
Financial reports	Cost reports providing details of expenditure, baselines, and other project's finances	<ul style="list-style-type: none"> Email 	Monthly	<ul style="list-style-type: none"> Project Sponsor Financial Officer 	Project Mgr.	<ul style="list-style-type: none"> Project's financial status report 	<ul style="list-style-type: none"> Shared via established communication platform or via email
Quality inspection reports	Updates on quality performance and conformance	<ul style="list-style-type: none"> Email 	Monthly	<ul style="list-style-type: none"> Project team Members Project Sponsor BELTRAI DE BOD Project Team 	Project Manager	<ul style="list-style-type: none"> Quality report 	<ul style="list-style-type: none"> Sent via email or shared platform

8.0 Communication Guide

In situations where additional information is required to determine the communication type, approach, technology or method, clarification and approval must be sought from the project manager (who will communicate with BELTRAIDE's General Manager Ms. Lejia Melanie Gideon or Senior Project's officer at BELTRAIDE) to seek guidance and then communicate the way forward to the team. In general, the communications matrix can assist; but there may be some instances where confidential information is to be shared and clearance must be sought at all times in how to proceed. It has been established that the General Manager is the only one that shares confidential information, or otherwise indicated.

9.0 Guidelines for Meetings for the construction OF BEI2

The following are basic guidelines for meetings for the Construction of BEI2.

- **Meeting Agenda**

Meeting Agenda will be distributed seven (7) business days in advance of the meeting. The Agenda should identify the topic, presenter and time line. The first item in the agenda should be a review of action points from the previous meeting,

and as such a summary is to be given. Meeting Objectives are also established at the beginning. No objection is sought before proceeding.

- **Meeting Minutes**

The project manager or BELTRAIDE's General Manager will assign a person to take the meeting minutes. This minutes will be distributed within one (1) business days following the meeting. Meeting minutes will include the status of all items from the agenda along with new action items and the Parking Lot list.

- **Action Items**

Action Items are recorded in both the meeting agenda and minutes. Action items will include both the action item along with who is responsible of the action item, and required resources needed to be executed, inclusive of timelines for completion, where applicable.

- **Meeting Chair Person**

The Chair Person is responsible for distributing the meeting agenda, facilitating the meeting and distributing the meeting minutes. The Chair Person will ensure that the meeting starts and ends on time and that all presenters adhere to their allocated time frames. The Chair person will normally be the most senior member of the project team in that meeting, in the absence of the project manager. Normally the Project Manager will undertake this role.

- **Note Taker**

The Note Taker is responsible for documenting the status of all meeting items, maintaining a Parking Lot item list and taking notes of anything else of importance during the meeting. The note taker will be responsible to create the Meeting Minutes.

- **Time Keeper**

The Time Keeper is responsible for helping the chairperson adhere to the time limits set in the meeting agenda. The Time Keeper will find the most useful way of communicating the time available to the speaker i.e. hand signal, paper or announce it

- **Parking Lot**

The Parking Lot is a tool used by the chairperson to record and defer items not being covered during that respective meeting, but which will be addressed later on or in

the upcoming meeting. All actions in the parking lot record will identify an owner for follow-up. This is also to be included in the minutes, and reported.

10.0 Communication Standards

The only Standard templates and formats that will be applied to the Construction of BEI2 is the project meetings formats specified earlier in the communications plan and the type of reports, minutes, and agenda. This will be later on developed.

The physical internal file be BEL/BEI2/001- General project documentation; which will have a filing log where each document filed in this file will be archived for easier retrieval.

For this project, BELTRAIDE will utilize standard organizational formats and templates for all formal project communications. Formal project communications are detailed in the project's communication matrix and as such for the Kickoff Meeting, project team meetings, weekly project team meetings, monthly project status meetings, and technical design meetings – the project team will utilize BELTRAIDE's standard templates for meeting agenda and meeting minutes. Additionally, any slides presented will use the BELTRAIDE's standard presentation template.

For Project Status Reports, the BEI2 project team will utilize BELTRAIDE's project status report document, which will be created by the Senior Project's officer and shared in Google Drive with the project team.

11.0 Communication Escalation Process

Efficient and timely communication has been stated as a key factor for project success and/or failure. Therefore, it is vital that any disputes, conflicts, or discrepancies regarding project communications are resolved. In order to ensure that the Construction of BEI2 project stay on schedule and issues are resolved, BELTRAIDE will use the following standard escalation model to provide a framework

for the project team. The chart below defines the priority levels, decision authorities, and timeframes for resolution.

Chart Communication Escalation by Priorities (Source: Riverol, Nilda)

Priority	Definition	Decision Authority	Timeframe for Resolution
Priority 1	Major impact to project or business operations. If not resolved quickly there will be a significant adverse impact to scope, and/or schedule.	General Manager of BELTRAIDE or higher	Within 6 hours
Priority 2	Medium impact to project or business operations which may result in some adverse impact to schedule, or cost.	BELTRAIDE	Within one to two business days
Priority 3	Slight impact which may cause some minor scheduling difficulties with the project but no impact to business operations	Project Manager	Within two to three business days
Priority 4	Insignificant impact to project but there may be a better solution.	Project Manager	Work continues and any recommendations are submitted via the project change control process

** NOTE: Any communication including sensitive and/or confidential information will require escalation to General Manager or higher for approval prior to external distribution.

12.0 Glossary of Communication Terminology

Chart: Glossary for communication matrix (source: Riverol, Nilda)

Term	Definition
Communication	The effective sending and receiving of information. Ideally, the information received should match the information sent. It is the responsibility of the sender to ensure this takes place.
Stakeholder	Individuals or groups involved in the project or whose interests may be affected by the project's execution or outcome.
Communications Management Plan	Portion of the overall Project Management Plan which details how project communications will be conducted, who will participate in communications, frequency of communications, and methods of communications.
Escalation	The process which details how conflicts and issues will be passed up the management chain for resolution as well as the timeframe to achieve resolution.

SPONSOR ACCEPTANCE

_____ Date: _____
 Amparo Masson
 CEO, Ministry of Economic Development, Petroleum, Investment, Trade and Commerce,
 and Executive Chairman, BELTRAIDE

_____ Date: _____
 Lejia Melanie Gideon
 General Manager, Enterprise and Innovation, BELTRAIDE

Figure 32 BEI2 Project Communications Plan, template retrieved from projectmanagementdocs.com, communications management plan, November, 2017

4.8. Project Risk Management

Project Risk Management is a fundamental part of project management. Project risk is defined by PMI as, "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives" (www.pmi.org). PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition), defines this Knowledge area as the "processes of conducting risk management planning, identification, analysis, response planning, and controlling risk in a project (Pg. 309). The below figure depicts the processes involved in risk management:

- 11.1 **Plan Risk Management**—The process of defining how to conduct risk management activities for a project.
- 11.2 **Identify Risks**—The process of determining which risks may affect the project and documenting their characteristics.
- 11.3 **Perform Qualitative Risk Analysis**—The process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.
- 11.4 **Perform Quantitative Risk Analysis**—The process of numerically analyzing the effect of identified risks on overall project objectives.
- 11.5 **Plan Risk Responses**—The process of developing options and actions to enhance opportunities and to reduce threats to project objectives.

Figure 33 Project risk management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013. pg.309

4.8.1 Plan Risk Management

The main inputs used for the development of the risk management plan is the project charter for the Construction of BEI2; the stakeholder register derived from the Stakeholder Management Plan. There are very few to no organizational process assets or environmental factors due to the limited exposure of BETRAIDE to this type of projects.

The tools and techniques used to complete the plan was expert judgement and meetings that were held with the architect of Edge Partners Co. Ltd.; and the Sponsor. A quantitative and qualitative analysis was done to determine the risks that are to be addressed.

The Risk Management Plan Template was derived from an online source (www.loc.gov/portals/.../documents/Risk_Management_Plan_Template) and adapted to the context of the Construction of BEI2 Project. Below the Risk Management Plan for BEI2.

RISK MANAGEMENT PLAN

**BELTRAIDE
Construction of BEI2**

9/18/2017

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- 1.0 Introduction
- 2.0 Risk Management Approach
- 3.0 Risk Identification

4.0 Risk Prioritization and Categorization

5.0 Risk Response Planning

6.0 Risk Control

7.0 Acceptance

1.0 Introduction

A project risk has been defined as an uncertain event or condition that, if it occurs, could have a positive or negative effect on a project's objectives (PMBOK, Fifth edition, 2013). The purpose of the Risk Management Plan for Construction of BEI2 is to establish the framework in which the project team will identify risks and develop strategies to mitigate or avoid those risks.

The Risk Management Plan includes the following sections:

- Risk Management Approach – this determines how to approach and conduct the risk management activities for the project
- Risk Identification – The process of identifying, quantifying and documenting risks as they are identified.
- Risk Prioritization & Categorization – Evaluating the risks to determine probability of occurrence, impact, and timeframe.
- Risk Response Planning – Once the risks have been prioritized and categorized, it is essential to establish an action plan for risk and assign responsibility.
- Risk Monitoring, Controlling, & Reporting – Capture, compile, and report risk using the Risk Register- this will not be emphasized at this stage considering the project management plan is only for the initiating and planning phases of the project.

2.0 Risk Management Approach

BELTRAIDE has limited knowledge of expertise in the area of Construction. While they have been exposed to project management in the past, they haven't had the need to engage in a detailed risk analysis using technical tools. Normally projects

executed are provided with project documents in advance from the funding agency. In this instance, BELTRAIDE developed, and funded this project; therefore, the risk management approach for Construction of BEI2 is to identify grave risks and take necessary actions before problems arise that may impact project objectives. Many different tools will be used as part of this strategy. The approach taken to manage risks for this project will undertake the following process:

1. Through a systematic process the project team will identify, score, and rank various risks.
2. Risks identified by the project team will be entered into the **Risk Register**.
3. The Project Manager will maintain the Risk Register, and Risk information will be a principal topic in all Construction of BEI2 project report status meetings.
4. It is essential that the discussion also integrates the identification of any unforeseen or new risks to be assessed to determine if any actions to mitigate is necessary.
5. The most likely and highest impact risks will be added to the project plan to ensure that the assigned personnel take the necessary steps to implement the mitigation response at the appropriate time during the project.

The project team is small, and as such everyone is responsible to identify, and observe that mitigation efforts are exercised when risks happen. The Site Manager will provide status updates on assigned risks in weekly and monthly project team meetings. Upon completion of the project, during the closing process, the project Manager along with the Contractor, Site Manager, Engineers, and Sponsor, inclusive of the technical lead i.e. the Sr. Projects Officer and BELTRAIDE and Finance Officer, who are part of the Project team, will analyze each risk and review the risk management process. All lessons learned will be documented and added to the risk management process for future projects.

3.0 Risk Identification

Risk identification for the Construction of BEI2 involved the project team, and sponsors. There is an absence of environmental factors, and limited information on organizational culture related to this specific type of project; therefore, technical expertise and feedback from stakeholders was key. The following inputs were also used: The Project scope, Schedule plan, Cost plan, Requirements plan, Quality plan, Stakeholder register, Human resources plan. It was crucial to also assess the project deliverables, assumptions, constraints, Work Breakdown Schedule, cost/effort estimates, resource plan, and other key project documents.

The following methods were used to assist in the identification of risks associated with

Construction of BEI2:

- Expert Interviews
- Risk Assessment Meetings
- Historical Reviews of Similar Projects by Edge Partners Co. Ltd. Although the fact that the building uses Green Technology limited the availability of information.
- Brainstorming
- Interviewing- basically with the Sponsor- BELTRAIDE;

The Risk Register will be updated as needed and will be stored electronically in the project library located as determined by the Sponsor for access with project team. The Risk Register can be found as a separate document.

4.0 Risk Prioritization & Categorization

In order to determine the severity of the risks identified by the team, a probability and impact factor will be assigned to each risk. This process will allow the Project Director to prioritize risks based upon the potential impact to the project. All risks are to be assigned a probability and impact, and a risk mitigation/avoidance planning. The probability and impact of occurrence for each identified risk will be

assessed by the Project Manager, with input from the project team using the following approach:

Impact Matrix

Impact	Numerical Scales Description				
Project Objective	Very low (0.10)	low (0.20)	moderate (0.30)	Critical (0.60)	Catastrophic (0.90)
Cost (USD)	Less than \$1000 over budget	\$1000.50 - \$2000 over budget	\$1750.50 - \$3250 over budget	\$3250- \$5,000 over budget	>\$5,000 over budget
Time	Minor time increase	3- 8 days delay	9 - 15 days delay	16 – 35 days delay	>35 days delay
Scope	Scope decrease barely noticeable	Minor areas of scope affected	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is effectively useless
Quality	Quality barely visible	Only certain areas affected	Quality damages require approval	Quality reduction not acceptable	Project product/output is unusable

Risk Probability Scale

Category	Very Low (0.10)	Low (0.20)	Moderate (0.40)	High (0.60)	Very high (0.90)
Description	Once every year	Once every six months to 12 months	Once every 4 weeks to 6 weeks	Once every 1 to 4 weeks	More than once per week

P x I probability Scale

Risk Level	Range (%)	Color Code
Low	0.01-0.10	Green

Moderate	0.11 -0.25	Yellow
High	0.26-0.53	Orange
Extreme	0.54-0.81	Red

Probability of impact

<u>Severity</u>	<u>Probability of Impact</u>				
	Very Low (0.10)	Low (0.20)	Moderate (0.40)	High (0.60)	Very high (0.90)
Catastrophic (0.90)	0.10	0.18	0.36	0.54	0.81
Critical (0.60)	0.06	0.12	0.24	0.36	0.54
Marginal (0.30)	0.03	0.06	0.12	0.18	0.27
Acceptable (0.20)	0.02	0.04	0.08	0.12	0.18
Negligible (0.10)	0.01	0.02	0.04	0.06	0.09

Risks that fall within the RED and ORANGE zones will have a risk response plan which may include both a risk response strategy and a risk contingency plan. Risks that Fall within certain parameters of YELLOW may require a risk response strategy.

5.0 Risk Response Planning

Each major risk (those falling in the Red & Yellow zones) will be assigned to a risk owner for monitoring and controlling purposes to ensure that the risk will be addressed and managed appropriately. The Project Manager in most instances will be the risk owner; however, risk owners may also be any member of the project team, considering that the team will not have an assigned risk manager.

As stated in the PBOK, for the Construction of BEI2 Project, for each major risk, one of the following approaches will be selected:

- Avoid – The project team may eliminate the threat or condition, or avoid impact to the project objectives by eliminating the cause. Avoidance may be achieved by changing scope, adding time, or adding resources.
- Mitigate – A reduction of the probability and/or impact of a risk to be within acceptable threshold limits. Identify ways to reduce the probability or the impact of the risk. These steps may be costly and time-consuming.
- Accept –The project team accepts that the risk exists and makes no change to the project plan to address the risk. No response strategy is identified.
- Contingency –Define actions to be taken in response to risks.
- Transfer – Shift the consequence and ownership of a risk by making another party responsible (buy insurance, outsourcing, etc.).

6.0 Risk Monitoring, Controlling, And Reporting

The Risk Register for Construction of BEI2 is a log of all identified risks, their probability and impact to the project, the category they belong to, and mitigation strategy. This register was created in the early planning phase of the project. Other applicable risks will be added to the project plan as they occur. The level of risk on Construction of BEI2 will be tracked, monitored, controlled and reported throughout the project lifecycle. Project status reports and meetings will be able to track risks and how they are being addressed.

7.0 Acceptance

_____ Date: _____

CEO, Ministry of Economic Development, Petroleum, Investment, Trade and
Commerce & Chairman, BELTRAIDE, Board of Directors

_____ Date: _____

Lejia Melanie Gideon, General Manager
Enterprise and Innovation Division, BELTRAIDE

Figure 34 BEI2 Project Risk Management Plan , *template retrieved and adapted from*
www.loc.gov/portals/.../documents/Risk_Management_Plan_Template, November, 2017

4.8.2 Identify Risks, Quantitative and Qualitative Analysis

Project Name: Construction of BEI2

Created by: Nilda Riverol

Submitted to: Edge Partners for further submission to BELTRAIDE, Project Sponsor

4.8.2.1 Risk Breakdown Structure (RBS) for the Construction of BEI2

The RBS includes the risk categories that will more than likely impact the project. A brainstorming session was conducted to determine the categories, after which we discussed via a meeting which were not the more likeable ones to be present. Below the RBS of the project.

Risk Breakdown Structure (RBS) for the Construction of BEI2

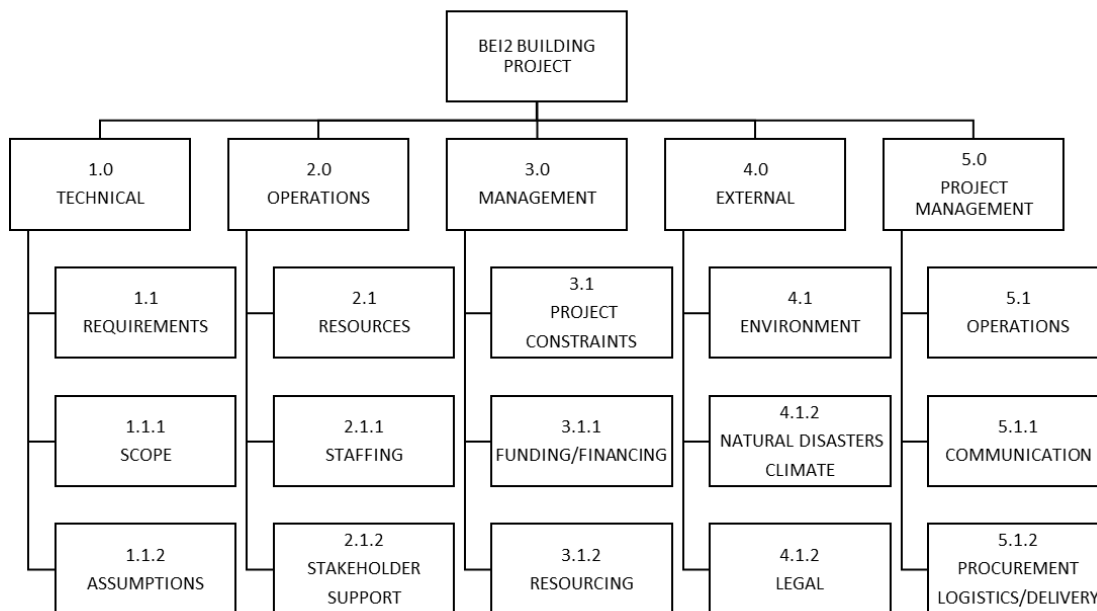


Figure 35 “Risk Breakdown Structure for BEI2 (Source: Riverol, Nilda, Author, September, 2017)”

4.8.2.2 PROBABILITY & IMPACT SCALES

The below probability and impact scales integrated in the Risk Management Plan will be used for the analysis of the risks for Construction of BEI2.

Chart 12: Impact probability Scale (Source: Riverol, Nilda, Author, September, 2017)

Impact	Numerical Scales Description				
Project Objective	Very low (0.10)	low (0.20)	moderate (0.30)	Critical (0.60)	Catastrophic (0.90)
Cost (USD)	Less than \$1000 over budget	\$1000.50 - \$2000 over budget	\$1750.50 - \$3250 over budget	\$3250- \$5,000 over budget	>\$5,000 over budget
Time	Minor time increase	3- 8 days delay	9 - 15 days delay	16 – 35 days delay	>35 days delay
Scope	Scope decrease barely noticeable	Minor areas of scope affected	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is effectively useless
Quality	Quality barely visible	Only certain areas affected	Quality damages require approval	Quality reduction not acceptable	Project product/output is unusable

Chart 13 Risk Probability Scale (Source: Riverol, Nilda, Author, September, 2017)

Category	Very Low (0.10)	Low (0.20)	Moderate (0.40)	High (0.60)	Very high (0.90)
Description	Once every year	Once every six months to 12 months	Once every 4 weeks to 6 weeks	Once every 1 to 4 weeks	More than once per week

Chart 14 P x I probability Scale (Source: Riverol, Nilda, Author, September, 2017)

Risk Level	Range (%)	Color Code
Low	0.01-0.10	Green

Risk Level	Range (%)	Color Code
Moderate	0.11 -0.25	Yellow
High	0.26-0.53	Orange
Extreme	0.54-0.81	Red

Chart 15 Probability of impact (source: Riverol, Nilda, Author, September, 2017)

<u>Severity</u>	<u>Probability of Impact</u>				
	Very Low (0.10)	Low (0.20)	Moderate (0.40)	High (0.60)	Very high (0.90)
Catastrophic (0.90)	0.10	0.18	0.36	0.54	0.81
Critical (0.60)	0.06	0.12	0.24	0.36	0.54
Marginal (0.30)	0.03	0.06	0.12	0.18	0.27
Acceptable (0.20)	0.02	0.04	0.08	0.12	0.18
Negligible (0.10)	0.01	0.02	0.04	0.06	0.09

4.8.2.3 RISK REGISTER

Chart 16 Risk Register and Risk Analysis for Construction of BEI2 (Source: Riverol, Nilda, Author, September, 2017)

RBS Code	Risk	Cause	Consequences	Probability	Impact	Pxl	Trigger	Owner	Strategy	Cost
2.1.2	Disagreements on technical and non-technical roles by project team and stakeholders	Differences in personalities, expertise, or expectation	35 days delay on project, additional cost of \$5,000	More than once per week (very high) 0.90	Catastrophic 0.90	Extreme (0.81)	Lack of collaboration on joint tasks	Project Coordinator	Mitigate: acquiring expertise and sharing all relevant information at the beginning and as per Communications plan	(\$4500) .90*5000
5.1.1	Disagreements on project decisions	Disagreement in communication between main stakeholders	10 days delay on project, additional cost of \$2,000	More than once per week (very high) (0.90)	Marginal (0.30)	High (0.27)	Lack of collaboration on joint tasks, roles or decisions	Project Coordinator	Mitigate – Ensure that stakeholder consultation is consistent and that the communication plan is executed appropriately	(\$1, 800) .90*2000
1.1.1	Project requirements and stakeholder interests have high expectations	A continuous flow of change order requests might be present, throwing the project off course	40 days delays on project, additional cost of \$6000 (9)	Once every 4 to 6 weeks (0.40)	Catastrophic (.90)	High (0.36)	poor or limited stakeholder engagement and communication in planning phase	Project Manager	Mitigate- have a communication plan that ensures information is clearly shared with all stakeholder	(\$2400) 0.40*6000

RBS Code	Risk	Cause	Consequences	Probability	Impact	Pxl	Trigger	Owner	Strategy	Cost
									s on scope and resources for project	
3.1.1	Poor budget management	Poor management skills;	100 days delay on project, additional cost of \$30,000	Once every 3 months (moderate) (0.40)	Catastrophic (0.90)	High (0.36)	Actual budget is 5% greater than planned budget	Project Manager	Mitigate: Ensure that contingency adequate to address risk	(\$12,000) .40*30000
3.1.2	Key approvals aren't available when required	Multiple projects being coordinated at the same time within the company	10 days delay on project, additional cost of \$ 3, 000	More than once per week (Very high) (0.90)	Marginal (0.30)	High (0.27)	Resource absent when scheduled	Project Coordinator	Avoid: Ensure that all submissions are done on time and that proper follow up is done	(\$2700) .90*3000
4.1.1	Projects deliverables aren't completed on time – scheduling delays	Severe climate conditions not projected	40 days delay on project, additional cost of \$20000	Once every four to six months (.40)	Catastrophic (.90)	High (0.36)	Planned scheduling Under projected	Project Manager; Contractors	Mitigate: Ensure that the contingency reserves have adequate allocation of funds to address this risk	(\$8,000) 0.40*20000
5.1.2	Requirements for procurement are lengthy	Not being able to find acceptable proposals to complete	10 days delay on project; \$2000 cost	once every four to six months (0.40)	Acceptable (0.30)	Moderate (0.12)	Evaluation of proposals show a negative	Project manager	Mitigate: Put in place minimum requirements to	(\$800) .40*2000

RBS Code	Risk	Cause	Consequences	Probability	Impact	Pxl	Trigger	Owner	Strategy	Cost
		an RFP in the necessary timeframe which can affect project deliverables					turnover		increase the probability for finding an acceptable proposal	
3.1.1	Insufficient funds for execution of certain project deliverables	Change in Market prices Under projection of cost	36 days delay; additional cost \$5000	Once every four to six months (0.40)	Critical (.60)	Moderate (0.24)	Project cost not calculated accurately	Finance Officer Project Manager	Mitigate: ensure that prices are projected in advance	(\$2000) 0.40*5000
2.1.1	Unavailability of experience consultant and/ or Incomplete or no feedback from relevant stakeholders	Failure to deliver within agreed contract terms	30 days delay on project, additional cost of \$ 3,000	Once every 6 months (0.40)	Critical (0.60)	Moderate (0.24)	Not completing assigned task within contracted period	Project Coordinator	Mitigate: Close monitoring of work performance and bi-weekly status meetings	(\$1200) 0.40*3000
1.1.2	No historical information on green buildings since the project is the first of its kind in that country	First project of its kind and may lead to poor estimations	45 days delay on project, additional cost of \$10,000	Once every six to 12 months (Low) (0.20)	Catastrophic (0.90)	Moderate (0.18)	Planned budget and scope immensely exceeded	Financial Officer	Mitigate: invest in trainings on the quality aspects of green technology	\$2000 .20*10000

RBS Code	Risk	Cause	Consequences	Probability	Impact	PxI	Trigger	Owner	Strategy	Cost
4.1.2	Change of local building regulations as it relates to construction requirements after project commences	Management for Local building authorities changes	30 days delay on project, additional cost of \$5000	Once a year (0.10)	Critical (0.60)	Low (0.06)	Changes in management or political changes	Project Manager	Accept: This requires the risk to be transferred to a lawyer should it occur	(\$500) 0.10*500 0
Total Contingency using P X I										\$33,900

The qualitative risk analysis process identified eight (8) risks, one (1) of which was extreme, two (2) high, four (4) moderate and one (1) low. The risk response strategy will require that the most resources be dedicated to reduce the impact of the highest risk and or the probability of its occurrence. Based on the qualitative risk analysis, the main recommendations are being proposed:

1. Dedicate most of the resources to mitigate the occurrence of the “Extreme” and “High” risks.
2. For the highest risk identified which is the refusal of the subcontractors to work together, mitigate by firstly organizing conflict management sessions for the affected subcontractors and also include termination criteria in their work contracts.
3. Mitigate the risk “poor budget management” by building capacity of the financial officer, providing trainings on budget management.
4. Mitigate the risk “key resources are unavailable when required” by locating experienced external resources from outside the company, and integrating this in the budget
5. A passive accept response for item that is marked low considering that is an external risk that is beyond the control of the project and preventative measures will not necessarily prevent such risks from happening. If it happens, ensure all documentation is properly filed and monitored.

4.9 Project Procurement Management

Project procurement management will include the processes necessary to purchase or acquire products, services, or results needed from outside the project team (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*, Pg. 355). For the purpose of the Project Management Plan for the Construction of BEI2, we will focus on Plan Procurement Management, being the first process of the four (4) that this knowledge management area addresses. This process is incorporated during the initiating and planning phases.

4.9.1 Plan Procurement

Plan Procurement Management will deliver the Project Procurement Management Plan as the output, the Procurement Statement of work, Source Selection Criteria, among other outputs that will not be emphasized for the purpose of this project.

The main inputs used for the development of this process was the requirements documentation, risk register, activity resource details, project schedule, activity cost estimates, and stakeholder register. Meetings with the Architect and BELTRAIDE, as well as expert judgement were the two tools utilized. Below the Project's Procurement Management Plan which was adapted from an online source and adapted from (www.projectmanagementdocs.com) to the context of this project.

PROJECT PROCUREMENT MANAGEMENT PLAN

BELTRAIDE
Construction of BEI2

11/10/2017

TABLE OF CONTENT

- 1.0 Introduction
- 2.0 Procurement Management Approach
- 3.0 Procurement Definition
- 4.0 Contract Type
- 5.0 Procurement Approval Process
- 6.0 Decision Criteria
- 7.0 Vendor Management
- 8.0 Acceptance

1.0 Introduction

The purpose of the Procurement Management Plan is to define the procurement requirements for the Construction of BEI2 project and how it will be managed, from developing procurement documentation through contract closure. The Procurement Management Plan should be in compliance with the rules and regulations set by BELTRAIDE. The Procurement Management Plan for the Construction of BEI2 will define the following:

- Procurement management approach
- Procurement definition
- Contract Type
- Procurement approval process
- Decision criteria
- Vendor management
- Sponsor approval

2.0 Procurement Management Approach

The Project Manager will provide oversight for all procurement activities under Construction of BEI2. He will work with the project team to identify all items to be sourced or procured for the successful completion of the project's deliverables. The procurement list will have to be reviewed and assessed properly along with the Project Steering Committee (PSC) for approval. The process will require a decision to determine whether it should be internally sourced or if outside support is required and, if so what to acquire, how to acquire it, how much is needed, and when to acquire it.

3.0 Procurement Definition

The following procurement items and/or services have been determined to be essential for completion and success of Construction of BEI2. The following list of items/services, justification, and timeline are pending PSC review:

Chart: List of Items/Services and justification (Source: Riverol, Hilberto)

Item/Service	Justification	Category	Needed By
Rebar	Structural steel needed for all structural members must meet ASTM standards	Reinforcement	2 February 2018
Concrete Blocks	6" CMU Concrete Cinder Blocks, must not be porous and be of high density, must meet Building Code Requirements for masonry structures ((TMS 402/ACI 530/ASCE 5)	Walls	15 June 2018
Cement	Standard Portland Cement to meet ASTM standard (C150 / C150M – 1)	Concrete	30 January 2018
Concrete Piles	Specified by Structural Engineer 14x14 pre-stressed concrete piles with 6500 PSI compressive strength	Foundation	30 January 2018
Tiles	18x18 Porcelain Tiles from Brazil to meet ASTM Standards with PEI 4	Floors	15 July 2018
Windows	Miami DADE approved PVC windows, double pane insulated, impact and shatter resistant window panes	Fenestration	10 November 2018
Parex Paint Finish	Paint finish for exterior of building, will require 20 weeks pre-order for custom color, must meet ASTM standards for exterior finishes.	Walls	10 January 2019
York Chiller	250 tonne York Liquid Cooled water Chiller with Air Handlers and ductwork	HVAC	15 March 2018

In addition to the above list of procurement items, only Lejia Melanie Gideon is authorized to approve purchases for the Contraction of BEI2. In the case she is unavailable, the Finance Officer, Luis Chavez is allowed to approve purchases, with written authorization submitted via email by Ms. Gideon. The project manager is to submit the request via email for approvals, and a purchase order will be release upon approval of the request.

4.0 Contract type

All items and services to be procured for Construction of BEI2 will be solicited under firm-fixed price contracts. The Sr. Project Officer at BELTRAIDE, Debbie Alfaro, will work with the project manager to define the item types, quantities, services and required delivery dates. The Request for Proposal (RFP) will then be released by Debbie Alfaro who will then solicit bids from various vendors. The RFPs will be reviewed by the Steering Committee comprising of Melanie Gideon, General Manager, Hilberto Riverol, Project Manager, Debbie Alfaro, Sr. Project's officer, in order to procure the items within the required time frame and at a the most reasonable cost under the firm fixed price contract once the vendor is selected.

5.0 Procurement Approval Process

The Project Manager along with members of the project team who also form part of the steering committee will meet to determine the type of procurement model that best meets the need of the project. Because BELTRAIDE is a Statutory Body for the Government of Belize, any procurement exceeding US\$10,000 in lump sum should go for tendering.

6.0 Decision Criteria

The criteria for the selection and award of procurement contracts under this project will be based on the following decision criteria:

- Comparison of outsourced cost versus in house sourcing
- Mandatory Requirements
- Vendor financial documentation
- Experience
- Past performance Technical Qualifications
- Quality
- Ability of the vendor to provide all items by the required delivery date
- Cost

These criteria will be measured by the Evaluators Assigned by BELTRAIDE, Project Manager, Architect and Subject Matter Experts, where needed, depending on what is

being procured and the Sr. Projects Officer. The final decision will be made based generally on these criteria as well as other available resources.

7.0 Vendor Management

The Project Manager is in the end responsible for managing vendors. In order to ensure the timely delivery and high quality of products from vendors, the Project Manager or his/her designee will meet weekly, bi-weekly or as needed with BELTRAIDE along with each vendor to discuss the progress for each procured item. The purpose of these meetings is to review all documented specifications for each product as to clarify expectations on quality, and urgency of delivery. This approach will enable the parties to review and establish the parameters and expectations of the service being sourced to ensure it complies with the requirements established in the project specifications.

All questions on contracts, quantities being requested, quality, schedule for delivery, mode of delivery, payment agreements, and any other concerns can be addressed in this instances to allow for the modification of contracts or requirements ahead of time in order to prevent delays in delivery and schedule. The Project Manager will be responsible for scheduling these meetings as needed, until all items are delivered and are determined to be acceptable.

8.0 Acceptance

_____ Date: _____
 CEO, Ministry of Economic Development, Petroleum, Investment, Trade and Commerce
 & Chairman, BELTRAIDE, Board of Directors

_____ Date: _____
 Lejia Melanie Gideon, General Manager
 Enterprise and Innovation Division, BELTRAIDE

Figure 36 BEI2 Project Procurement Plan, template retrieved and adapted from projectmanagementdocs.com, procurement management plan, November, 2017

4.10 Project Stakeholders Management

The Stakeholder Management Plan details the project's activities related to engaging stakeholder. It is a subsidiary plan of the Project Management Plan. PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) defines Project Stakeholder Management as the plan that includes the processes required “to identify the people, groups, or organizations that could impact or be impacted by the project” (p.g. 391). The Stakeholder Management processes that will be included in the Project Management Plan for the Construction of BEI2 are listed below in Figure 20.

13.1 Identify Stakeholders—The process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success.

13.2 Plan Stakeholder Management—The process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success.

Figure 37 BEI2 Project stakeholder management, Reprinted from Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition, Project Management Institute, Inc., 2013. p.g. 391

4.10.1 Identify Stakeholders

For the first process of identifying stakeholders, the inputs used were the Project Charter for BEI2. As mentioned before there is an absence of enterprise environmental factors, and organizational process assets; however, BELTRAIDE project team provided the information via meetings. The main technique utilized was expert judgement from staff of BELTRAIDE as well as that of the Architect from Edge Partners Co. Ltd. A series of consultations was done in particular with Mr. Hilberto Riverol Jr., Architect, and BELTRAIDE to ensure that the stakeholder register listed the most important and relevant stakeholders. Below chart with main stakeholder register highlights the main stakeholders, and their responsibilities, expectations and requirements.

Chart 17 Stakeholder Register (source; Riverol, Nilda, Author, September, 2017)

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
1	Minister Tracy Taegar Panton	Minister of State, Ministry of Economic Development, Petroleum, Investment, Trade and Commerce	Project sponsor; approve high-level requirements;	Achievement of project objectives	The project must stay within scope taking into consideration all the technical and non-technical requirements, as well as ensuring we are within scope, time, and cost	High	The Ministry's role is that of a consultative stakeholder considering that BELTRAIDE is a statutory Body with its own Board of Directors who make decisions

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
2	Ms. Amparo Masson	CEO of Ministry of Economic Development and Chairman BELTRAIDE	Project sponsor; approve high-level requirements; approve project charter. Bidding negotiations	Achievement of project objectives	The project must stay within scope taking into consideration all the technical and non-technical requirements, as well as ensuring we are within scope, time, and cost	High	The Chairman of the Board of BELTRAIDE is also the CEO of the Ministry
3	Members of Board of Directors	Directors of BELTRAIDE BOD	Provide recommendations, approve high-level requirements; approve project	Achievement of project objectives	The project must stay within scope taking into consideration all the technical and non-	High	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
			charter. Bidding negotiations		technical requirements, as well as ensuring we are within scope, time, and cost		
4	Ms. Lejia Melanie Gideon-BELTRAIDE	General Manager, BELTRAIDE	Direct Client - Main stakeholder who oversees and reviews all documents, scope changes, and project deliverables and milestones prior to being reported to the CEO and Chairman	Achievement of project objectives	The project must stay within scope taking into consideration all the technical and non-technical requirements, as well as ensuring we are within scope, time, and cost	High	She also sits on the change control Committee; and works closely with the project manager and project team

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
5	Mr. Luis Chavez-BELTRAIDE	Finance-Governmental	Oversee all financial related aspects of project	Provide the proper oversight and support to the project team as it relates to the project budget	BEI2 must cost less than 2.6 million USD. The building must not exceed 100 USD per square foot construction cost. This does not include site and landscape design. All cost must use the adequate invoicing requirements	High	The architect on charge of the design is Renzo Piano.

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
6	Ms. Debbie Alfaro-Sr. Projects Officer	Project Management	Responsible to assist the project manager-contractor of the project and the General Manager in the project management planning, execution, monitoring and closing of project as per requirements and conditions of project as set by stakeholders and internal procedures	Provide the technical support in project management; achievement of project objectives	Project must stay within project scope , and requirements	Medium	N/A

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
7	Ms. Nilda Riverol	Manager, Small Business Development Centre, Belize, BELTRAIDE	Start project; estimate time, cost, schedule; prepare budget; identify, analyze and respond to risks; and all other basic tasks of the PM team	Achievement of project objectives	Building shall have a total area of 28,500 SF of both livable and exterior spaces to host the offices and incubators	Medium	N/A
8	Ms. Shahera McKoy	Manager, EXPORTBelize, BELTRAIDE	Provide expert judgement to the project team in relation to certain project specifications	Achievement of project objectives	Building shall have a total area of 28,500 SF of both livable and exterior spaces to host the offices and incubators	Medium	N/A

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
9	Mr. Hilberto Riverol	Architect, and Consultant acting as project manager on behalf of BELTRAIDE on the project site	In charge of designing the structure / design, and oversight of the construction of BEI2. Also responsible for starting project, estimating time, cost, schedule, analyzing and responding to risks, and all other technical tasks of the Construction of BEI2	Delivery of BEI2 conceptual design, and oversee execution of the project from start to finish	Deliver a design that meets all requirements set by the local authorities as well as that of direct stakeholders;; act as project manager alongside Ms. Melanie Gideon, GM of BELTRAIDE on the construction of BEI2 following all the project management tools and	Medium	Beneficiaries. Airport is open 24 hours (high utilization)

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
					processes established for the successful accomplishment of the project's scope		
10	Contractor	Construction Team member	supervises construction on behalf of project manager	Meet project objectives	have all project documents and timeline for project to ensure compliance	Medium	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
11	Foreman	Construction Team member	Responsible for construction	Meet project objectives	have all project documents and timeline for project activity executions to ensure compliance	Medium	
12	Site supervisor	Construction Team member	Responsible for supervising the construction site	Meet project objectives	have all project documents and timeline for project activity executions to ensure compliance	Medium	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
13	Hvac – Heating and cooling AC	Supplier	supplier of Acs	Supply all materials within time and cost	The building HVAC (York Chilled Water) system must efficiently keep building at constant temperature of 75 degrees Fahrenheit for daily human comfort.	Medium	
14	Maheia's Construction	Supplier	supplier of grey works supplies	Supply all materials within time and cost	Receive a listing of supplies that are clear in type, quantities, and schedule for delivery so that	Medium	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
					procurement is not affected		
15	Benny's HomeCenter	Supplier	supplier of all plumbing and electrical supplies	Supply all materials within time and cost	Receive a listing of supplies that are clear in type, quantities, and schedule for delivery so that procurement is not affected	Medium	
16	York International-ACs	Supplier	supplier of Acs	Supply all materials within time and cost	Fabricator to provide York Chiller System and BMS (Building Management)	Medium	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
					System). Also, to provide shipping from Miami to Belize. (Johnston Controls and Systems)		
17	Aluco Bon-Green supplies	Supplier	Supplier of Green supplies	Supply all materials within time and cost	provide all supplies to meet green requirements	Medium	
18	Aluver-Windows and claddings	Supplier	Supplier of Windows and claddings	Supply all materials within time and cost	Fabricator to provide high impact Miami Dade standard aluminum frame windows and doors. Fabricator to provide	Medium	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
					shipping from Miami to Belize. (Assura Doors & Windows Co. LTD.)		
19	Bonazo- floor finishing's	Supplier	Supplier of floor finishing	Supply all materials within time and cost	Fabricator to provide tile finish for all floors and must meet PEI 4 regulations. (ITTA Gris Ceramica)	Medium	
20	Department of the Environment	National Government-Regulator	Conducts environmental impact assessments	conduct relevant EIAs on schedule	Ensure that all recommendations on the EIA are implemented; recycle gray	Medium	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
					waters for use in landscapes.		
21	Mr. Arnaldo Hernandez	Executive Director, Central Building Authority-CBA	approves construction and design plans ;		Fabricator to have all structural designs prepared and signed off by a registered structural engineer in Belize and approved by CBA (Central Building Authority) of Belize.	High	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
22	Mr. Jeffrey Locke	CEO, Belize Electricity Limited	electricity provider	facilitated the process of application for installation and access to electricity	Ensure that the electrical plan is as per guidelines established	high	
23	Belize Telemedia Limited	Utility supplier	Telephone supplier	facilitated the process of application for installation and access to telephone lines	Ensure that the relevant plans are approved	high	
	Belize Water Services Limited	Utility supplier	Water services provider	facilitated the process of application for installation and access to water installation	Ensure that the relevant plans are approved		

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
24	Local Building Authority- Belize City Council	Local Government- Regulator	approves construction and design plans ;	facilitate the process of permit and other license applications related to construction or any other activity related to the project	acquire all relevant permits and licenses	high	
25	LEED architect	Green Certification body				Medium	
26	Drafting technicians	Edge Partners Co. Ltd.	Responsible for the drawing/sketching of the plans	have the plans ready within schedule and as per specifications	Submit a timeline and a clear definition of drawings	Low	
27	Electrical Engineer	Sub-Contractor	responsible for the electrical plan	Deliver the electrical plans on time	Covered chiller and water pumps area on	Low	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
					roof deck to be included.		
28	Mechanical Engineer	Sub-Contractor	responsible for all mechanical works	Deliver plans on time	Structure will comprise of cast in place concrete columns, beams and floor areas as per structural engineer's design drawings.	Low	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
29	Structural Engineer	Sub-Contractor	designs the structural aspect of the building specifying all specifications	Deliver plans on time	The building must be able to withstand category 4-5 hurricanes; Cast in place concrete floors will be of 4500 PSI concrete and will be of 6” thickness, rebar layout will be adhered to as per structural engineer’s design drawings	Low	

ID	Stakeholders	Functional Area	Roles – Responsibilities	Main Expectations	Major Requirements	Influence/Impact (Low-Medium-High)	Additional Comments
30	University of Belize- Maintenance and Ground keeping Department	Educational facility- Governmental	provides non-technical support to project team	The project team to communicate with the Maintenance dept.	The building must meet to self-sustain itself for a period of 2 weeks in case of any natural disaster.	Medium	
31	Community – Residents	Stakeholder	buy in for the construction in the area considering the noise level	Support of community at all times	Communicate timely and ensure that project delivers within scope and time with as less impact on the community as possible	Low	
32	Land Surveyor	Sub-Contractor				Low	

4.10.2 Plan Stakeholder Management

The second process is the Plan Stakeholder Management which utilized the stakeholder register as the main input, and opted for a similar approach in the techniques; that being, expert judgement and meetings; however, analytical techniques were also incorporated. This derived the actual tool “Stakeholder Management Plan”. Within this process and within the plan the stakeholder analysis was conducted. The template used to develop the Stakeholder Management Plan was downloaded from an online source (<http://project-management.magt.biz/templates>), and the parts of the plan adapted and adopted to the context of the Construction of BEI2.

Construction of BEI2

Stakeholder Management Plan

September, 2017

Version #1

The signature indicates approval of this Stakeholder Management Plan.

Approved by:

Project Sponsor, BELTRAIDE

Table of Contents

- 1.0 Purpose
- 2.0 Identify stakeholders
- 3.0 Plan Stakeholder Management

1.0 Purpose

PMBOK, fifth edition indicates that “Stakeholder Management includes the processes required to identify the people, groups and organizations that could affect or be affected by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate strategies and tactics for effectively engaging stakeholders in a manner appropriate to the stakeholders’ interest and involvement in the project” (Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK Guide)- Fifth Edition, p.g. 391). The stakeholder management is very important to a project, as they are the ones that influence and exercise power to support a project. Communication with them to ensure that their needs and expectations are being met is critical to project success. The Stakeholder Management Plan for BEI2 is focusing on the initiating and planning phases of the project; therefore, below the two sections that are going to be explored:

- **Identify Stakeholders** – identify by name and title the people, groups, and organizations that have significant influence on project direction and its success or who are significantly impacted by the project.
- **Plan Stakeholder Management** – identify the strategies and mechanisms that will be used to achieve the greatest support of stakeholders and minimize resistance

2.0 Identify stakeholders

An effective plan for managing stakeholders need to ensure that stakeholders are clearly recognized and assessed. For the construction of BEI2 project, Stakeholders will be identified by performing a **stakeholder analysis** in which potential stakeholders and relevant information (interests, involvement, interdependencies,

influence, and potential impact on project success) are gathered, documented and analyzed (Project Management Institute (2013), A Guide to the Project Management Body of Knowledge (PMBOK Guide)- Fifth Edition).

The output of the Identify stakeholders process will be the “Stakeholder Register” listed below. The register includes:

- Stakeholder name
- Functional area
- Roles-responsibilities
- Major requirements
- Influences/impact on project
- Additional comments

2.1 Stakeholder Analysis- Power/Interest Classification

Below is the Stakeholder Analysis for the Construction of BEI2 where the stakeholders listed in the register have been classified into the following groups:

Stakeholder Register Analysis (Source: Author: Riverol, Nilda)

Group Name Classification	No. of stakeholders	Analysis
Ministry of Economic Development	1	Ministry of Economic Development has high interest and high power; since decisions happen at that level. These group should be managed closely
BELTRAIDE/CEO/Board of Directors	7	As sponsors, these members have high interest and high power to influence success of the project. They are supportive and leading
Edge Partners Co. Ltd.	2	This group are generally supportive- considering they are aware of the project and the potential changes and impacts – they have high interest and high power considering their technical advising role to the sponsors and other stakeholders. These stakeholders should be managed properly.

Contractors	1	The contractors are supportive and have high interest in the project considering deliverables depend on them; however, their power level is low considering they are commissioned to do the work, and they have limited to no influence to impact project success. These stakeholders should be kept informed.
Sub-Contractors	4	The sub- contractors are supportive and have high interest in the project considering they are commissioned to do the work; however, they have low power considering the role and responsibilities. These stakeholders should be kept informed.
Suppliers	10	The suppliers are supportive and have high interest in the project considering they are commissioned to do the work; however, they have low power considering the role and responsibilities. These stakeholders should be kept informed.

Construction Team	3	The contractors are supportive and have high interest in the project considering they are commissioned to do the work assigned; however, they have low power considering their role and responsibilities as it relates to project success. These stakeholders should be kept informed.
Regulators- (local Government, and national Government agencies; international agencies)	3	Regulators have high power, and low interest. These stakeholders should be kept satisfied as it relates to complying with the law and regulations.
Local Community	2	The local community are generally neutral, or unaware. They have low interest and low power in the project ; however they should be monitored.

As mentioned in the identify stakeholders section, The Construction of BEI2 project is assessing each group's position, as well as their impact on the project and/or how they are impacted by the project. This activity helps to identify and categorize groups so that appropriate attention can be given to each group according to the level of engagement needed. In order to categorize stakeholders into respective groups, for the Construction of BEI2 we will use PMBOK's Power/Interest Grid for the analysis (Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK Guide)- Fifth Edition).

An important outcome of the stakeholder identification and analysis work, including the Power/Interest Grid, is to identify the most influential and most impacted stakeholder groups. Below is a graphical illustration of the power/interest Grid Used for the Analysis of BEI2 stakeholders.

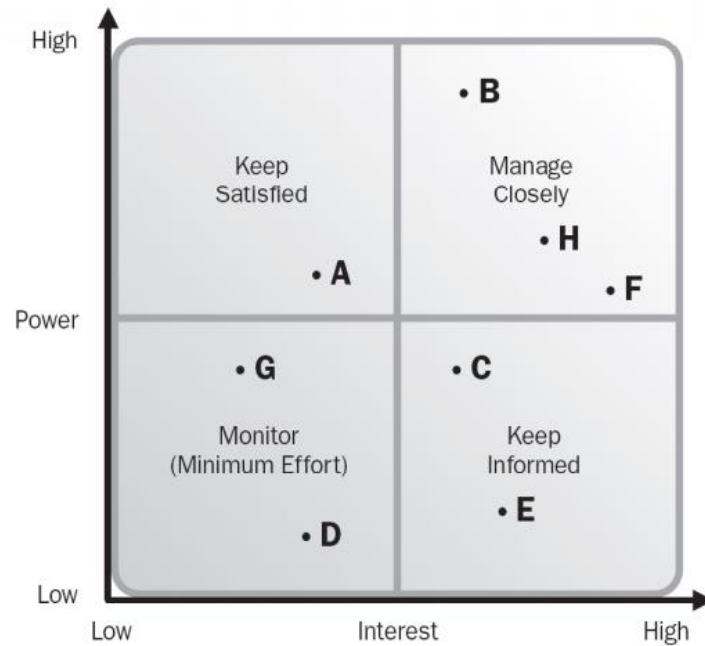


Figure Power/ Interest Grid (Source: Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK Guide)- Fifth Edition, pg. 397))

The analysis below illustrates the Stakeholder Analysis using the Power/Interest Grid for BEI2:

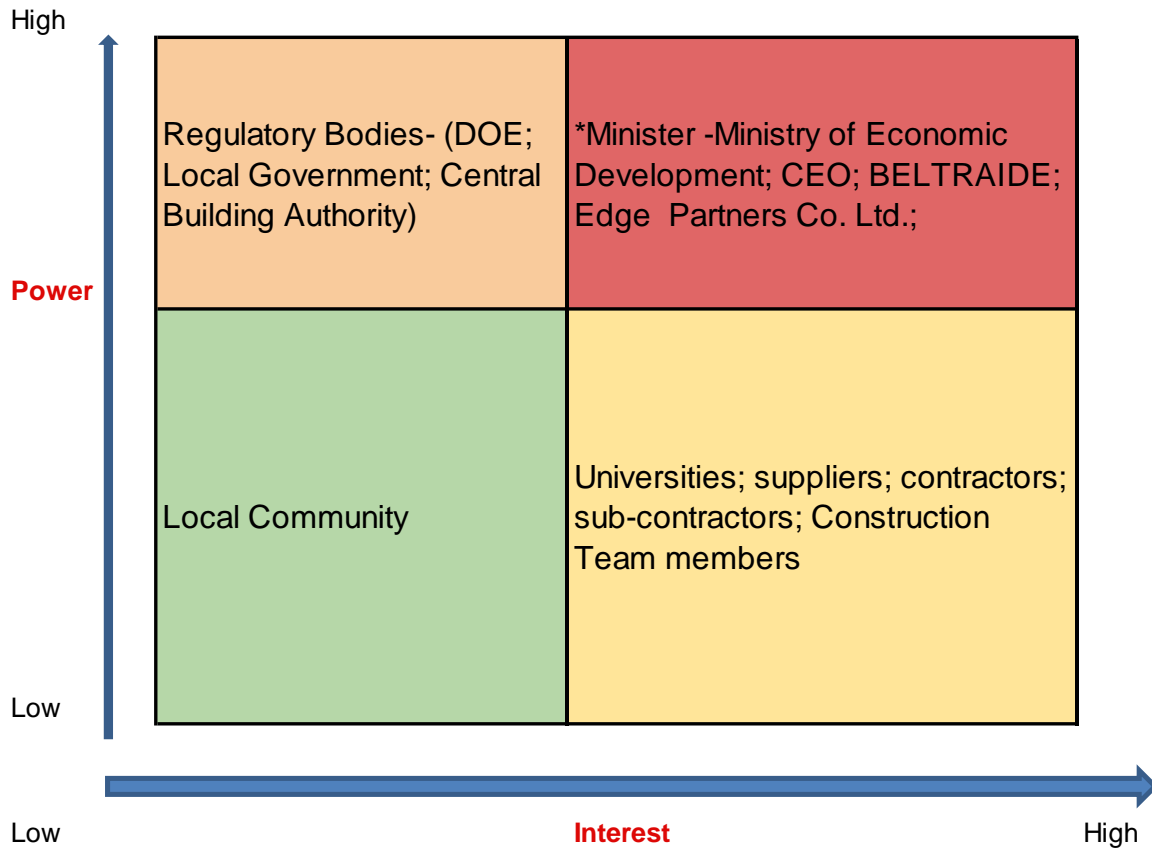


Figure 1 Power/Interest Grid for Construction of BEI2 (source: Author, Riverol, Nilda)

3.0 Plan Stakeholder Management

Plan Stakeholder Management is the second process in the Project Stakeholder Management, and it is the process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle based on the analysis of their needs, interests, and potential impact on the project (Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK Guide)- Fifth Edition, pg. 391).

The Stakeholder Register and Analysis, as well as the Communication Plan for the BEI2 Construction Project will assist the Project Manager in engaging stakeholders throughout the lifecycle of the project. The level of engagement required for each stakeholder may differ over the course of the project and it is projected that at the

beginning stages of the project, the project manager will engage the most influential stakeholders, more than likely those in the high power/high interest level. Later into the project, the level of engagement will shift from key stakeholders to the broader project team and end-users.

3.1 Stakeholder Management

To ensure the correct level of engagement is being achieved by each stakeholder, the Project Manager will analyze current levels of engagement by using the PMBOK Stakeholders Engagement Assessment Matrix. As noted above in the Stakeholder Analysis Register, each stakeholder group shall be assessed in terms of their current and desired level of engagement. **Below is the “Construction of BEI2” Stakeholder Engagement Assessment Matrix.** The stakeholders were listed as per the groups identified in the analysis above. A “C” was placed for their current level of engagement and “D” in the column of their desired level of engagement. As per PMBOK (Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK Guide)- Fifth Edition, pg. 402) the state of change readiness is assessed using the below measures:

- U-Unaware- Unaware of the project and its impacts
- R-Resistant- Aware of project and potential impacts and resistant to change
- Neutral- Aware of project yet neither supportive nor resistant
- Supportive- Aware of project and potential impacts and supportive to change
- Leading- Aware of project and potential impacts and actively engaged in ensuring the project is a success

Chart Stakeholder Engagement Assessment Matrix- Construction of BEI2 (Source: Author; Riverol, Nilda)

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Ministry of Economic Development					C; D
BELTRAIDE/CEO/Board of Directors					C; D
Edge Partners Co. Ltd.				C;	D
Contractors				C; D	
Sub-Contractors				C; D	

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Suppliers				C; D	
Construction Team				C; D	
Regulators- (local Government, and national Government agencies; international agencies)			C	D	
Local Community	C			D	

Figure 38 BEI2 Project Stakeholder Management Plan, template retrieved and adapted f from <http://project-management.magt.biz/templates>, September 2017

CONCLUSIONS

The general objective of the FGP is to develop a Project Management Plan to facilitate the compliance with the construction requirements and functionality of BEI2 during the initiating and planning stage. Using the PMBOK Guide (Project Management Institute, A Guide to the Project Management Body of Knowledge (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition), the Project Management Plan was developed, to be used as a guide and tool by BELTRAIDE and the project team. Ten Subsidiary plans with its respective inputs, tools and outputs were developed. To develop the plans, templates were used as referenced, as well as other software such as Microsoft Visio, Microsoft project, and Microsoft office tools. Below a summary of the main conclusions.

1. The first subsidiary element of the Project Management Plan was The project charter. The Project Charter specified the purpose of the project, objectives of the project, high level requirements, assumptions and constraints, high level risks, summary milestone schedule, summary budget, main stakeholders, assigned project manager, and details of the sponsor who will authorize the project and grant the project manager the authority to apply organizational resources to the project in order deliver the project's objectives.
2. Objective two specified the development of the Scope Management Plan to document how the project construction scope will be defined as per the standards established in the Project Management Book of Knowledge (PMBOK) (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) for project initiating and planning. In this subsidiary plan, the WBS and its respective WBS Dictionary, requirements were developed. This plan was developed with guidance from the Sponsor and expert judgement from the Architect from Edge Partners Co. Ltd.
3. A time management plan was the output for objective no. three (3). This established the planning of the project schedule as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to

the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) for project initiating and planning. Within the Time Management Plan, the activity list, milestone list, activity attributes, duration, and scheduling analysis was developed.

4. The fourth objective was to develop a cost management plan to determine the costs associated with the project as per the standards established in the PMBOK (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*) for project initiating and planning. This subsidiary plan contains the cost baseline for the construction of BEI2, and the respective plan itself as the final output. All details related to the budget was included in this element.
5. To develop a quality management plan was the fifth objective. This plan specifies the quality metrics for the project. In addition, it specifies the quality requirements as per the standards established in the PMBOK (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*) for project initiating and planning
6. The sixth objective was to develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of the project team as per the standards established in the PMBOK (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*) for project initiating and planning. The plan contains the Responsibility assignment matrix, and will enable the project manager and sponsor to identify the right personnel and schedule the roles and responsibilities accordingly. The main output of this objective was the actual HR management plan
7. A communication management plan was the output for the seventh objective. This plan was developed to establish the necessary communication to address stakeholder needs as per the standards established in the PMBOK (Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) - Fifth Edition*) for project initiating and planning. The communications matrix developed in this plan highlighted the

different types for communications, ensuring that it is the the right information is sent to the right person, at the right time, using the appropriate medium.

8. To address the eight objective a risk management plan was developed as the output, in order to plan, identify and document project risks as per the standards established in the PMBOK (Project Management Institute. (2013). A Guide to the Project Management Body of Knowledge, (*PMBOK® Guide*) - Fifth Edition) for project initiating and planning. A qualitative and quantitative risk analysis was conducted on the project. This entailed developing A risk breakdown structure, a risk register, a probability and impact assessment, with the respective analysis.
9. Objective nine delivered the procurement management which will determine buying decisions . The Source selection criteria was specified within the framework of the Procurement management plan.
10. Finally the tenth objective, but one which was done prior to the scope management plan was to develop a stakeholder management plan to identify and analyze all stakeholders. To address this objective a stakeholder register and analysis was done to list all the key stakeholders and re-group them to better understand the interest vs. power they had on the project. This was aligned to the communications, and scope based on needs, and expectations.

RECOMMENDATIONS

The Project Management Plan was developed as a result of BELTRAIDE not having organizational assets to support this type of projects. The type of projects BELTRAIDE isn't related to construction. As Such, it is recommended that the institution takes the Project Management Plan and all its subsidiary plans as a tool for future projects, and that is be stored securely; therefore, it is relevant for them to invest in a document control system.

Additionally, it is recommended that BELTRAIDE opts for formal Project Management of projects, where the appropriate processes are utilized to ensure success of projects. Also, Edge Partners Co. Ltd. should consider using project management plans as a means of accountability, and transparency to sponsors. Although the company reports, and monitors, the inadequacy of formal tools doesn't guarantee appropriate levels of planning, and execution of deliverables.

1. BELTRAIDE should ensure that prior to the commencement of a project, relevant initiation tools be developed such as a project charter and business case. This will enable all relevant stakeholders to understand the framework of the project under consideration.
2. The business case for this project is in the form of a presentation done to the Board of Directors who approved the project with very limited high level information. This presentation was also done to key stakeholders such as the University of Belize; however, other than a presentation, there isn't any formal business case agreement by all stakeholders; other than the informal nature of accepting what the project is expected to deliver. The presentation depicts what is BEI2, what value it will provide in the short and long term; however, it doesn't have a complete analysis of value, cost, resources. The development of a comprehensive Business Case for projects should be considered as a practice on project processes by BELTRAIDE in all projects it executes. Developing and maintaining a solid Business Case for projects will help BELTRAIDE to ensure that (1) all key stakeholders develop a common understanding of the value the project will deliver; (b) the organization will

have a clear, ongoing foundation for determining whether the project is worth continuing; (c) resources are used efficiently (on the right projects); (d) priorities are clearly established- especially because the organization doesn't have a well-structured projects department ; and (e) there will be a clear basis for assessing project success which is critical for institutions like BELTRAIDE. A project Charter isn't a Business Case; and the distinction must be further emphasized. The Projects unit should develop a Business Case Template for all functional managers to complete prior to commencement of a project.

3. All projects that BELTRAIDE undertake should ensure it has a project team to ensure that project scope is met. In addition, projects should be aligned to the respective requirements.
4. BELTRAIDE hired Edge Partners Co. Ltd. to assist in the oversight of the construction of BEI2, considering they did the design; however, it is recommended that the institution consider investing in project management tools and training for the project's sub unit so they may be in a position to do the monitoring and evaluation of projects.
5. It is recommended that the staff to be part of the project management team for the construction of BEI2 be familiar with the tools and understand the data being presented in the project management plan
6. as specified in the project management plan for the Construction of BEI2.
7. It is essential that the project be within scope, therefore, it is recommended that BELTRAIDE ensures the project team is reporting, and communicating relevant information to stakeholders as per the communications matrix. One of the factors that leads to projects not being successful is lack of communication.
8. The project has very specific requirements. However, if cost baseline isn't honored, the project may go over-budget, so it is essential that BELTRIADÉ's finance officer and sr. project's officer monitor cost. The tools and outputs for time management of the project and as specified in the time management plan must be used.

9. BELTAIDE and Edge Partners Co. Ltd should consider utilizing the scope, time, cost, risk, quality, HR, communications, procurement, and stakeholder management plans effectively and

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APPENDICES

Appendix 1: FGP Charter

FGP PROJECT CHARTER

Process inputs: business case, statement of work, agreements, enterprise environmental factors, organizational project assets.

Tools and techniques: expert judgment, facilitation techniques.

Client organization: BELTRAIDE

Outputs: Charter

PROJECT CHARTER	
Date	Project Name:
26/6/2017	Project management plan Development for the construction project of the Belize Enterprise and Innovation Institute (BEI2)
Knowledge Areas / Processes	Application Area (Sector / Activity)
Knowledge areas: scope; time; cost; quality; human resources; communication; risk; procurement; stakeholders Process groups: Initiation and Planning	Construction
Start date	Finish date
26/6/2017	22/12/2017
Project Objectives (general and specific)	
General objective:	

1. To develop a Project Management Plan to facilitate the compliance with the construction requirements and functionality of BEI2 during the initiating and planning stage

Specific objectives:

1. To create the project charter that will allow for the authorization of the project and grant the project manager with the authority to apply organizational resources to the project in order deliver the project's objectives, in this case " the project management plan".
2. To develop a scope management plan in order to document how the project construction scope will be defined as per the standards established in the Project Management Book of Knowledge (PMBOK) for project initiating and planning
3. To develop a time management plan to establish the planning of the project schedule as per the standards established in the PMBOK for project initiating and planning
4. To develop a cost management plan to determine the costs associated with the project as per the standards established in the PMBOK for project initiating and planning
5. To develop a quality management plan in order to identify quality requirements as per the standards established in the PMBOK for project initiating and planning
6. To develop a human resources management plan to identify, and document project roles, responsibilities, skills, reporting relationships, scheduling of the project team as per the standards established in the PMBOK for project initiating and planning
7. To develop a communication management plan in order to establish the necessary communication to address stakeholder needs as per the standards established in the PMBOK for project initiating and planning
8. To develop a risk management plan in order to plan, identify and document project risks as per the standards established in the PMBOK for project initiating and planning
9. To develop a procurement management plan to determine buying decisions as per the standards established in the PMBOK for project initiating and planning

10. To develop a stakeholder management plan to identify and analyze all stakeholders as per the standards established in the PMBOK for project initiating and planning

Project purpose or justification (merit and expected results)

The Belize Trade and Investment Development Service (BELTRAIDE), under a signed Memorandum of Understanding (MOU) with the University of Belize (UB), launched its Small Business Development Centre (SBDCBelize) on November 1st, 2012. The SBDCBelize offers one to one business advisory services and business development trainings to Entrepreneurs and Established enterprises, referred to as Micro, Small, and Medium Sized Enterprises (MSMEs). Due to the success and demand, and with the integration of one more Centre, EXPORTBelize, it was necessary for BELTRAIDE to plan for a sizeable expansion, in the areas of human resources, specialised advising, and physical facilities, so as to satisfy its private sector demand on services.

The larger facility, being marked as the Belize Enterprise & Innovation Institute (BEI2), has been designed to inspire and to nurture entrepreneurship and innovation. The facility's design should incorporate Green technology, suitable for sub-tropical climate, as well as taking advantage of SMART technologies. Functionally, BEI2 will provide for a series of advising/meeting rooms, more trained staff, several small business incubators, and a resource centre. BEI2 will headquarter both SBDCBelize and EXPORTBelize given their existing synergies. In addition, the construction of BEI2 will reinforce and strengthen the partnership with UB, considering the functionality and complementarity of the services that both institutions offer.

The FGP's deliverables will assist BELTRAIDE and the project coordinating team to have the framework for the planning and initiating process groups which will be used for the other process groups in the future. The building's construction is expected to start in early 2018. The tools, templates, analysis within the plans generated will be of great assistance to the teams to remain within scope, time, quality, and cost. The ten

knowledge areas are being considered enabling less risks, compliance to requirements and demands by stakeholders. Additionally, it is the first time that a project of this type and sector is being overseen by BELTRAIDE, so the FGP's specific objectives will greatly add value to the team in initiating and planning within the framework of project management, and to successfully develop the future process groups of implementation, control, and closing.

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

1. Signed charter which will authorize the project manager to use resources throughout the project
2. Document with the Scope management plan which will describe the project's scope statement, creation of WBS, change control to scope statement
3. Document with the schedule management plan which will describe the tools and methods used to define the project's schedule, and will define scheduled activities and its corresponding elements
4. Document with the cost management plan which will describe how costs are estimated in accordance with the project, inclusive of units of measurement, accuracy, precision, performance and reporting
5. Document with the quality management plan detailing quality requirements and how compliance will be adhered to as per the project's client specifications
6. Document with the human resources management plan which will identify and detail the roles and responsibilities of the project's team, inclusive of staffing
7. Document with the communication management plan highlighting the requirements on methods for communicating based on stakeholders needs and organization's resources
8. Document with the risk management plan which will show how risks are identified, and managed
9. Document with the procurement management plan which will explain the processes for buying and sourcing sellers

10. Document with the stakeholder management plan which explains how stakeholder identification and analysis is done

Assumptions

1. It is assumed that BELTRAIDE will agree for the FGP to be done on the BEI2 project.
2. It is assumed that BELTRAIDE and UB will facilitate all the required information on BEI2 to complete the FGP.
3. It is assumed that the time is adequate to complete the FGP.
4. It is assumed that the financing will be available for the completion of the FGP.
5. It is assumed that the architect will be available to share his expertise and necessary information to complete analysis as per the deliverables of the FGP.

Constraints

1. Quality: Available sources of information should be adequate to perform the analysis
2. Confidentiality: Certain information shared by BELTRAIDE should be kept confidential
3. Time: The FGP process development is to be performed within the time and dates specified
4. Time: All the the relevant project's stakeholders would need to be engaged within the time set by the FGP completion

Preliminary risks

1. If stakeholders aren't willing to share the adequate information, it might affect the analysis, impacting the timely delivery of outputs of the FGP.
2. If the communication established with the the tutor during the devleopment of the FGP is limited, it might affect the FGP process development, impacting the FGP completion in terms of quality and time.
3. If the time invested and as required on a weekly basis isn't possible, it might impact the ability to understand the objectives of the week, resulting in deliverables not being consistent with what is required.

Budget

Preliminary bill of quantities have been developed for the project and a draft budget has been developed for future planning. The total cost for BEI2 is USD\$2.5 million. This budget includes all the process groups inclusive of initiation, planning, executing, controlling and closing.

The FGP is taking into consideration only initiation and planning, and based on the product, the budget for the FGP would be \$USD1000.00

Milestones and dates

Milestone	Start date	End date
Graduation seminar approved	June 26 th , 2017	August 6 th , 2017
FGP Development (results) finalized	August 12 th , 2017	October 27 th , 2017
FGP development, conclusions and recommendations finalized	August 27 th , 2017	October 27 th , 2017
Reviewers corrections	November 6 th , 2017	November 6 th , 2017
Presentation to Board of Examiners	December 18 th , 2017	December 22 nd , 2017
Final Graduation Project concluded	December 22 nd , 2017	December 22 nd , 2017

Relevant historical information

BELTRAIDE executes projects related to Investment, Trade, and Enterprise development, assisted by one Sr. Projects Officer. Currently there is no formal department that implements projects. Each functional department develops, and executes projects within their functions.

This is the first construction project that BELTRAIDE will oversee; therefore the FGP will assist in having a foundation for the future execution, control and closing phases of the BEI2. Additionally, the FGP can become part of its organizational assets for future projects.

Stakeholders

Direct stakeholders:

1. BELTRAIDE- Sponsor and main project manager
2. Ministry of Economic Development, Petroleum, Investment, Trade and Commerce- Sponsor
3. University of Belize- main partner
4. Department managers at BELTRAIDE- ExportBelize and SBDCBelize

Indirect stakeholders:

1. Architect- involved in the design and construction-will subsequently become consultant to BELTRAIDE for the construction of BEI2
2. Enterprises- beneficiaries of the services that will be rendered by BEI2
3. Government Ministry of Agriculture- secondary partners as it relates to some of the specs of the building
4. Ministry of Science and Technology- Key partners in the design of the Green technology incorporation of BEI2

Project Manager: Nilda Riverol

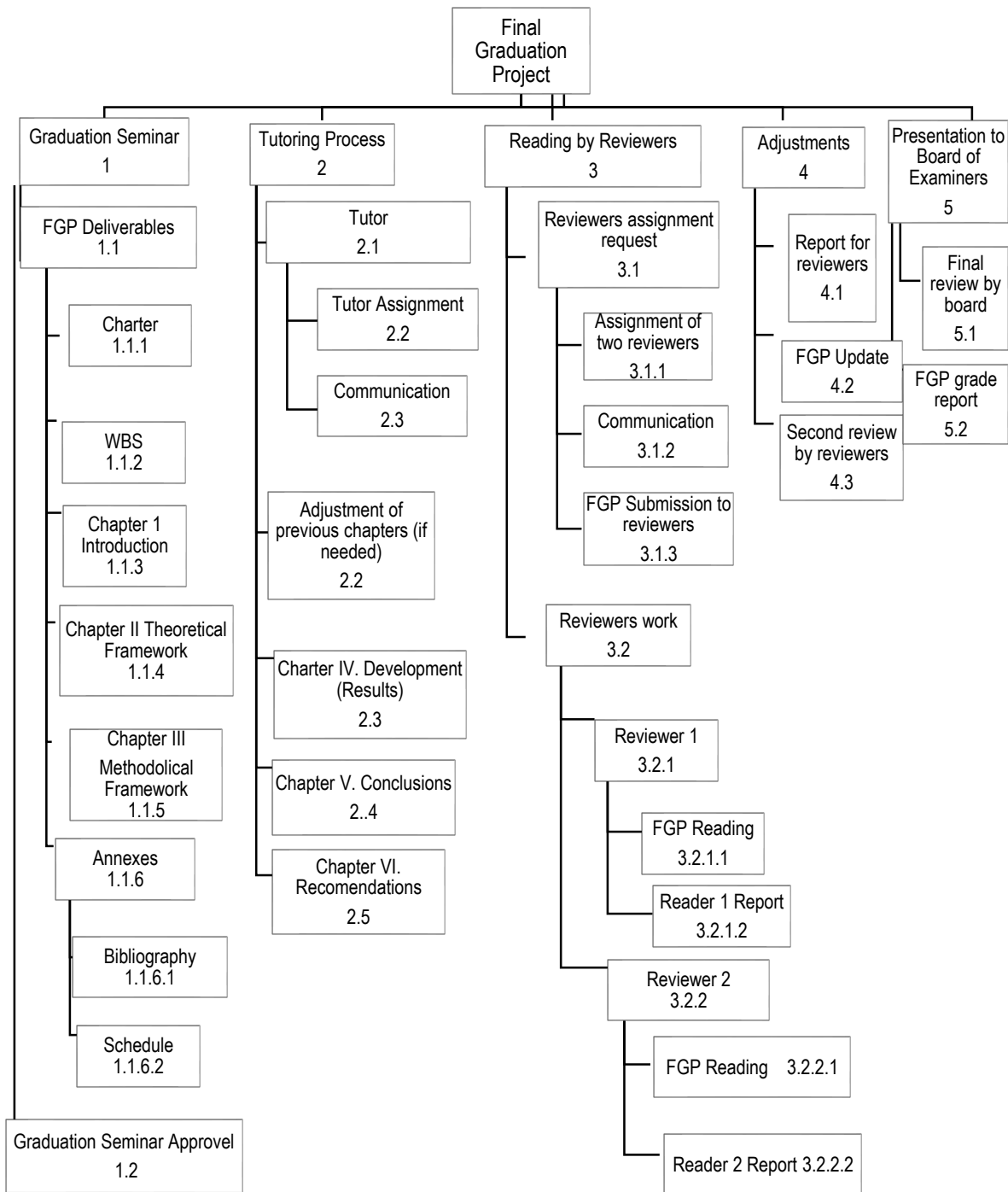
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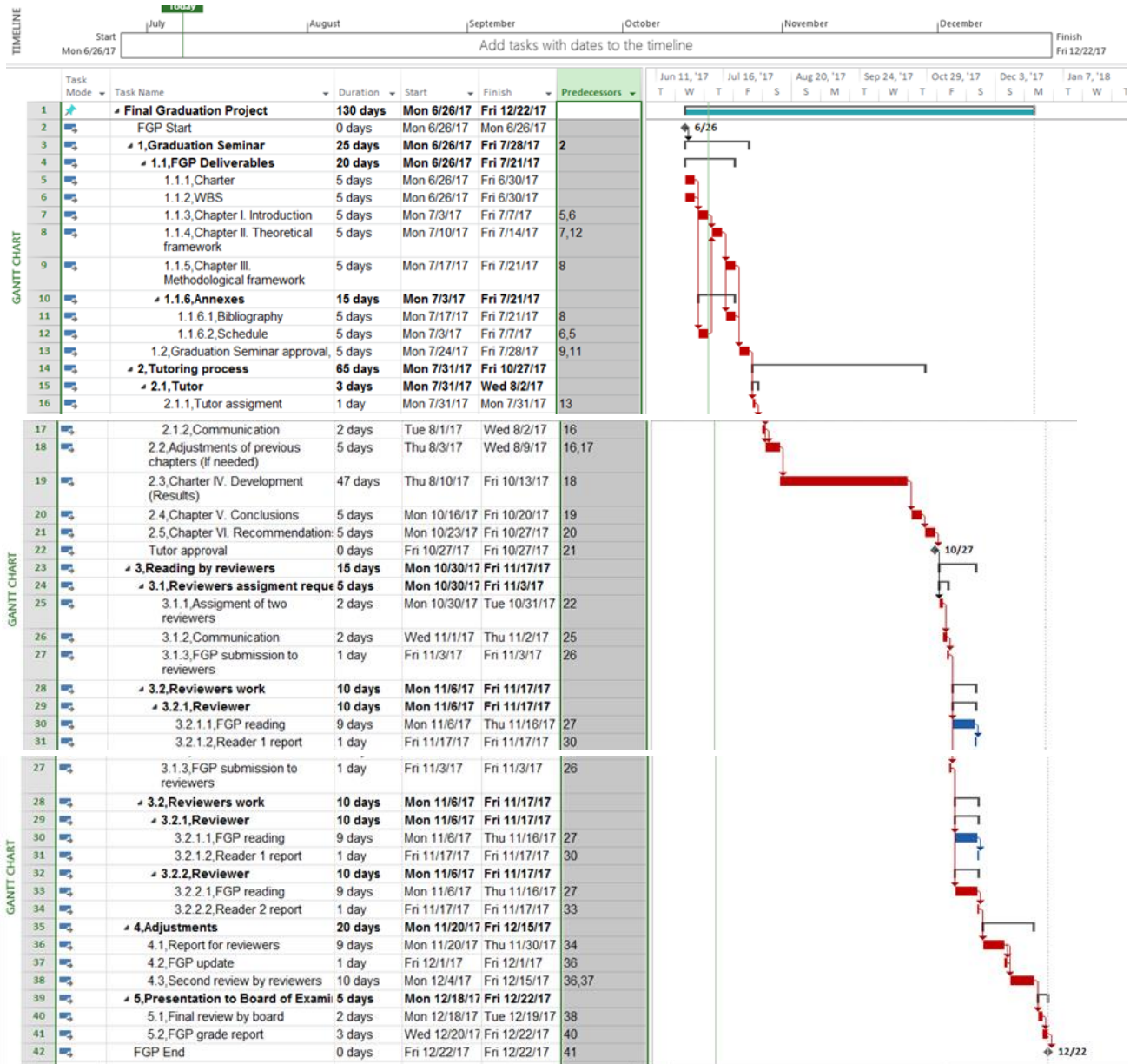
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Appendix 2: FGP WBS

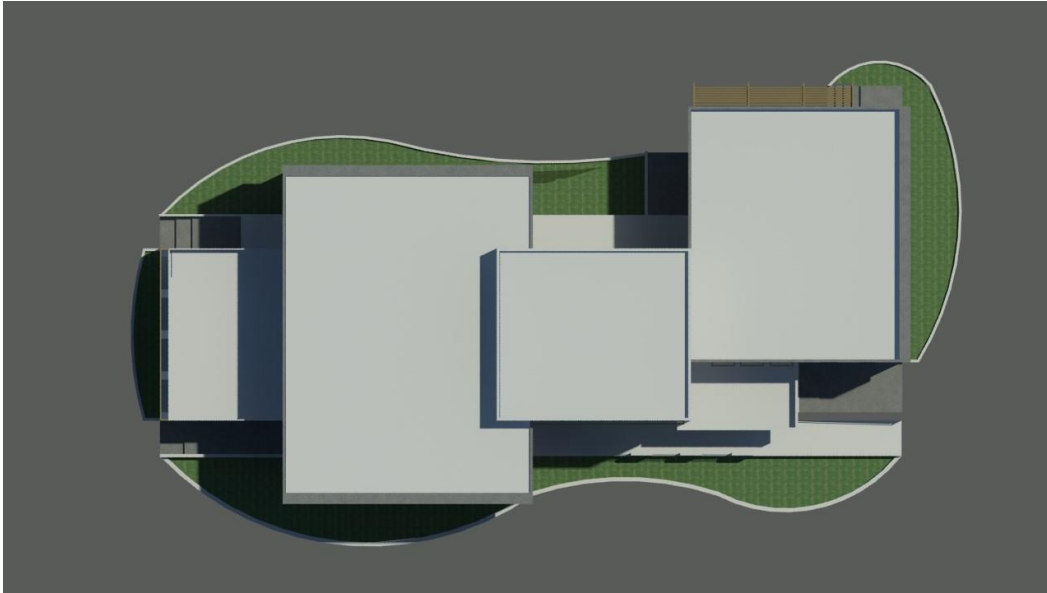


Appendix 3: FGP Schedule



Appendix 4: Architectural Conceptual Renderings and floor plans of the Belize Enterprise and Innovation Institute (BEI2)

Rendering of top view



Rendering of front view



Rendering of back view



Rendering of left view



Aerial View of BEI2



Architectural First Floor plan



Architectural Second Floor Plan



Appendix 5: Revision Dictum

DICTUM OF PHILOSOPHICAL CORRECTIONS FOR
"PROJECT MANAGEMENT PLAN (PMP) DEVELOPMENT FOR THE CONSTRUCTION OF THE BELIZE
ENTERPRISE AND INNOVATION INSTITUTE (BEI2)

Right Insights
San Ignacio Town,
Cayo District
Belize C.A.

November 30th, 2017

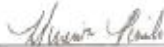
To Whom It May Concern

I am a trained teacher who taught English, Literature and a number of humanities courses for eight (8) years at Sacred Heart Junior College, a community college in Belize.

I hold a Doctorate in Education from Nova Southern University. A copy of the degree is attached in addition to transcripts for both graduate and post-graduate coursework.

I reviewed Mrs. Nilda Riverol's FGP and made grammatical corrections where necessary. The focus of my revision was on grammar, usage, mechanics, style and spelling. In addition, I also made recommendations to Mrs. Riverol on the integration of technical language for the industry in which her thesis' context is set.

Sincerely,



Dr. Minerva Pinelo



Email: mpinelo@rightinsights.bz
Website: www.rightinsights.bz

Appendix 6: Reviewer-Professional Credentials

Nova Southeastern University

Abraham S. Fischler School of Education and Human Services

The trustees of the University
on the recommendation of the faculty confer upon

Minerva Anita Pinelo
the degree of
Doctor of Education

with all rights, privileges, and responsibilities thereto appertaining.
Witnessed with the authorized signatures and university seal in
Fort Lauderdale-Davie, Florida
September 30, 2011

George R. Johnson
George R. Johnson, M. President

W. Wells Singleton
W. Wells Singleton, Dean



Frank DeLano
Frank DeLano, University Provost