UNIVERSIDAD PARA LA COOPERACIÓN INTERNACIONAL
(UCI)

# PROJECT MANAGEMENT PLAN FOR TESTER TRANSFER TO COSTA RICA MEGA LAB

FLOR GEN ULATE

FINAL GRADUATION PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
MASTER IN PROJECT MANAGEMENT (MPM) DEGREE

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(UCI)

This Final Graduation Project was approved by the University as partial fulfillment of the requirements to opt for the Master in Project Management (MPM) Degree

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## DEDICATION

I dedicate this project to my family, my parents Allan and Zaida, and to my sister Sofia for always encouraging me to be my better self.

## ACKNOWLEDGMENTS

My gratitude is to my managers Ed Zawacki and Max Ramirez who have always supported me in my path to become a better professional. In addition, for giving me the opportunity to give the extra mile in my career.

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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **CRML** | Costa Rica Mega Lab |
| **CS** | Corporate Services |
| **EHS** | Environment, Health, and Safety |
| **MIG** | Manufacturing Infrastructure Group |
| **MVE** | Manufacturing Validation Engineering |
| **PEG** | Platforms Engineering Group |
| **PDE** | Product Development Engineering |
| **PMI** | Project Management Institute |
| **PMP** | Project Management Plan |
| **SoC** | System on a Chip |
| **WBS** | Work Breakdown Structure |

## EXECUTIVE SUMMARY (ABSTRACT)

Costa Rica Mega Lab (also known as CRML) has been established as a consolidation center for post-silicon testing and debug activities. The core operations of CRML use remote service for different geographies such as Israel, Malaysia, Ireland, United States, and Guadalajara, based on a 24/7 model to ensure continuous support to different business partners.

Due to the support model CRML of 24/7, it has become more attractive to other organizations within Intel. This project is one of the many that CRML has been receiving in the last couple of years, aligned to the company strategy towards consolidating operations to keep Intel quality standards. The project of the Tester Transfer from Malaysia to Costa Rica has been originated from the need of support in the same geography (time zone) for one internal customer located in the United States. The customer needed to execute several tests through the use of this tester within a really tight schedule.

The project management plan purpose was to add structure and improve operational competencies within MVEs organization.

The project management plan became critical; thus, all the required documentacion was provided and by having done this the quality of the project was easier to track and the communication with the stakeholders became more fluid and crisp.

The general objective was to develop a Project Management Plan based on PMI and UCI guidelines for the transfer of a Tester from Malaysia to Costa Rica Mega Lab to support US business partners within the same time zone.

The specific objectives were: to develop a project charter that formally authorizes the project and describes the project objectives to clearly frame project deliverables and to produce the project management plan, to create a scope management plan to define and control what will be included and what will not in the project through clear requirements, to develop a sustainable time management plan that includes the processes required to manage the timely completion of the project, to create a cost management

plan so that the project can be completed within the approved budget, to create a robust quality management plan to satisfy the needs for which the project was undertaken through meeting product requirements and validating those, to develop a human resource management plan to organize, manage, and lead the project team, to create a communications management plan to define the appropriate communication strategy to ensure timely and effective information distribution across stakeholders, to develop a risk management plan to identify, analyze, respond, and control the risks in the project, to create a procurement management plan to define the necessary processes to purchase or acquire products, services, or results needed from outside the project team, and to create a stakeholders management plan to identify the people, groups, or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution.

The methodology used was analytical, where the information came from sources such as A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Fifth Edition and interviews with different key stakeholders or content experts. All the information was gathered towards the creation of all the subsidiary documents that integrates the Project Management Plan for the tester transfer from Malaysia to CRML.

However, there is a need for CRML to pursue project management as a culture in order to find simpler ways to cover from small to big projects through the creation of standards that are also aligned to Intel's policies. In addition, the creation of a single repository share drive to capture all the learnings from previous projects will be a benefit and will move towards the information accessibility era.

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# 1 INTRODUCTION

## 1.1. Background

Intel has operated in Costa Rica since 1997. It was the largest exporter in the country with over $2 billion in annual exports, a figure that represents 15 percent of total exported goods in the country.

In 2015, Intel opened the Center for Research and Development, which is currently the country's largest division and it is dedicated to the design, prototype, testing, and validation of IT solutions and software development. In this department, 1,250 people make up a number of different sub-departments that perform increasingly complex and specialized tasks to keep up with the advancement of technology. This center is in direct coordination with company divisions around the world with the mission to assist in the development of new technology products that will be introduced into the market in the coming years.

Costa Rica Mega Lab (also known as CRML) is a part of this center and it has been established as a consolidation center for post-silicon testing and debug activities. The core operations of CRML use remote service for different geographies such as Israel, Malaysia, Ireland, United States, and Guadalajara, based on a 24/7 model to ensure continuous support to different business partners.

Due to the support model CRML has, it becomes more attractive to other organizations within Intel, since the rest of them do not have a 24/7 support. This project is one of the many that CRML has been receiving in the last couple of years and it is aligned to the company strategy towards consolidating operations by keeping Intel quality standards.

## 1.2. Statement of the problem

Due to the importance of this transfer to be completed, nothing, in regards to what a project should include, can be left aside. This Project Management Plan should be able to provide all the subsidiary documents of the project in order to capture all the parties involved and avoid any lack of planning within the activities and the scope of the project.

Folsom PDE Team needs to support post-silicon activities (debug, testing) by using a specific tester (Round Head + Extreme Handler) no later than Q2'18, which means that they will require a lab that offers the required services remotely. Malaysia site is the only that owns the required machine; however, the site does not offer a support model of 24/7 and it is located in a different time zone from Folsom team. Hence, aligned with business strategy of the consolidation of post-silicon activities in CRML, the best option is to transfer the machine to Costa Rica. The impact of this transfer will be reflected in tool utilization indicator in 70% plus and machine availability in 90% plus.

## 1.3. Purpose

This project management plan purpose is to add structure and improve operational competencies within MVEs organization. The project management plan is critical since it will clearly provide all the required documentation to the main stakeholders, and by having done this,the quality of the project will be easily tracked and the communication with the stakeholders will become more fluid and crisp.

The project of the Tester Transfer from Malaysia to Costa Rica has been originated from the need of remote testing services in the same geography (time zone) for one internal customer located in United States (Folsom), no later than Q1'18.

One of the benefits out of this transfer is that CRML has a model of 24/7 support, which Malaysia's site does not currently have. Costa Rica's site has already had proven experience on remote service and has previously

worked with Folsom PDE Team in other products and services, which is a plus since the ramping up will be faster and easier.

This transfer must be completed flawlessly in order to provide the required support to the end customer. The customer needs to execute several tests through the use of this tester within a really tight time schedule, that iswhy it is important to clearly state the risks and time management plan. This tester will be one of a kind tester in Costa Rica, so it will be critical to meet the expected timeline since there will be no back-up machine.

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## 1.4. General objective

To develop a Project Management Plan, based on PMI and UCI guidelines, for the transfer of a Tester from Malaysia to Costa Rica Mega Lab to support US business partners within the same time zone.

## 1.5. Specific objectives

1. To develop a project charter that formally authorizes the project and describes the project objectives to clearly frame project deliverables and to produce the project management plan.
2. To create a scope management plan to define and control what will be included and what will not in the project through clear requirements.
3. To develop a sustainable time management plan that includes the processes required to manage the timely completion of the project.
4. To create a cost management plan so that the project can be completed within the approved budget.
5. To create a robust quality management plan to satisfy the needs for which the project was undertaken, through meeting product requirements and validating those.
6. To develop a human resource management plan to organize, manage, and lead the project team.

7. To create a communications management plan to define the appropriate communication strategy to ensure timely and effective information distribution across stakeholders.
8. To develop a risk management plan to identify, analyze, respond, and control the risks in the project.
9. To create a procurement management plan to define the necesary processes to purchase or acquire products, services, or results needed from outside the project team.
10. To create a stakeholders management plan to identify the people, groups, or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution.

# 2 THEORETICAL FRAMEWORK

## 2.1 Company/Enterprise framework

### 2.1.1 Company/Enterprise background

Intel is a high technology company involved in the design, manufacturing, and sale of computer products and new technologies founded on July 18th, 1968, by Robert Noyce and Gordon Moore. The headquarters are located in Santa Clara, California. The company's name comes from "integrated electronics."

Intel invented the microprocessor, the 'computer on a chip', that made possible the first handheld calculators and personal computers (PCs). This was even a technology-changing event across the world. Since 1968, Intel has been evolving to continue delivering the products their customers need. A huge milestone was reached in late 1990s when Intel made several strategic acquisitions that rapidly gave the company a significant presence in areas outside its microprocessor core. Part of these acquisitions were: wireless communications products, such as flash memory for mobile phones and two-way pagers, networking building blocks, such as hubs, switches, and routers, and embedded control chips for laser printers, storage media, and automotive systems.

Intel makes most of its products in its own manufacturing facilities, which allows the company to control the process for quality, speed, and flexibility. For some communications, connectivity, networking, field programmable, and memory components, the company outsources manufacturing to third parties. Intel handles test and assembly in-house and through contractors.

As of today, Intel operates its business through several segments such as Programmable Solutions, Non-Volatile Memory Solutions, Client Computing, Data Center, Client & Internet of Things Business & Systems Architecture (CISA), among all others. Each of these segments have a complex structure behind them, due to their complexity and the different geographies that support this business. One example is MVE organization that has a cross collaboration between 15 sites, see figure 1.


**Figure 1. MVE Global Footprint (Source: Intel's Footprint)**

One of Intel's facilities is located in Belén, Costa Rica since 1997. Now operating with more than 2000 employees who work on the design, prototyping, testing, and validation of integrated circuit and software solutions and end-to-end multifunctional corporate services from finance, human resources (HR), procurement, sales and marketing, and information technology (IT).

### 2.1.2 Mission and vision statements

As stated in Intel's corporate information page:

> Our goal is to be the preeminent provider of semiconductor chips and platforms for the worldwide digital economy. As part of our overall strategy to compete in each relevant market segment, we use our core competencies in the design and manufacture of integrated circuits, as well as our financial resources, global presence, and brand recognition. (Intel Corporate Information, 2017, Mission)

In alignment with this statement, mission and vision are as follows:

- **Vision:** If it is smart ad connected, it best with Intel.
- **PEG Mission:** To partner with our business units to deliver breakthrough platforms that delight and disrupt, enabling our customers to win.

- **MVE Mission:** Delivering quality products that delight our customers.

### 2.1.3 Organizational structure

As mentioned early, Intel has a complex infrastructure due to the variety of segments this company supports. As shown in Figure 2, this section will be focused on CISA, mainly in the Platform Engineering Group (PEG) that falls within this group.

One of PEG's biggest areas is Manufacturing Validation Engineering (MVE), which is the result of a complex transformation and is the convergence of two very strong and successful organizations with similar journeys. Under MVE structure is Labs area, CRML, and Penang Validation Center, which are the two labs that will be impacted by this project. Moreover, under MVE structure falls FM PDE Group that will be the end user of the transferred equipment that falls under Manufacturing Infrastructure Group (MIG).

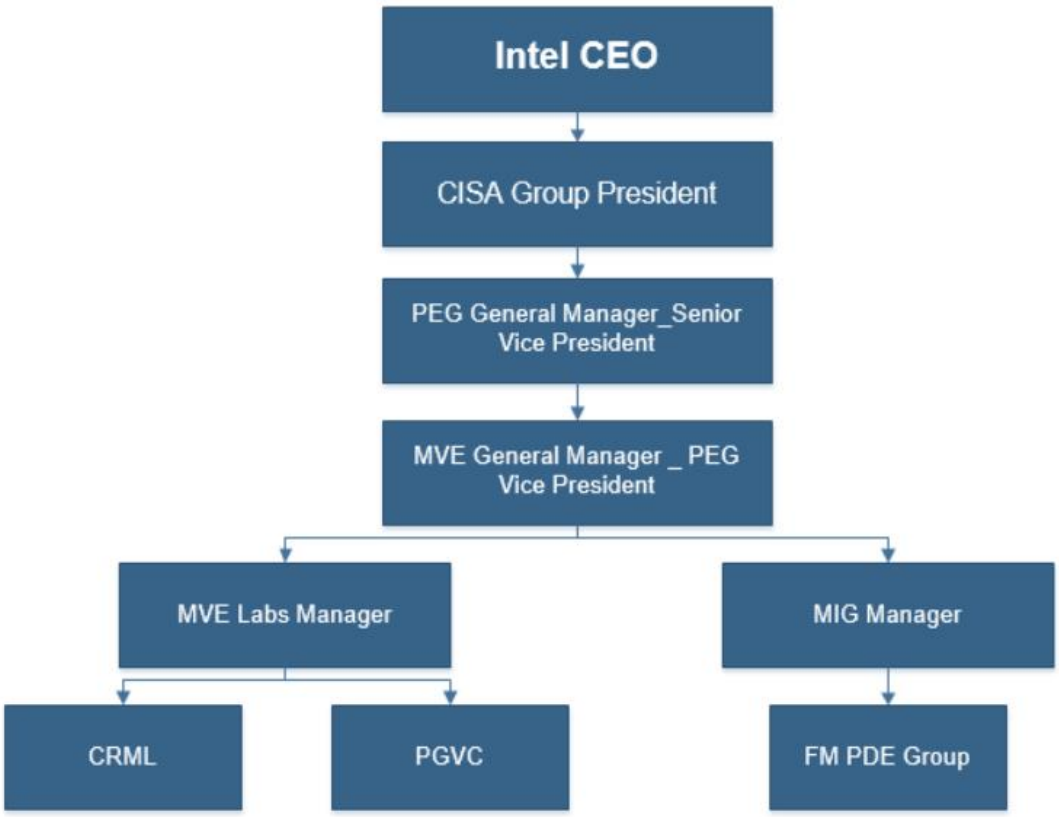



**Figure 2. Organizational Structure (Source: Intel's Staff Org Charts)**

### 2.1.4 Products offered

PEG is considered as the innovation and execution engine of Intel that brings together a mix of experts with different backgrounds to develop and design new technologies and deliver amazing computing experiences.

MVE is responsible for testing development and manufacturing of microprocessors, SoCs, and chipsets. It also performs post-silicon validation and verification for Intel Platforms.

MVE Labs deliver quality end-to-end manufacturing, and platform test capability, operations, and maintenance, while MIG focus does it on developing and deploying methods, infrastructure, tooling, and test programs for ATE (Assembly and Test Engineering) manufacturing in Sort, Class, and Fuse.

## 2.2 Project Management concepts

### 2.2.1 Project

As defined in the PMBOK Guide a project is “a temporary endeavor undertaken to create a unique product, service, or result” (PMI, 2013). In alignment with the definition previously stated, this Final Graduation Project is about developing a project management plan for tester transfer to CRML.

### 2.2.2 Project management

According to the PMBOK Guide, Project Management is “the application of knowledge, skills, tools and techniques to project activities to meet the project requirements” (PMI, 2013).

Project management is a specialized form of management, similar to other functional strategies, that is used to accomplish a series of business goals, strategies, and work tasks within a well-defined schedule and budget. The essence of project management is to support the execution of an organization’s competitive strategy to deliver a desired outcome (i.e., fast time-to-market, high quality, low-cost products) (Milosevic, 2003).

The project management plan will provide all the required documentation to the main stakeholders; thus, it will be easier to track the project's quality and the communication with the stakeholders will become more fluid and crisp. In addition, this PMP will serve the purpose of educating the organization on the best practices regarding project management.

### 2.2.3 Project life cycle and Processes

Every project has a beginning, a middle period during which activities move the project toward completion, and an ending (either successful or unsuccessful). Project Life Cycle is defined as "the series of phases that a project passes through from its initiation to its closure" (PMI, 2013).

Project life cycle contains five steps: initiation, planning, execution, monitoring/control, and closure. Any step is more important than the other and each step plays a crucial role in getting the project off the ground, through the race, down the stretch, and across the finish line.

In the initiation phase, an overview of the project will be provided in addition to the strategy that will be used, in order to achieve the desired results the project charter is a key item for this phase. The major deliverables and the participating work groups are identified and the project team begins to take shape and the recommended solution is approved.

Right after the approval, planning phase starts; thus, the project solution is further developed in as much detail as possible and the necessary steps to meet the project's objective are planned. In this step, the team identifies all of the work to be done. The project's tasks and resource requirements are identified, along with the strategy to produce them. This is also referred to as "scope management." The planning phase will include a risk assessment and it will also define the criteria needed for the successful completion of each task. In short, the working processes is defined, stakeholders are identified, and reporting frequency and channels explained.

During the execution and control phases, the planned solution is implemented to solve the problem specified in the project's requirements. In product and system development, a design resulting in a specific set of product requirements is

created. This convergence is measured by prototypes, testing, and reviews. As the execution and control phases progress, groups across the organization become deeply involved in planning  the final testing, production, and support.

The closure phase is typically highlighted by a formal written project review report which contains the following elements: a formal acceptance of the final product by the client, Weighted Critical Measurements (a match between the initial requirements laid out by the client against the final delivered product), lessons learned, project resources, and a formal project closure notification to higher management. Figure 3 illustrates how the process groups interact over the project life cycle:

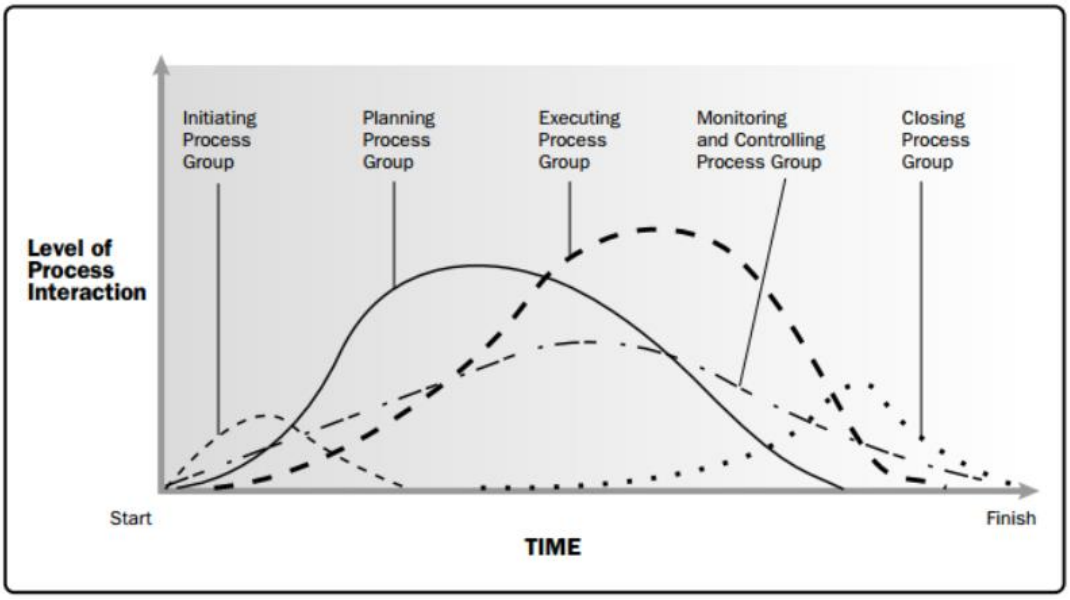



**Figure 3. Process Groups interact in a phase or a project (Source: PMI, 2013)**

The purpose of this project, along with the PMP development, is to follow accordingly each of the process groups mentioned above in order to avoid process gaps or lose critical or key information for the project. Another key aspect is the required documentation as outcomes of each of the phases.

It is important to highlight that only the initiating and planning processes will be used for this project (equipment transfer from Malaysia to Costa Rica). The project

management plan will be a compilation of subsidiary documents created as a result of both the initiating and planning process activity.

### 2.2.4 Project management knowledge areas

According to PMBOK, a knowledge area represents a complete set of concepts, terms, and activities that make up project management field (PMI, 2013). There are 10 knowledge areas:

1. Project Integration Management: This knowledge area contains the tasks that hold the overall project together and integrate it into a unified whole. It includes: project charter, project management plan, direct and manage project work, monitor and control project work, perform integrated change control, and close project or phase.

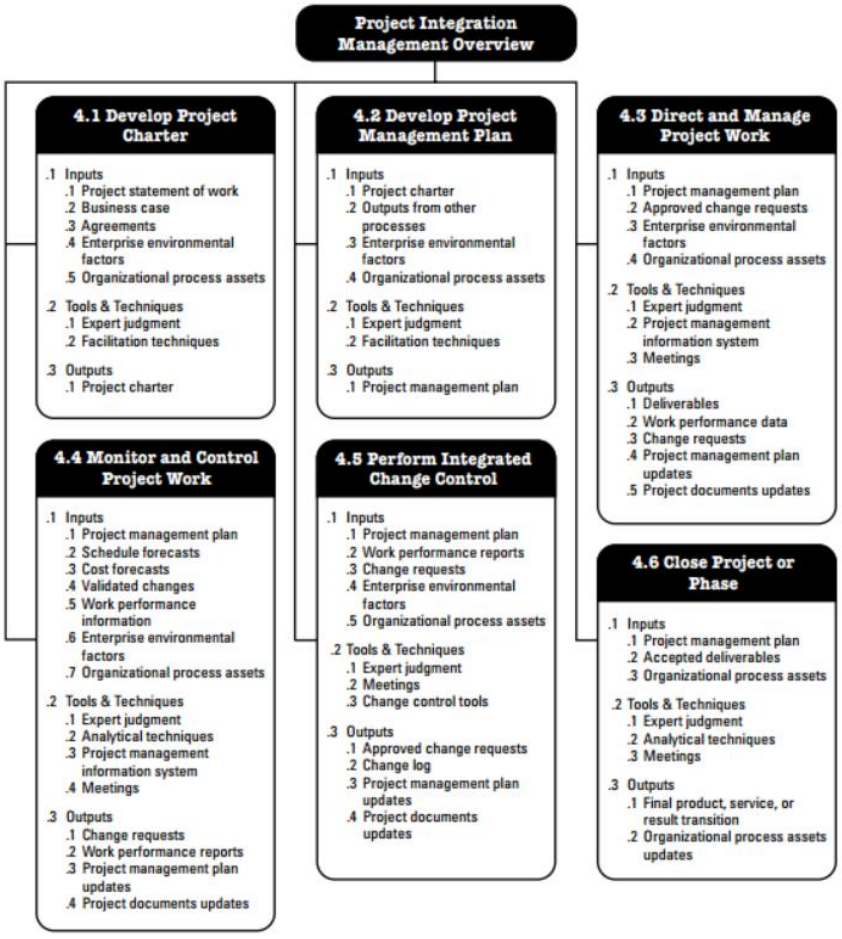



**Figure 4. Project Integration Management Overview (Source: PMI, 2013)**

2. Project Scope Management: This involves the project scope, that is, the work that is included within the project. It is very important that the boundaries of the project be well defined from the outset and monitored rigorously. This includes plan scope management, collect requirements, define scope, create WBS, validate scope, and control scope.

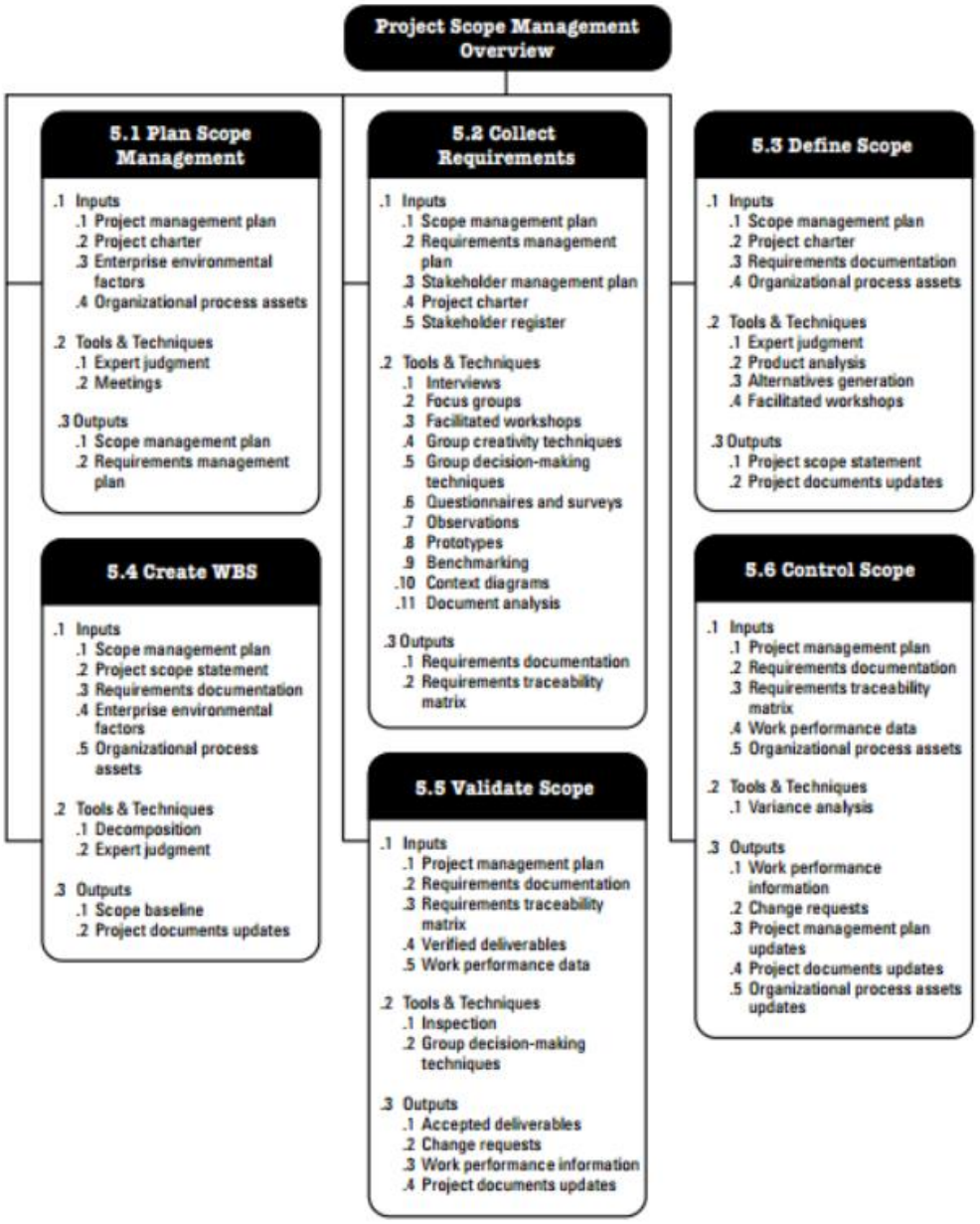



**Figure 5. Project Scope Management Overview (Source: PMI, 2013)**

3. Project Time Management: This area involves plan schedule management, define activities, sequence activities, estimate activity resources, estimate activity durations, develop schedule, and control schedule.

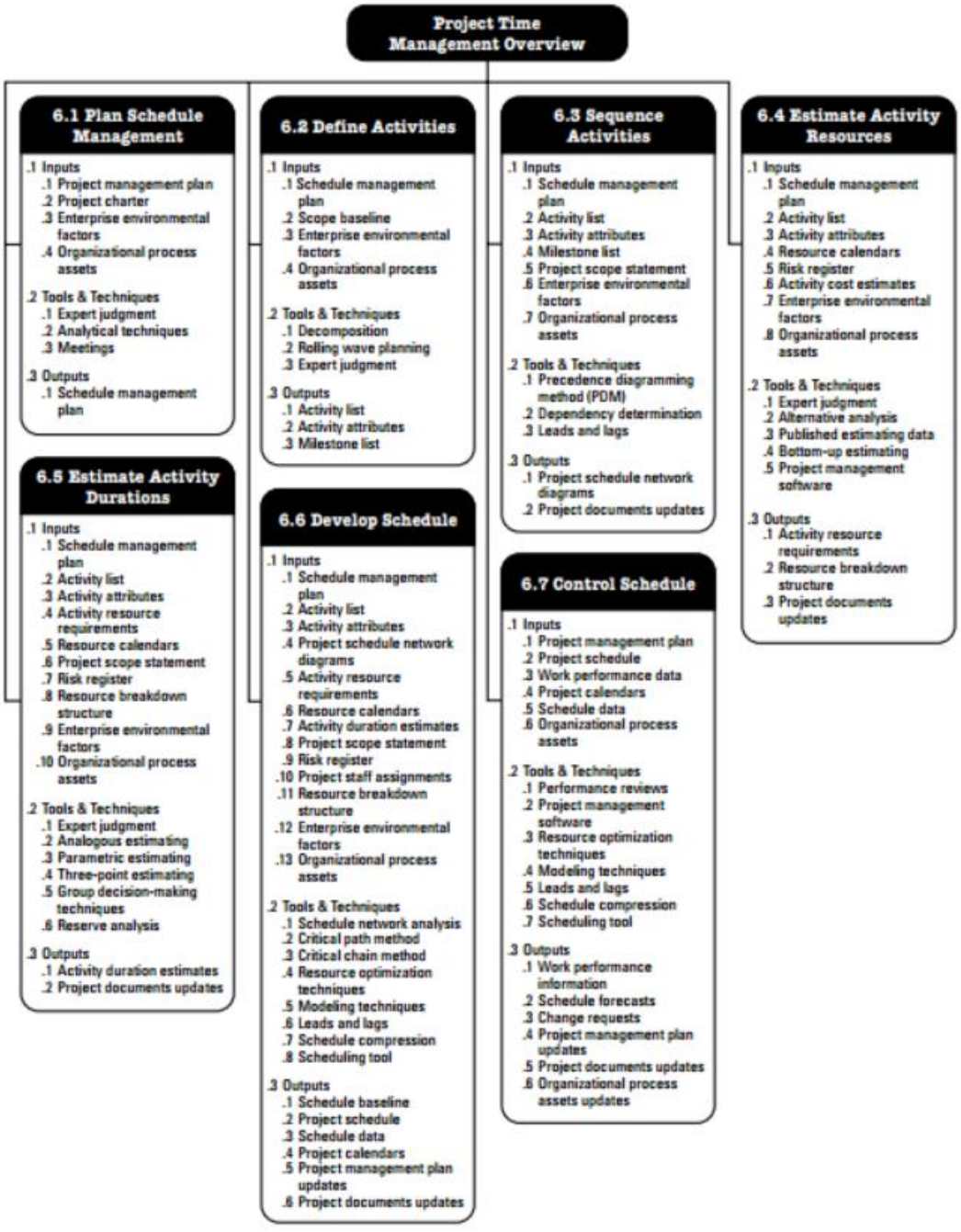



**Figure 6. Project Time Management Overview (Source: PMI, 2013)**

4. Project Cost Management: It includes plan cost management, estimate costs, determine budget, and control costs. This is always a sensitive area because it is the one related to project budget.

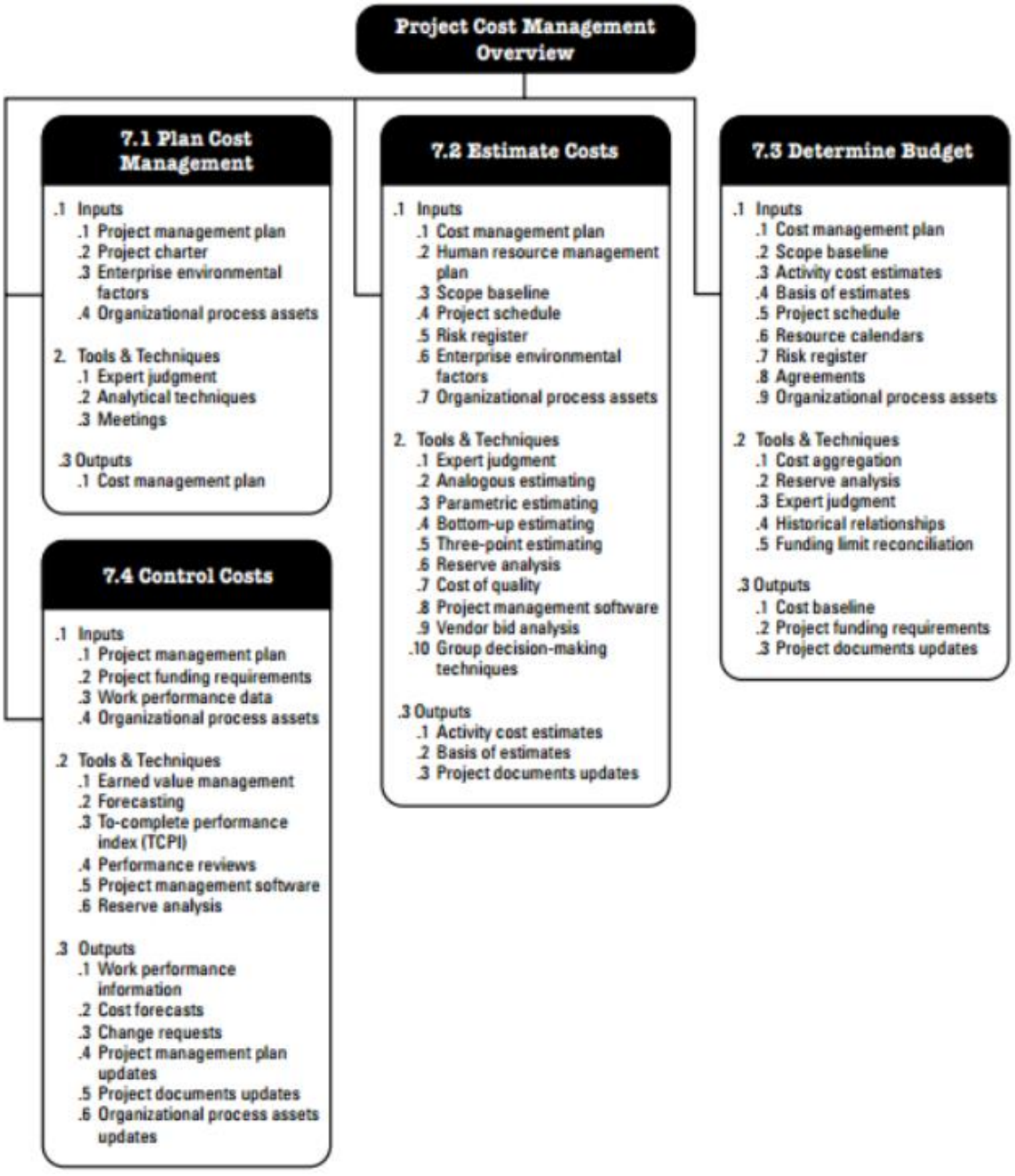



**Figure 7. Project Cost Management Overview (Source: PMI, 2013)**

5. Project Quality Management: This involves plan quality management, perform quality assurance, and control quality throughout the project.

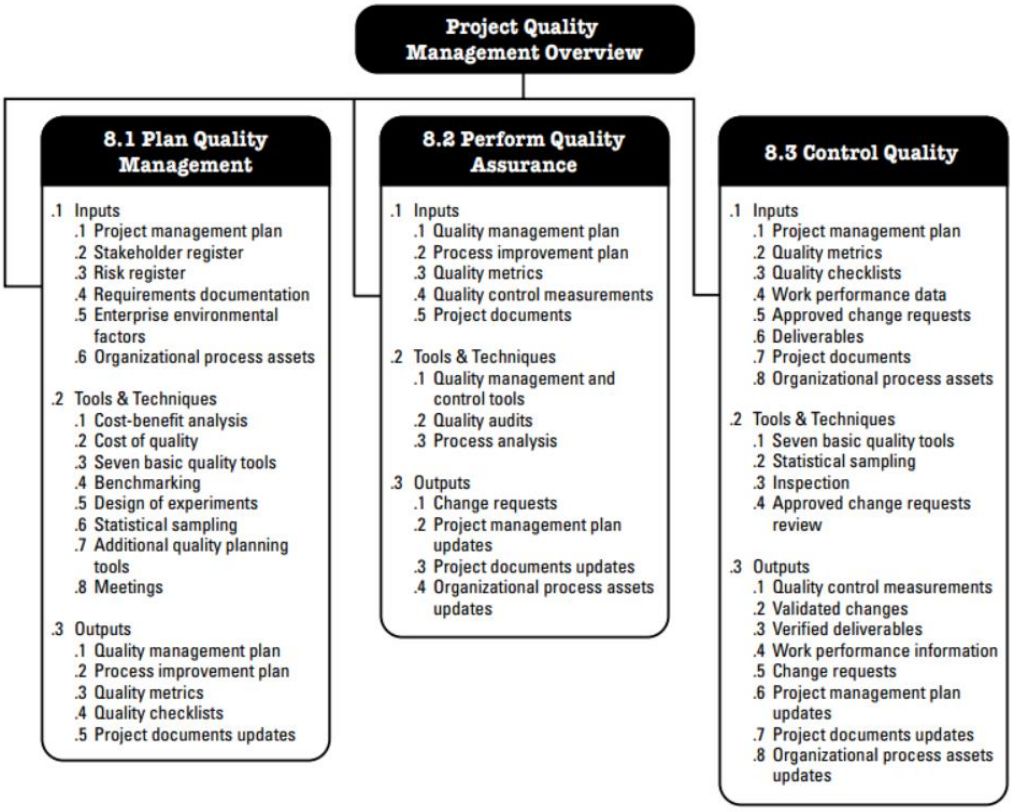



**Figure 8. Project Quality Management Overview (Source: PMI, 2013)**

6. Project Human Resources Management: This includes plan human resource management, acquire project team, develop project team, and manage project team.

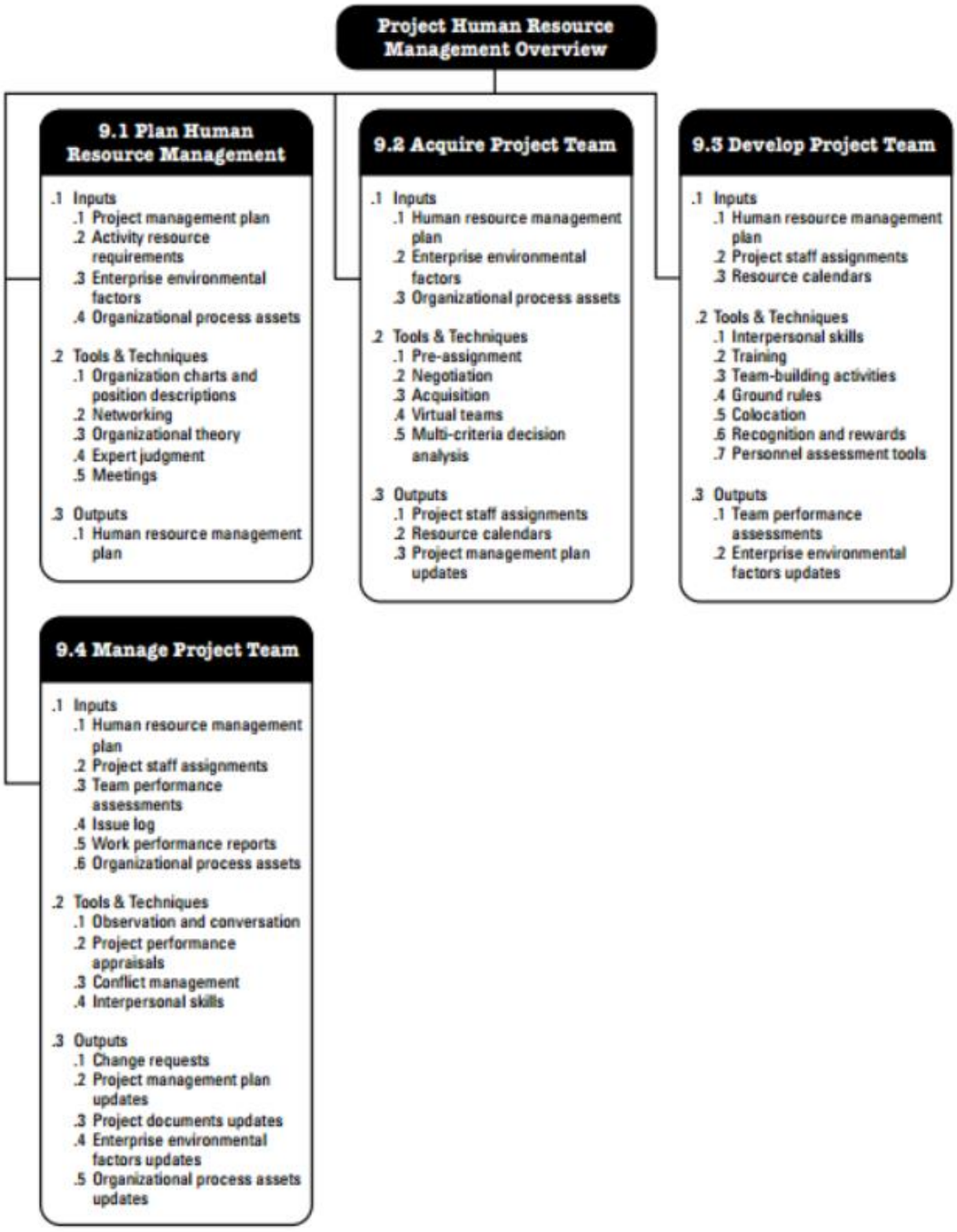



**Figure 9. Project Human Resource Management Overview (Source: PMI, 2013)**

7. Project Communications Management: This includes plan communications management, manage communications, and control communications.

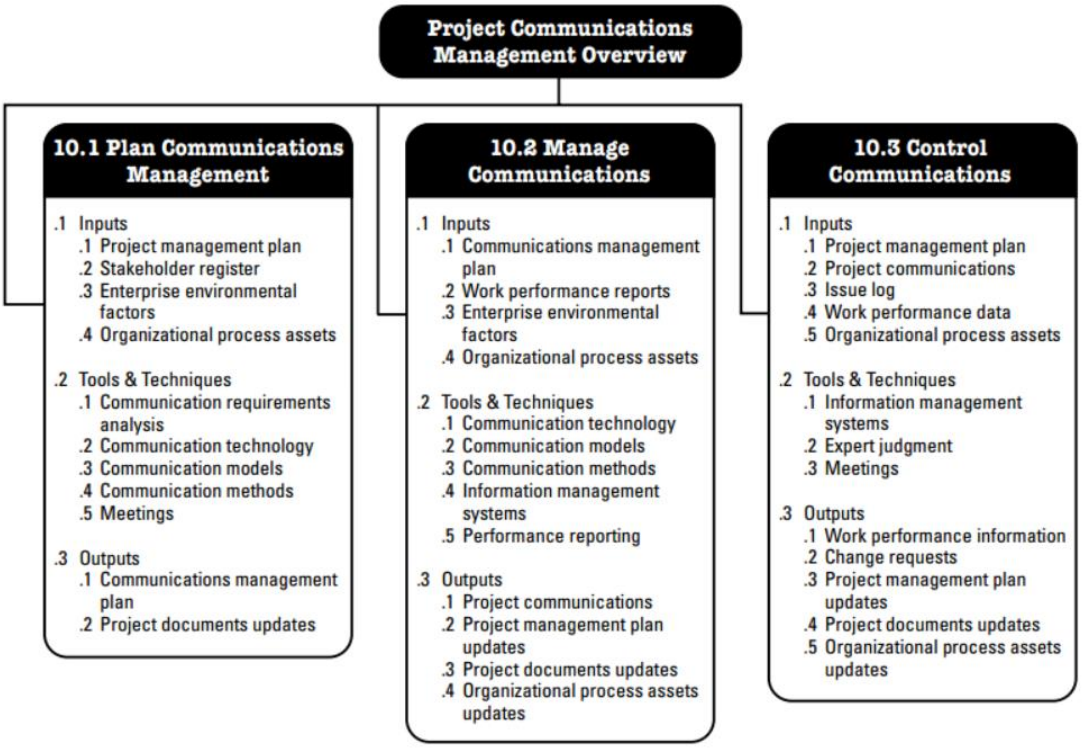



**Figure 10 Project Communications Management Overview (Source: PMI, 2013)**

8. Project Procurement Management: This includes plan procurement management, conduct procurements, control procurements, and close procurements.

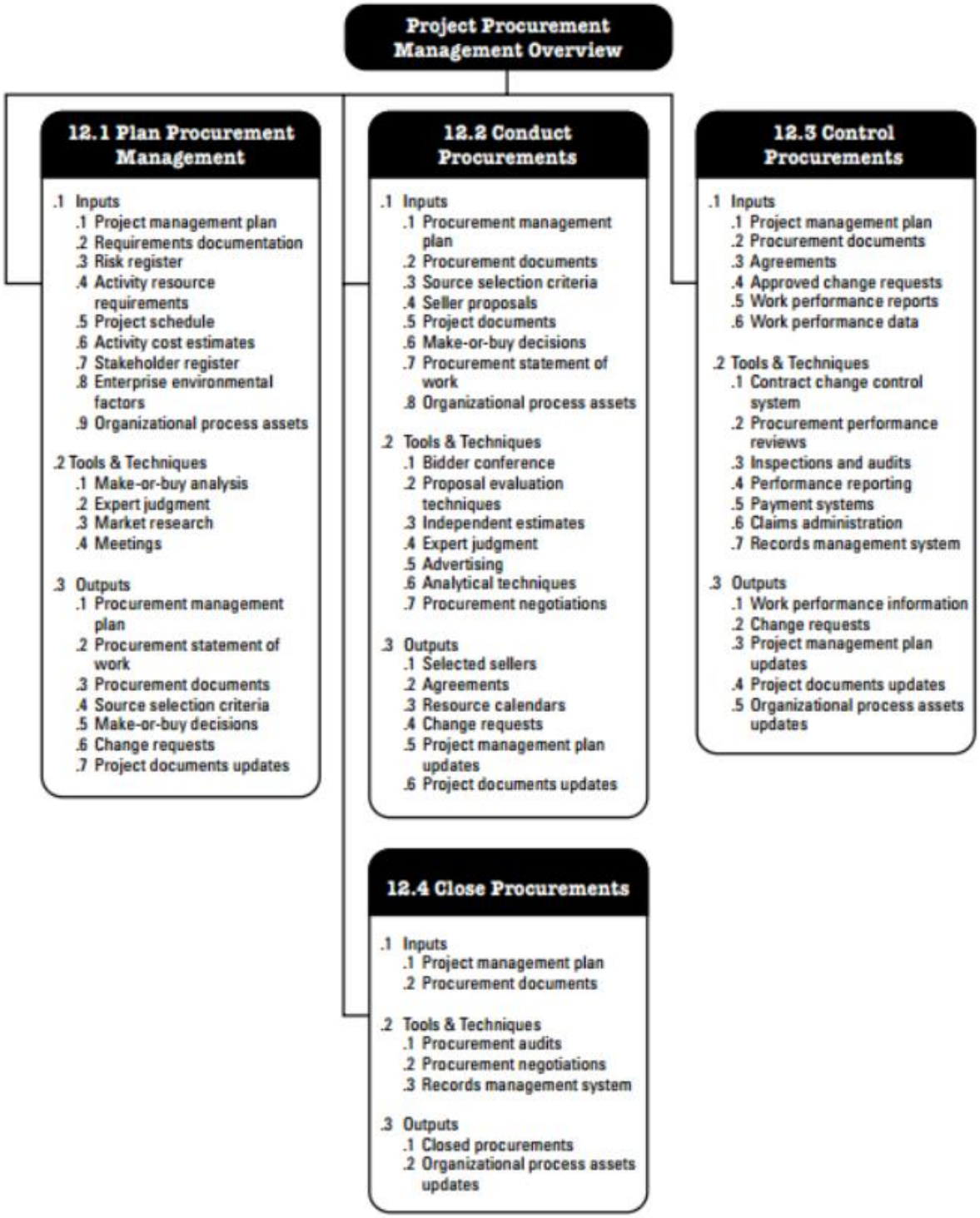



**Figure 11. Project Procurement Management Overview (Source: PMI, 2013)**

9. Project Risk Management: It involves plan risk management, identify risks, perform qualitative risk analysis and perform quantitative risk analysis, plan risk responses, and control risks.

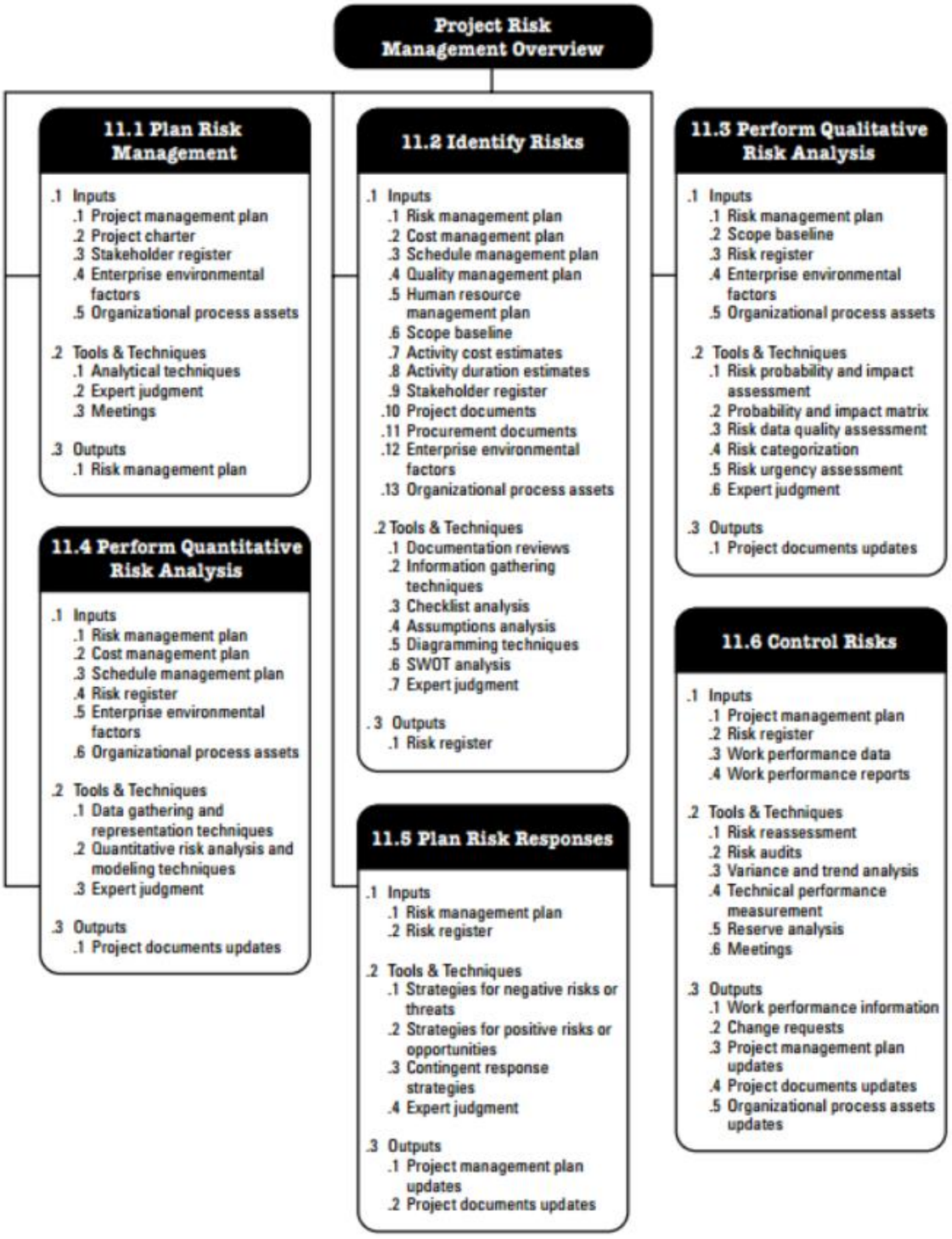



**Figure 12. Project Risk Management Overview**

10. Project Stakeholders Management: This involves identify stakeholders, plan stakeholder management, manage stakeholder engagement, and control stakeholder engagement.

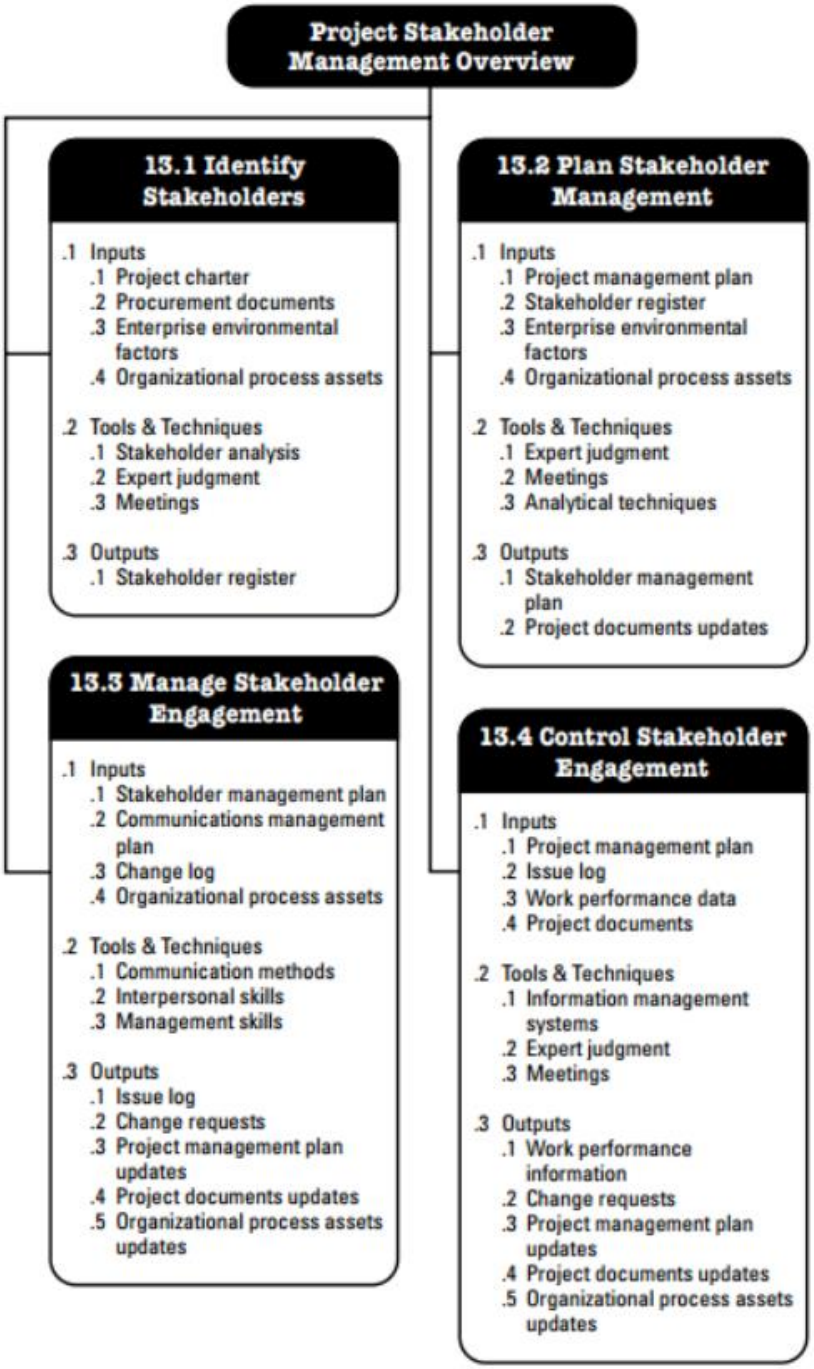



**Figure 13. Project Stakeholder Management Overview (Source: PMI, 2013)**

The figure below shows the mapping of the 47 project management processes within the five project management process groups and the 10 knowledge areas.

| Knowledge Areas | Project Management Process Groups | | | | |
|---|---|---|---|---|---|
| | Initiating Process Group | Planning Process Group | Executing Process Group | Monitoring and Controlling Process Group | Closing Process Group |
| 4. Project Integration Management | 4.1 Develop Project Charter | 4.2 Develop Project Management Plan | 4.3 Direct and Manage Project Work | 4.4 Monitor and Control Project Work<br>4.5 Perform Integrated Change Control | 4.6 Close Project or Phase |
| 5. Project Scope Management | | 5.1 Plan Scope Management<br>5.2 Collect Requirements<br>5.3 Define Scope<br>5.4 Create WBS | | 5.5 Validate Scope<br>5.6 Control Scope | |
| 6. Project Time Management | | 6.1 Plan Schedule Management<br>6.2 Define Activities<br>6.3 Sequence Activities<br>6.4 Estimate Activity Resources<br>6.5 Estimate Activity Durations<br>6.6 Develop Schedule | | 6.7 Control Schedule | |
| 7. Project Cost Management | | 7.1 Plan Cost Management<br>7.2 Estimate Costs<br>7.3 Determine Budget | | 7.4 Control Costs | |
| 8. Project Quality Management | | 8.1 Plan Quality Management | 8.2 Perform Quality Assurance | 8.3 Control Quality | |
| 9. Project Human Resource Management | | 9.1 Plan Human Resource Management | 9.2 Acquire Project Team<br>9.3 Develop Project Team<br>9.4 Manage Project Team | | |
| 10. Project Communications Management | | 10.1 Plan Communications Management | 10.2 Manage Communications | 10.3 Control Communications | |
| 11. Project Risk Management | | 11.1 Plan Risk Management<br>11.2 Identify Risks<br>11.3 Perform Qualitative Risk Analysis<br>11.4 Perform Quantitative Risk Analysis<br>11.5 Plan Risk Responses | | 11.6 Control Risks | |
| 12. Project Procurement Management | | 12.1 Plan Procurement Management | 12.2 Conduct Procurements | 12.3 Control Procurements | 12.4 Close Procurements |
| 13. Project Stakeholder Management | 13.1 Identify Stakeholders | 13.2 Plan Stakeholder Management | 13.3 Manage Stakeholder Engagement | 13.4 Control Stakeholder Engagement | |

**Figure 14. Project Management Process Group and Knowledge Area Mapping (Source: PMI, 2013)**

# 3 METHODOLOGICAL FRAMEWORK

## 3.1 Information sources

Information is knowledge gained or given, facts, news, or the communicating or reception of knowledge. Information is a means of communicating knowledge, helping us to find out what we need to know.

An information source is where people get information. It is the means by which a person is informed about something because knowledge is available to anyone.

Information can be obtained in several ways; for instance, by asking people or looking for it on documents, books, websites, pictures, and organizations. Information is published in a range of formats and it is important to select and use those according to the needs. The format to be chosen will depend on circumstances, including the time and technology available. Formats may vary between print, electronic, or audio-visual.

Information is usually categorized into two main types: primary and secondary.

### 3.1.1 Primary sources

Primary sources of information come directly from a person or organization – they are completely original and have not been altered in any way. Some examples include: patents, diaries, newspaper articles, artefacts, photographs, transcripts of conversations or interviews, speeches, music, art, legislation and policy, novels, poems, plays, and parliamentary papers.

In regards to the primary sources that will be used in the final graduation project, these are meeting minutes based on conversations with the stakeholders, personnel, and supplier’s interviews. (Refer to Chart 1 for a more detailed view on the source used for each of the objectives.)

### 3.1.2 Secondary sources

Secondary sources of information interpret and comment on primary information. Examples of secondary sources include books or articles that summarize the work of others, literature reviews, and biographies. Refer to Chart 1 for a more detailed view on the source use for each of the objectives.

**Chart 1. Information Sources [Source: F. Gen, December 2017]**

| Objectives | Information sources | |
|---|---|---|
| | Primary | Secondary |
| To create a scope management plan to define and control what will be included and what will not in the project through clear requirements. | Meeting minutes. Personnel interviews. | PMBOK Guide, PMI database and Internet. |
| To develop a sustainable time management plan that includes the processes required to manage the timely completion of the project. | Meeting minutes. Personnel interviews. | PMBOK Guide, PMI database and Internet. |
| To create a cost management plan so the project can be completed within the approved budget. | Meeting minutes. Personnel interviews. | PMBOK Guide, PMI database and Internet. |
| To create a robust quality management plan to satisfy the needs for which the project was undertaken, through meeting product requirements and validate those. | Meeting minutes. Personnel interviews. | PMBOK Guide, PMI database and Internet. |
| To develop a human resource management plan to organize, manage, and lead the project team. | Meeting minutes. Human Resources staff member's interviews. | PMBOK Guide, PMI database and Internet. |
| To create a communications management plan to define the appropriate communication strategy to | Meeting minutes. Personnel interviews. | PMBOK Guide, PMI database and Internet. |

| | | |
|---|---|---|
| ensure timely and effective information distribution across stakeholders. | | |
| To develop a risk management plan to identify, analyze, respond, and control the risks in the project. | Meeting minutes. Personnel interviews. | PMBOK Guide, PMI database and Internet. |
| To create a procurement management plan to define the necessary processes to purchase or acquire products, services, or results needed from outside the project team. | Meeting minutes. Personnel interviews. Supplier's interviews and SOWs. | PMBOK Guide, PMI database and Internet. |
| To create a stakeholder's management plan to identify the people, groups, or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution. | Meeting minutes. Stakeholder's interviews. | PMBOK Guide, PMI database and Internet. |

## 3.2 Research methods

"Research in common parlance refers to a search of knowledge" (Kothari, 2004). Therefore, a research methodology is the structured process we use to get to that knowledge.

There are many types of research methods such as quantitative, qualitative, and the one that will be used in this final graduation project, which is the analytical method.

### 3.2.1 Analytical Method

Kothari (2004) described that in analytical research "the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material"

The research method that will be used for each of the objectives is further explained in Chart 2.

**Chart 2. Research Methods [Source: F. Gen, December 2017]**

| Objectives | Research methods |
|---|---|
| | Analytical Method |
| To create a scope management plan to define and control what will be included and what will not in the project through clear requirements. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 2, will be used to create the scope management plan. |
| To develop a sustainable time management plan that includes the processes required to manage the timely completion of the project. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 3, will be used to create the time management plan. |
| To create a cost management plan so the project can be completed within the approved budget. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 4, will be used to create the cost management plan. |
| To create a robust quality management plan to satisfy the needs for which the project was undertaken, through meeting product requirements and validating those. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 5, will be used to create the quality management plan. |
| To develop a human resource management plan to organize, manage, and lead the project team. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 6, will be used to create the human resource management plan. |

| | |
|---|---|
| To create a communications management plan to define the appropriate communication strategy to ensure timely and effective information distribution across stakeholders. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 7, will be used to create the communications management plan. |
| To develop a risk management plan to identify, analyze, respond, and control the risks in the project. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 8, will be used to create the risk management plan. |
| To create a procurement management plan to define the necessary processes to purchase or acquire products, services, or results needed from outside the project team. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 9, will be used to create the procurement management plan. |
| To create a stakeholders management plan to identify the people, groups or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution. | Facts and information provided, as the outputs from sources identified in Chart 1 for objective 10, will be used to create the stakeholders management plan. |

### 3.3 Tools

A tool is described as “something tangible, such as a template or software programme, used in performing an act” (PM1, 2013).

The specific tools that will be used for each of the objectives are listed below in Chart 3.

**Chart 3. Tools [Source: F. Gen, December 2017]**

| Objectives | Tools |
|---|---|
| To create a scope management plan to define and control what will be included and what will not in the project through clear requirements. | Scope Management Template.<br>WBS Schedule Pro.<br>Expert's judgement. |
| To develop a sustainable time management plan that includes the processes required to manage the timely completion of the project. | Microsoft Project 2013<br>Expert's judgement. |
| To create a cost management plan so the project can be completed within the approved budget. | Cost Management Plan Template.<br>Microsoft Excel 2013<br>Expert's judgement. |
| To create a robust quality management plan to satisfy the needs for which the project was undertaken, through meeting product requirements and validating those. | Quality Management Plan Template.<br>Check list template.<br>Expert's judgement. |
| To develop a human resource management plan to organize, manage, and lead the project team. | Human Resource Management Plan Template.<br>Expert's judgement. |
| To create a communications management plan to define the appropriate communication strategy to ensure timely and effective information distribution across stakeholders. | Communications Management Plan Template.<br>Expert's judgement. |
| To develop a risk management plan to identify, analyze, respond, and control the risks in the project. | Risk Management Plan Template.<br>Risk Register Template.<br>Expert's judgement. |
| To create a procurement management | Procurement Management Plan |

| | |
|---|---|
| plan to define the necessary processes to purchase or acquire products, services, or results needed from outside the project team. | Template.<br>Expert's judgement. |
| To create a stakeholders management plan to identify the people, groups, or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution. | Stakeholders Management Plan Template.<br>Stakeholders Register Template.<br>Expert's judgement. |

### 3.4 Assumptions and constraints

Assumption is defined as "a factor in the planning process that is considered to be true, real, or certain, without proof or demonstration" (PMI, 2013, p. 529).

Constraint is defined as "a limiting factor that affects the execution of a project, programme, portfolio, or process" (PMI, 2013, p. 533).

The summary of assumptions and constraints is explained in Chart 4.

**Chart 4. Assumptions and Constraints [Source: F. Gen, December 2017]**

| Objectives | Assumptions | Constraints |
|---|---|---|
| To create a scope management plan to define and control what will be included and what will not in the project through clear requirements. | Project scope will not change in the short to medium term. | Customers considering increasing the scope/activities to be supported in CRML. |
| To develop a sustainable time management plan that includes the processes required to manage the | Time allocated to complete the project is sufficient (3 months). | Costa Rica customs department might execute random audits that might delay |

| | | |
|---|---|---|
| timely completion of the project. | | equipment transfer. |
| To create a cost management plan so the project can be completed within the approved budget. | The budget ($232k) allocated for this project will be enough to support all transfer activities. | Expedite shipments were not included as part of the budget. |
| To create a robust quality management plan to satisfy the needs for which the project was undertaken, through meeting product requirements and validating those. | Product requirements clearly defined by customer. | Scope changes on the expected outcome of the project. |
| To develop a human resource management plan to organize, manage, and lead the project team. | Organization will provide the project team/staffing to work on this project. | Headcount increase due to scope changes. |
| To create a communications management plan to define the appropriate communication strategy to ensure timely and effective information distribution across stakeholders. | The organization will provide all the required tools to keep fluid communication. | Different time zones between Malaysia and Costa Rica. |
| To develop a risk management plan to identify, analyze, respond, and control the risks in the project. | All risks should be detected in an early stage of the project. | Scope changes during project execution might generate new risks at a late stage. |

| | | |
|---|---|---|
| To create a procurement management plan to define the necessary processes to purchase or acquire products, services, or results needed from outside the project team. | All the required suppliers are approved by Intel. | Chemicals import policies not supported by the supplier. |
| To create a stakeholders management plan to identify the people, groups, or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution. | All the stakeholders will be identified with the respective level of influence and power within the project. | Scope changes during project execution might generate new stakeholders. |

### 3.5 Deliverables

Deliverable is defined as “any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project” (PMI, 2013, p. 537).

Each of the objectives of this final graduation project will have deliverables related to it; those are listed in Chart 5.

**Chart 5. Deliverables [Source: F. Gen, December 2017]**

| Objectives | Deliverables |
|---|---|
| To create a scope management plan to define and control what will be included and what will not in the project through clear requirements. | Scope Management Plan. |

| | |
|---|---|
| To develop a sustainable time management plan that includes the processes required to manage the timely completion of the project. | Schedule Management Plan. |
| To create a cost management plan so that the project can be completed within the approved budget. | Cost Management Plan. |
| To create a robust quality management plan to satisfy the needs for which the project was undertaken, through meeting product requirements and validating those. | Quality Management Plan. |
| To develop a human resource management plan to organize, manage, and lead the project team. | Human Resources Management Plan. |
| To create a communications management plan to define the appropriate communication strategy to ensure timely and effective information distribution across stakeholders. | Communications Management Plan. |
| To develop a risk management plan to identify, analyze, respond, and control the risks in the project. | Risk Management Plan.<br>Risk Register. |
| To create a procurement management plan to define the necessary processes to purchase or acquire products, services, or results needed from outside the project team. | Procurement Management Plan. |
| To create a stakeholders management plan to identify the people, groups, or organizations that could impact or be impacted by the project and develop an effective strategy to engage them in project decisions and execution. | Stakeholder Management Plan.<br>Stakeholder Register. |

# 4 RESULTS

## 4.1 Scope Management Plan

### 4.1.1 Scope Management Introduction

Scope Management is a collection of processes, which ensure that the project includes all the work required to complete it while excluding all the work that is not necessary to complete it. The Scope Management Plan details how the project scope will be defined, developed, and verified. It clearly defines who is responsible for managing the projects' scope and acts as a guide for managing and controlling the scope.

Project Scope Management follows a five-step process: collect requirements, define scope, create WBS, verify scope, and control scope. Each step will be explained below.

1. Collect Requirements: this first step is the process by which we define and document the requirements needed to meet all project objectives. The foundation of this process is the project charter and stakeholder register. Subsequently, the team can identify requirements, discuss collectively details associated with meeting each requirement, conduct interviews and follow-on discussion to clarify the requirements, and document the requirements in sufficient detail to measure them once the project begins the execution phase. This documentation also serves as an input to the next step in the process which is to define scope.
2. Define Scope: this step is critical to project success as it requires the development of a detailed project or product description to include deliverables, assumptions, and constraints and establishes the framework in which project work must be performed.
3. Create WBS: this process breaks project deliverables down into progressively smaller and more manageable components which, at the lowest level, are called work packages. This hierarchical structure

allows for more simplicity in scheduling, costing, monitoring, and controlling the project.

4. Verify Scope: this is the process by which the project team receives a formalized acceptance of all deliverables with the sponsor or customer.
5. Control Scope: this is the process of monitoring or controlling the project or product scope as well as managing any changes in the scope baseline. Changes may be necessary to the project scope but it is imperative because they are controlled and integrated in order to prevent scope creep and gold plating.

### 4.1.2 Scope Management Approach

The purpose of this scope management plan is to set forth the plans and procedures for defining, developing, monitoring, controlling, changing, implementing, and verifying the project scope. It is the intent of scope management to ensure the completion of all the work required (and only the work required) to complete the project successfully.

The scope for this project is defined by the scope statement, Work Breakdown Structure (WBS) and WBS Dictionary. The Project Manager, Sponsor and Stakeholders will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements. Proposed scope changes may be initiated by the Project Manager, stakeholders, or any member of the project team. All change requests will be submitted as change orders to the Project Manager who will then evaluate the requested scope change. Upon acceptance of the scope change request, the Project Manager will submit the scope change request to the Sponsor, Stakeholder, Sub Consultants, or Subcontractors. The Project Manager is responsible for the approval of scope changes that are strictly technical in nature, whereas the Project Sponsor is responsible for the approval of scope changes affecting time and costs parameters. Upon approval of scope changes, the Project Manager will update all project documents and communicate the scope changes to all stakeholders through a change advisory board [CAB]. Based on feedback and

input from the Project Manager and Stakeholders, the Project Sponsor is responsible for the acceptance of the final project deliverables and project scope.

### 4.1.3 Roles and Responsibilities

The project manager will assume overall responsibility for project scope management. The people listed below will assume the following scope management responsibilities:

**Chart 6 R&R's [Source: F. Gen, March 2018]**

| Name | Roles | Responsibilities |
|---|---|---|
| Flor Gen Ulate | Project Manager | a. Measure and verify project scope.<br>b. Facilitate scope change requests.<br>c. Facilitate impact assessments of scope change requests.<br>d. Organize and facilitate scheduled change control meetings.<br>e. Communicate outcomes of scope change requests.<br>f. Update project documents upon approval of all scope changes. |
| CRML Manager<br>IEP Team | Project Sponsor | a. Approve or deny scope change requests as appropriate.<br>b. Evaluate need for scope change requests.<br>c. Accept project deliverables. |
| Module Engineer<br>EHS Engineer<br>Operations Team | Project Team Members | a. Participate in defining change resolutions.<br>b. Evaluate the need for scope changes and communicate them to the project manager as necessary. |
| Folsom PDE Team | Stakeholders & End users | a. Can propose scope changes<br>b. Will execute change directives issued by Project Manager |

### 4.1.4 Scope Definition

The scope for this project was defined through a comprehensive requirements collection process, even though the timeline to execute this project is actually too tight. First, a full assessment on the possible impact this transfer might have to CRML operations was carried out; moreover, a deep revision around law concerns due to some items that required a chemical analysis was done and also an exhaustive cadence of meetings with the stakeholders were held. From the information gathered, the project manager developed the requirements management plan and requirements documentation.

The project deliverables were generated based on the requirements collection process and input from subject matter experts such as the IEP Team, Malaysia counterparts, Team members, EHS Team, and OPS team from CRML. This process of expert judgement provided feedback on the most effective, safe, and cost-efficient ways to meet the original requirements of the transfer.

### 4.1.5 Project Scope Statement

The project scope statement details the project's deliverables and the necessary work to create these deliverables.

#### 4.1.5.1 Product Deliverables and Acceptance Criteria

The success of this project will be measured by the following criteria:

1. Tester up and running in CRML in Q1'8 with at least 95% availability and 80% tool utilization.
2. Folsom PDE Team able to connect remotely without connectivity issues.
3. Tester critical spares available in Wiings [Storage system for consumables] with its defined algorithm.
4. Qualified tester through Install Qualification process that meets 1700 mechanical units processed without hardware issues [Dropped units, tester crashes].
5. Tester installed in the defined layout in CRML meeting safety requirements.

6. Trained OPS team members to support Folsom PDE activities on a 24/7 model.

#### 4.1.5.2 Project Constraints

The owners have requested that the project should not exceed three hundred thousand US dollars. In addition, the project duration should not exceed three months to completion.

#### 4.1.5.3 Project Assumptions

Assumptions will include:

1. Project scope will not change in the short to medium term
2. Organization will provide the project team or staff to work on this project.

### 4.1.6 Work Breakdown Structure

The Work Breakdown Structure (WBS) and Work Breakdown Structure Dictionary are key elements to effective scope management. This section should discuss how the project scope is subdivided into smaller deliverables in the WBS and WBS Dictionary and how these smaller components are managed during the life of the project.

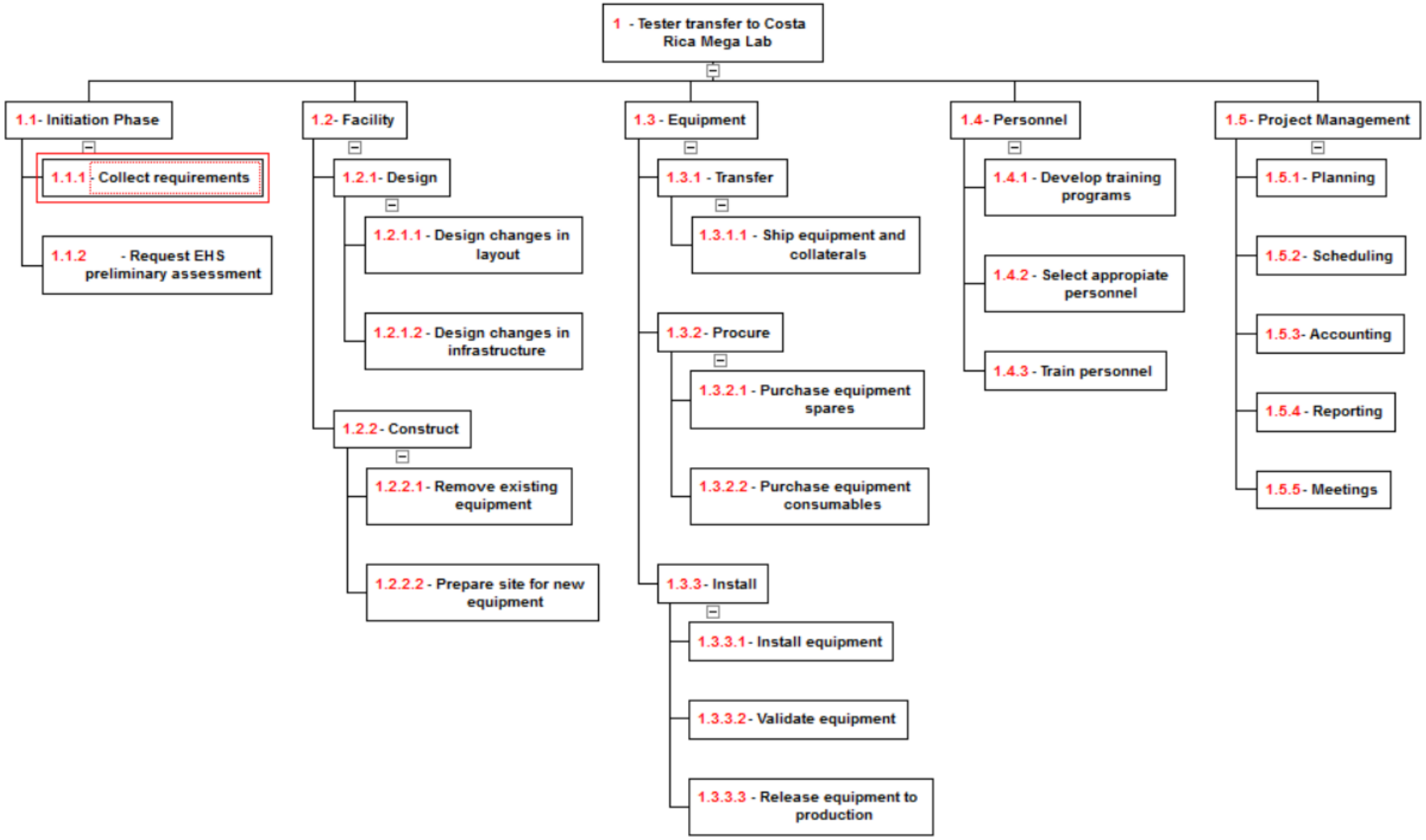



**Figure 15. WBS [Chart View] [Source: F. Gen, April 2018]**

In order to define the necessary work for project completion, WBS Dictionary was used. The WBS Dictionary includes an entry for each WBS element. The WBS Dictionary includes a detailed description of work for each element and the deliverables, budget, and resource needs for that element.

**Chart 7. WBS Dictionary [Source: F. Gen, April 2018]**

| WBS ID | Task Name | Description of Work | Deliverables | Budget | Resources |
|---|---|---|---|---|---|
| **1.1** | **Initiation Phase** | **Request for proposal.** | | **NA** | |
| 1.1.1 | Collect requirements | Meet with project key stakeholders to gather project's needs. | Initial requirements documentation | NA | |
| 1.1.2 | Request EHS preliminary assessment | EHS site contact will perform assessment of the project. | EHS project assessment | NA | |
| **1.2** | **Facility** | **Phase where all changes in the infrastructure are planned and executed.** | | **$12,500.00** | |
| **1.2.1** | **Design** | **Design phase to include all the required changes.** | | **$12,500.00** | |
| 1.2.1.1 | Design changes in layout | Update CRML layout. | CRML layout CAD file | NA | |
| 1.2.1.2 | Design changes in infrastructure | Submit all changes required in facilities to corporate services. | CS tickets for facilities changes | $12,500.00 | CS quote |

| | | | | | |
|---|---|---|---|---|---|
| **1.2.2** | **Construct** | **Construction phase to execute all the required changes.** | | **NA** | |
| 1.2.2.1 | Remove existing equipment | Space clean-up to install the new tool. | Cleaned site | NA | |
| 1.2.2.2 | Prepare site for new equipment | Space readiness to install the new tool, including the installation of required facilities. | Facilities installed | NA | |
| **1.3** | **Equipment** | **Management of the transfer, procurement, and installation processes of the project.** | | **$197,000.00** | |
| **1.3.1** | **Transfer** | **Transferring equipment.** | | **$110,000.00** | |
| 1.3.1.1 | Ship equipment and collaterals | Equipment and collaterals shipment from Malaysia to CRML. | Collaterals and equipment dock date confirmation | $110,000.00 | Courier quote |
| **1.3.2** | **Procure** | **Executing required purchases to support new equipment.** | | **$77,000.00** | |

| | | | | | |
|---|---|---|---|---|---|
| 1.3.2.1 | Purchase equipment spares | Identify spares needed and submit the purchase orders required. | Spares purchase orders | $42,000.00 | Suppliers quotes |
| 1.3.2.2 | Purchase equipment consumables | Identify consumables needed and submit the purchase orders required. | Consumables purchase orders | $35,000.00 | Suppliers quotes |
| **1.3.3** | **Install** | **Installing phase of new equipment in CRML.** | | **$10,000.00** | |
| 1.3.3.1 | Install equipment | Works related to assemble the equipment and connecting all the facilities. | Equipment connected to facilities. | $10,000.00 | Sub-contractor quote |
| 1.3.3.2 | Validate equipment | Process of tool qualification and validation. | IQ white paper | NA | |
| 1.3.3.3 | Release equipment to production | Deliver a validated equipment to Operations Team. | Tool release note | NA | |
| **1.4** | **Personnel** | **Enabling headcount to support the new equipment.** | | **$20,500.00** | |
| 1.4.1 | Develop training programs | Works related to develop a training program. | Training material and schedule | NA | |

| | | | | | |
|---|---|---|---|---|---|
| 1.4.2 | Select appropriate personnel | Headcount allocation to run the new equipment. | Personnel list | NA | |
| 1.4.3 | Train personnel | Training execution to chosen personnel. | Training completion email | $20,500.00 | Sub-contractor quote |
| **1.5** | **Project Management** | **The management of the planning, execution, monitoring and controlling, and closure of the project.** | | **NA** | |
| 1.5.1 | Planning | Planning and updating project activities throughout project lifecycle. | Project Management Plan | NA | |
| 1.5.2 | Scheduling | Planning of project activities, assigning timeline and dates to determine, and control project duration. | Schedule - Gantt | NA | |
| 1.5.3 | Accounting | Monitoring the financial expenditures of the project throughout the project lifecycle. | Financial Report | NA | |

| | | | | | |
|---|---|---|---|---|---|
| 1.5.4 | Reporting | Documenting project activities, preparing reports and presenting to the appropriate stakeholders. | Project progress reports | NA | |
| 1.5.5 | Meetings | All meetings held to control the management of the project. | Progress meetings | NA | |

### 4.1.7 Scope Verification

The deliverables will be verified against the original scope by the Project Manager and will be approved by the Project Sponsor. Progress report meetings are one of the channels that will be used. The formal acceptance must be documented and distributed through email among the key stakeholders' distribution list. This will ensure that project work remains within the scope of the project on a consistent basis throughout the life cycle of the project.

### 4.1.8 Scope Control

The Project Manager and project team will ensure that the WBS Dictionary will be used as a statement of work for each WBS element. The project team will ensure that they perform only the work described in the WBS Dictionary and generate the defined deliverables for each WBS element.

When a scope change is required, the process for submitting changes should be redirected to the Project Manager in the form of a project change order. The Project Manager will then review the suggested change to the scope of the project. The Project Manager will either deny the change request if it does not apply to the intent of the project or convene a change control meeting between the project team

and Sponsor to review the change request further and perform an impact assessment of the change. If the change request receives approval by the Project Manager and Sponsor, the Project Manager will then formally submit the change request to the Project Sponsor who will formally accept the change by signing the change order. Upon acceptance of the scope change by the Project Manager and Project Sponsor, the Project Manager will update all project documents and communicate the scope directive to all project team members and stakeholders.

### 4.1.9 Sponsor Acceptance

Approved by the Project Sponsor:

_____ Date:_____

<Project Sponsor>
<Project Sponsor Title>

**Revision History**

| Version | Date | Reason | Executive Sponsor Sign Off |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

## 4.2 Schedule Management Plan

### 4.2.1 Schedule Management Introduction

The schedule management plan describes how the project schedule will be established and managed. The project schedule is the guide to how the project will be completed and finished. The schedule management plan is used to define the technique the project team will use in creating the project schedule. This plan also comprises how the team will review the project schedule and manage changes

after the standard schedule has been approved. This includes identifying, analyzing, documenting, prioritizing, approving or rejecting, and publishing all schedule related changes.

### 4.2.2 Schedule Management Approach

Project schedules will be made using Microsoft Project 2013. Activity definition will identify the specific work packages which must be performed to complete each deliverable. Activity sequencing will be used to determine the order of work packages and assign relationships between project activities. Moreover, activity duration estimating will be used to calculate the number of work periods required to complete work packages. Finally, resource estimating will be used to assign resources to work packages in order to complete schedule development.

Once an initial schedule has been developed, the project manager and assistant project manager will assess it cautiously to review assigned project tasks. The project team and resources must agree on the proposed work package assignments, durations, and schedule. Once this is achieved, the project sponsor will review and approve the schedule and it will be baselined.

### 4.2.3 Activities Definition, Sequence and Duration

Based on the WBS previously developed, a list of activities was defined in alignment to the three-month period expected to execute the project. This provided a basis for the timely estimation, sequencing, production, monitoring, and evaluation of project work. In addition, the interaction between project activities was specified, relationships were identified, documented, and logically sequenced.

**Chart 8. Project Work Packages [Source: F. Gen, April 2018]**

| WBS | Task Name | Description of Work | Duration | Predecessors |
|---|---|---|---|---|
| **1.1** | **Initiation Phase** | **Request for proposal** | **9 days** | |

| | | | | |
|---|---|---|---|---|
| 1.1.1 | Collect requirements | Meet with project key stakeholders to gather project's needs. | 4 days | |
| 1.1.2 | Request EHS preliminary assessment | EHS site contact will perform assessment of the project. | 5 days | 3 |
| **1.2** | **Facility** | **Phase where all changes in the infrastructure are planned and executed.** | **19 days** | **2** |
| **1.2.1** | **Design** | **Design phase to include all the required changes.** | **11 days** | |
| 1.2.1.1 | Design changes in layout | Update CRML layout. | 3 days | |
| 1.2.1.2 | Design changes in infrastructure | Submit all changes required in facilities to corporate services. | 8 days | 7 |
| **1.2.2** | **Construct** | **Construction phase to execute all the required changes.** | **8 days** | **6** |
| 1.2.2.1 | Remove existing equipment | Space clean-up to install the new tool. | 3 days | |
| 1.2.2.2 | Prepare site for new equipment | Space readiness to install the new tool, including the installation of required facilities. | 8 days | |
| **1.3** | **Equipment** | **Management of the transfer, procurement. and installation processes of the project.** | **24 days** | |
| **1.3.1** | **Transfer** | **Transferring equipment.** | **15 days** | **2** |

| | | | | |
|---|---|---|---|---|
| 1.3.1.1 | Ship equipment and collaterals | Equipment and collaterals shipment from Malaysia to CRML. | 15 days | |
| **1.3.2** | **Procure** | **Executing required purchases to support new equipment.** | **3 days** | **2** |
| 1.3.2.1 | Purchase equipment spares | Identify spares needed and submit the purchase orders required. | 3 days | |
| 1.3.2.2 | Purchase equipment consumables | Identify consumables needed and submit the purchase orders required. | 3 days | |
| **1.3.3** | **Install** | **Installing phase of new equipment in CRML.** | **5 days** | **9** |
| 1.3.3.1 | Install equipment | Works related to assemble the equipment and connecting all the facilities. | 5 days | |
| 1.3.3.2 | Validate equipment | Process of tool qualification and validation. | 2 days | |
| 1.3.3.3 | Release equipment to production | Deliver a validated equipment to Operations Team. | 1 day | |
| **1.4** | **Personnel** | **Enabling headcount to support the new equipment.** | **8 days** | **12** |
| 1.4.1 | Develop training programs | Works related to develop a training program. | 8 days | |
| 1.4.2 | Select appropriate personnel | Headcount allocation to run the new equipment. | 2 days | |

| | | | | |
|---|---|---|---|---|
| 1.4.3 | Train personnel | Training execution to chosen personnel. | 5 days | |
| **1.5** | **Project Management** | **The management of the planning, execution, monitoring and controlling, and closure of the project.** | **41 days** | |
| 1.5.1 | Planning | Planning and updating project activities throughout project lifecycle. | 41 days | |
| 1.5.2 | Scheduling | Planning of project activities, assigning timeline and dates to determine control project duration | 41 days | |
| 1.5.3 | Accounting | Monitoring the financial expenditures of the project throughout the project lifecycle. | 41 days | |
| 1.5.4 | Reporting | Documenting project activities, preparing reports, and presenting to the appropriate stakeholders. | 41 days | |
| 1.5.5 | Meetings | All meetings held to control the management of the project. | 41 days | |

### 4.2.4 Develop Schedule

In this section, all prior time management processes will be integrated to reflect equipment transfer to CRML project schedule. The sequenced activity list and duration estimated will be approved for the timely execution of project tasks over time.

Refer to appendix # 4 to review in detail project schedule.

### 4.2.5 Control Schedule

Controlling schedule involves monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan.

The schedule can only be changed through the formal change control procedures set forth in the change management plan. The schedule baseline will be used throughout the project as a basis for comparison to actual results.

### 4.2.6 Report Schedule

The project manager will review and update the project schedule every Monday and Thursday. On these dates, members of the project team will provide the project manager with actual performance and completion information.

The project manager will compare the actual information to the schedule baseline and calculate the completion percentages and any variances. The project manager will distribute the actual schedule information according to the terms set forth in the communication management plan.

Where necessary, the project manager will meet with the project team members to determine the cause of any variance and discuss appropriate corrective measures. Where schedule changes are necessary, the project manager will submit a change request in accordance with the change management plan

## 4.3 Cost Management Plan

### 4.3.1 Process Description and Importance

The cost management plan is the only output of the first process of cost management “Plan Cost Management”. It describes how the project costs will be planned, structured, and controlled by establishing the policies, procedures, and documentation for planning, managing, expending, and controlling projects costs. The main advantage of this process is that it provides guidance and direction on how the project costs will be managed throughout the project. The good

management of the cost of a project is directly related to the project success. Thus, one of the most important responsibilities presented to the Project Manager is to know how to adequately estimate costs to complete satisfactorily the project and please the interested parties. In order to have a successful cost management plan, it is imperative to following these requirements:

- Define specific units of measure for each resource.
- Establish the level of precision and accuracy of cost estimates.
- Create organizational procedures links with the organization.
- Define control thresholds to monitor cost performance.
- Establish the rules for the performance measurement through the earned value management (EVM).
- Report the formats and frequency of submission of reports.
- Document the process descriptions.
- Describe additional details about cost management.

### 4.3.2 Tools and Techniques to be used on the cost management plan

After the scope of the “Tester Transfer to CRML” project have been determined, the project team will finalize the resource and staffing requirements necessary for the successful completion of the project. The Project Manager will create the Work Breakdown Structure (WBS) of the Project using group decision making techniques with the engagement of all stakeholders with a very high level of power. Expert judgment will play a key role in establishing costs for activities. Costs will be easily estimated with the use of historical information, discipline specific tools, and activity guidelines. From this input, costs associated with labor, materials or resources needed, and planned durations of each WBS element, will be estimated and then aggregated to establish the cost of each work package.

A third point estimating approach using PERT analysis will be taken into account by using spreadsheets with formulas to compute expected costs, contingency reserves, and their translated monetary values to identify the costs of the known risks. Custom fields such as activity, sequence, duration, expected cost, contingency reserve, and expected monetary value will also be used. A vendor bid

analysis will be used for the supplies needed in the rodent control activities, road repairs, garbage receptacles, among others. Using the best information available at the time of estimation, a cost management plan will be prepared.

### 4.3.3 Activity Costs Estimates

Activity cost estimates is one of the outputs of the second process of project cost management, according to the PMBOK (5th edition) classification. Estimating Costs is defined as a process of developing an approximation of the monetary resources needed to complete project activities. Cost estimates are a prediction that is based on the information known at a given point in time. They should be reviewed and refined during the course of the project to reflect additional detail as it becomes available and assumptions are tested. The accuracy of a project estimate will increase as the project progresses through the project life cycle. The benefit of this process is that it determines the amount of cost required to complete project work.

This process presents ten tools and techniques for aiding with the cost estimates, namely expert judgment, analogous estimating, parametric estimating, bottom-up estimating, reserve analysis, cost of quality (COC), project management software, group decision-making techniques, vendor bid analysis, and three-point estimating. The latest one, three-point estimating, has been the technique chosen by this team due to its advantages over the other options. Three-point estimating improves the accuracy of the estimates of the costs of a single activity if they have uncertainty. It also takes into account risks; thus, estimates are used for three values to define an approximate range of the cost of the activity. This is done as follows:

- Most likely (cM): The cost of the activity is based on realistic effort assessment for the required work and any projected expenses.
- Optimist (cO): The activity cost is based on analysis on the best-case scenario for the activity.
- Pessimist (cP): The activity cost is based on analysis of the worst-case scenario for the activity.

From these values, the expected cost (cE) is then calculated using the following formulas:

- Triangular distribution: cE= (Co+Cm+Cp)/3 or
- Beta distribution (from PERT analysis): Ce= (cO+4cM+cP)/6

The estimation of costs through this tool (using a given distribution) clears the degree of uncertainty about the expected cost.

**Chart 9 Work Packages Cost Estimate [Source: F. Gen, April 2018]**

| WBS | Task Name | Description of Work | Optimistic (cO) | Most likely (cM) | Pessimistic (cP) | Expected Cost (cE) |
|---|---|---|---|---|---|---|
| **1.1** | **Initiation Phase** | **Request for proposal** | **NA** | **NA** | **NA** | **NA** |
| 1.1.1 | Collect requirements | Meet with project key stakeholders to gather project's needs. | NA | NA | NA | NA |
| 1.1.2 | Request EHS preliminary assessment | EHS site contact will perform assessment of the project. | NA | NA | NA | NA |
| **1.2** | **Facility** | **Phase where all changes in the infrastructure are planned and executed** | **$11,875.00** | **$12,500.00** | **$13,750.00** | **$12,604.17** |
| **1.2.1** | **Design** | **Design phase to include all the required changes.** | **$11,875.00** | **$12,500.00** | **$13,750.00** | **$12,604.17** |
| 1.2.1.1 | Design changes in layout | Update CRML layout. | NA | NA | NA | NA |
| 1.2.1.2 | Design changes in infrastructure | Submit all changes required in the facilities to | $11,875.00 | $12,500.00 | $13,750.00 | $12,604.17 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | corporate services. | | | | |
| **1.2.2** | **Construct** | **Construction phase to execute all the required changes.** | **NA** | **NA** | **NA** | **NA** |
| 1.2.2.1 | Remove existing equipment | Space clean-up to install the new tool. | NA | NA | NA | NA |
| 1.2.2.2 | Prepare site for new equipment | Space readiness to install the new tool, including the installation of required facilities. | NA | NA | NA | NA |
| **1.3** | **Equipment** | **Management of the transfer, procurement and installation processes of the project.** | **$187,150.00** | **$197,000.00** | **$216,700.00** | **$198,641.67** |
| **1.3.1** | **Transfer** | **Transferring equipment.** | **$104,500.00** | **$110,000.00** | **$121,000.00** | **$110,916.67** |
| 1.3.1.1 | Ship equipment and collaterals | Equipment and collaterals shipment from Malaysia to CRML. | $104,500.00 | $110,000.00 | $121,000.00 | $110,916.67 |
| **1.3.2** | **Procure** | **Executing required purchases to support new equipment.** | **$73,150.00** | **$77,000.00** | **$84,700.00** | **$77,641.67** |
| 1.3.2.1 | Purchase equipment spares | Identify spares needed and submit the purchase orders required. | $39,900.00 | $42,000.00 | $46,200.00 | $42,350.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1.3.2.2 | Purchase equipment consumables | Identify consumables needed and submit the purchase orders required. | $33,250.00 | $35,000.00 | $38,500.00 | $35,291.67 |
| **1.3.3** | **Install** | **Installing phase of new equipment in CRML.** | **$9,500.00** | **$10,000.00** | **$11,000.00** | **$10,083.33** |
| 1.3.3.1 | Install equipment | Works related to assemble the equipment and connecting all the facilities. | $9,500.00 | $10,000.00 | $11,000.00 | $10,083.33 |
| 1.3.3.2 | Validate equipment | Process of tool qualification and validation. | NA | NA | NA | NA |
| 1.3.3.3 | Release equipment to production | Deliver a validated equipment to Operations Team. | NA | NA | NA | NA |
| **1.4** | **Personnel** | **Enabling headcount to support the new equipment.** | **$19,475.00** | **$20,500.00** | **$22,550.00** | **$20,670.83** |
| 1.4.1 | Develop training programs | Works related to develop a training program. | NA | NA | NA | NA |
| 1.4.2 | Select appropriate personnel. | Headcount allocation to run the new equipment. | NA | NA | NA | NA |
| 1.4.3 | Train personnel | Training execution to chosen personnel. | $19,475.00 | $20,500.00 | $22,550.00 | $20,670.83 |
| **1.5** | **Project Management** | **The management of the planning,** | **NA** | **NA** | **NA** | **NA** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | **execution, monitoring and controlling, and closure of the project.** | | | | |
| 1.5.1 | Planning | Planning and updating project activities throughout project lifecycle. | NA | NA | NA | NA |
| 1.5.2 | Scheduling | Planning of project activities, assigning timeline and dates to determine and control project duration. | NA | NA | NA | NA |
| 1.5.3 | Accounting | Monitoring the financial expenditures of the project throughout the project lifecycle. | NA | NA | NA | NA |
| 1.5.4 | Reporting | Documenting project activities, preparing reports, and presenting to the appropriate stakeholders. | NA | NA | NA | NA |
| 1.5.5 | Meetings | All meetings held to control the management of the project. | NA | NA | NA | NA |

### 4.3.4 Project Budget

Determine the budget is the third process in project cost management as listed in the PMBOK (5th edition). It is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline. A project budget includes all the funds authorized to execute the project. The main advantage is that it determines the cost baseline against which project performance can be monitored and controlled.

This process presents the following five tools and techniques:

- Cost aggregation (The cost estimates are added according to the WBS work packages.)
- Reserve analysis (Both for contingency reserve and for project management.)
- Expert judgement (Experience.)
- Historical relationships (Development of simple or complex models from parametric or analogous estimates based on any historical relationship.)
- Funding limit reconciliation (Knowledge of the expenditure of funds based on the funding limits set.)

One output of this process is the cost baseline, which is the approved version of the project budget excluding any management reserve. This cost baseline can only be changed through formal change control procedures. It is used as a basis for comparison with the actual results and it is developed as the sum of the approved budgets for the different activities of the schedule. The baseline of the project is the one that marks the scope, the time, the costs, and the milestones to reach within a project. It could be said that it is the basis for the development of the project and its subsequent control. The cost baseline allows identifying the parts of the project where major deviations have occurred so that corrective actions can be taken. The results can be included in the generation of a knowledge base that can be used in future projects with the same characteristics.

**Chart 10. Budget Chart [Source: F. Gen, April 2018]**

| Code | Activity | Expected Cost | Contingency Reserve |
|---|---|---|---|
| **1.1** | Initiation Phase | NA | NA |
| **1.2** | Facility | $13,750.00 | $378.13 |
| **1.3** | Equipment | $216,700.00 | $5,959.25 |
| **1.4** | Personnel | $22,550.00 | $1,033.54 |
| **1.5** | Project Management | NA | NA |
| | Total | **$253,000.00** | **$7,371** |
| | **Cost Baseline** | **$260,370.92** | |
| | Management Reserve | **$13,018.55** | |
| | **Budget** | **$ 273,389.46** | |

The general purpose of reserves in projects is to provide a cushion against surprise both the expected (contingency reserve) and the unexpected (management reserve). Historical information (even from expert judgment) about similar successful community improvement projects, was used to allocate the percentages for each reserve in the project. The contingency reserves were calculated per major work package with each work package being allocated to a different percentage ranging from 3-5% based on the level of risk, uncertainty, and potential impact associated with that work package. The work package which would cause the most burdensome impact was “personnel” and thus was given the highest percentage (5%); followed by “equipment and facility” with 3% being assigned.

### 4.3.5 Cost Control Procedure

The last process of the PMBOK (5th edition) classification for the project cost management is the control costs. This process is responsible for monitoring the

level of execution of the project budget and controlling changes in the baseline of cost performance. The cost control of the project deals with the following aspects:

- Influence the factors that produce changes in the cost baseline.
- Ensure that cost change requests are approved.
- Manage cost changes as they occur.
- Ensure that potential surcharges do not exceed the funding restrictions authorized for the project both total and for periods.
- Monitor cost performance to detect and understand variations with respect to the cost baseline.
- Record accurately and pertinently the changes in the cost baseline.
- Avoid improper, inappropriate, or unapproved changes in cost or resource use.
- Report approved changes to relevant stakeholders.
- Ensure maintenance of the expected surcharges within acceptable limits.

The key benefit of this process is that it provides the means to detect deviations from the plan in order to take corrective action and minimize risk. The tools or techniques of this fourth process include:

- Earned value management(EVM): (performance measurement, integrates project scope measurements, cost and schedule)

| | | | |
|---|---|---|---|
| Planned Value (PV) | It is the authorized budget planned for the work to be accomplished for an activity or WBS component. | | |
| Earned Value (EV) | It is a measure of schedule performance expressed in terms of the budget authorized for that work. | | |
| Actual Cost (AC) | It is the realized cost incurred for the work performed on an activity during a specific time period. | | |
| | | | |
| Schedule Variance (SV) | SV=EV-PV | SV<0 | There is a delay in planning |
| | | SV>0 | There is no delay in programming |
| Cost Variance (CV) | CV=EV-AC | CV<0 | The budget has been exceeded |

| | | | |
|---|---|---|---|
| | | CV>0 | Budget is being respected |
| Schedule Performance Index (SPI) | SPI=EV/PV | SPI<1 | Inefficiency in the use of time |
| | | SPI>1 | Efficiency in the use of the time |
| Cost Performance Index (CPI) | CPI=EV/AC | CPI<1 | Inefficiency in the use of resources |
| | | CPI>1 | Efficiency in the use of resources |

• Forecasting: (as the project progresses, a projection of the conclusion estimate (EAC) is made).

- EAC forecast for ETC work performed at the budgeted rate: EAC=AC+(BAC-EV).
- EAC forecast for ETC work performed at present CPI: EAC=BAC/CPI.
- EAC forecast for ETC work considering both SPI and CPI factors: EAC=AC+((BAC-EV) / (CPI x SPI)).

• To-complete performance index (TCPI): (Estimating how much expenditure needs to be adjusted to meet the project budget).

• Performance reviews: (comparison of actual project work performance with baseline schedule and baseline costs).

- Variance analysis: It is the explanation (cause, impact, and corrective actions) for cost (CV=EV-AC), schedule (SV=EV-PV), and variance at completion variances (VAC=BAC-EAC).
- Trend analysis.
- Earned value performance.

• Project management software.

• Reserve analysis.

The Project Manager will be responsible for managing and reporting on the project's cost throughout the three months of the project. Project status meetings will be held biweekly as well as updates given on project expenditures and cost deviations. As the project progresses, the costs incurred will be matched against

baseline costs established using the WBS developed. Expenditures will be monitored using planned value, earned value, and actual cost on a weekly basis. This earned value management approach will be used to combine scope, schedule, and cost measurements to assess the project performance and progress at a given date. Earned value will be used to calculate cost variances that will determine whether the project is over budget or under budget. Cost variance (CV) will be calculated by deducting the actual costs from the earned value. The appropriate action(s) will be taken based on the extent of the variance:

- Positive cost variance (>0) – (the project work is costing less than planned in the budget) - In the event that this occurs, there will be an examination of activities and associated costs to determine if there were any overestimations. Secondly, the Project Manager will continue monitoring activities, taking advantage of less expensive options, and minimizing costs where necessary.
- Negative cost variance (<0) – (the project work is costing more than planned in the budget) – In the event that this occurs, there will be an examination of activities and associated costs to determine if there were any underestimations. Adjustments would have to be made accordingly. The Project Manager will also have to identify any events or circumstances that arose and in effect increased costs, in which case risk management strategies would have to be employed. As an added measure, CV can be calculated for each work package for better monitoring and control.
- Neutral Cost Variance (=0) – (expenses as planned in the budget) – If there is zero variance, then the Project Manager will continue to monitor project budget expenditure and activities to keep project on schedule as planned.

Performance reviews done biweekly will also entail:

- Updating the schedule and actual costs associated with the current progress.
- Inspections of work done and matching with the budget.
- Communicating project progress and budget updates to stakeholders

### 4.3.6 Cost Change Management

The cost change management process describes how changes are submitted, approved, and tracked. According to the PMBOK (5th edition), change requests may include preventive or corrective actions and are processed for review and disposition through the perform integrated change control process. Requests for budget changes are usually submitted by the project manager and approvals for project cost changes routed through the project sponsors. The cost change management processes include the following:

- Assessment of change identified using cost variance analysis.
- Completion of change request form.
- Review of proposed change along with documented analysis of cost change.
- Discussion among relevant stakeholders to determine approval or denial of requested changes.
- Decision for change request signed off on and documented.
- Project manager making the necessary adjustments to relevant documents (WBS, budget allocations, project schedule, among others).

Cost changes are clearly documented in the change log to aid in communication with stakeholders. The change log records all changes made to cost, scope, schedule, and quality so that changes and their resulting impact or risk can be closely tracked through a change log template [Please refer to Appendix 9].

## 4.4 Quality Management Plan

### 4.4.1 Quality Management Introduction

The quality management plan for the tester transfer to CRML project will establish the activities, processes, and procedures for ensuring a quality product upon the conclusion of the project. The purpose of this plan is to:

- Ensure that quality is planned.

- Define how quality will be managed.
- Define quality assurance activities.
- Define quality control activities.
- Define acceptable quality standards.

The quality management plan will use ISO 9001:2015 as a framework that allows our organization to document and improve our practices in order to better satisfy the needs and expectations of our customers, stakeholders and interested parties.

### 4.4.2 Quality Assurance

In order to perform quality assurance, the following steps or actions will be performed by the project team:

1. Analyze projects of the same size in Costa Rica to study the main characteristics of this ones and how successful they were, in order to take advantage of the methodology used through benchmarking.
2. Ensure that the main stakeholders have fully understood how the tester transfer to CRML project will be developed and the requirements to be met. In addition, maintaining constant communication with them throughout the entire development of the project to avoid possible misunderstandings and create a quality management plan and process improvement plan.
3. Find the most suitable means and the necessary resources to fulfill all the requirements of the project. Ensure that all the permits and approvals have been obtained at least a month prior to installation day.
4. Implement mechanisms and procedures for systematic verification and monitor the results periodically through internal or external quality audits, acting as soon as possible in case of detecting signs of deviations or errors in the project.

### 4.4.3 Quality Control

In order to control quality, the project team will employ the following steps or actions:

1. Establish quality control measurements. Specific requirements will be assigned to individual members on the project team and each person will be responsible for overseeing and verifying that requirements are delivered. However, the Project Manager will provide oversight in all areas.
2. Produce frequent progress reports to verify that results are accurate and in alignment with project scope. Reports will be delivered in regular meetings.
3. Analyze the results of quality audits. Non-compliant activities identified will undergo immediate corrective or preventative action in accordance with the established integrated change control process and change logs will be updated.
4. Monitor cost and schedule performance by examining planned versus actual results. Source of variances will be identified and the necessary corrective actions will be taken.
5. Monitor and evaluate the results of corrective actions and produce quality control reports.

### 4.4.4 Quality Management Tools

The tools to be used by the project team for quality management are:

- Quality Meeting: A quality meeting will be held at the outset to introduce the project to the team, identify and prioritize stakeholders and their requirements, and to get ideas via brainstorming in order to establish a quality management plan. Those meetings will also be held periodically to ascertain the progress of the team and, if there are any delays, determine corrective actions to be applied to get back on track.
- Flowchart: a flowchart will be used to establish the sequence of events. From these possible points of deviation (things going wrong), events will be identified and appropriate corrective measures established for said deviations will be implemented.
- Benchmarking: This will be applied whereby the team will examine past similar projects to obtain best practices for suppliers' selection, to prioritize

these suppliers, and to provide the basis for measuring performance. Things to look on will be hotels and transportation companies normally used and the outcome of their services.

- Check sheets: These will be primarily used as a data collection tool to source the suppliers for the event. The who, what, when, where, how, and why of the project will be established. It will tell the responsible person (who), what should be done by that person(s), when and where it should be done, detailing how it should be done to include specifications, assurance activity, and quality metrics, and the reason for collection (why) so that the goal is understood and team member(s) will respond appropriately in unexpected situations.
- Compliance matrix: a compliance matrix will be developed for each major stakeholder. This will include the stakeholder as the reference number, the requirements for each stakeholder, the response (what is to be done to meet each), completion date, team member(s) responsible, and the contacts for team members, stakeholders, and suppliers.
- Inspection: frequent inspections will be carried out to ensure that the project is progressing as planned. Initially, when the suppliers are finalized, project team members will visit the hotel (for example) to view the rooms and ensure that all requirements are met. A checklist will be used to note compliance with requirements. Moreover, it will be used on the day of the event inspection to ensure success and maintain the integrity of the team.
- Quality check list: In order to verify that the equipment installation is successful, a quality checklist needs to be fulfilled. For CRML purposes the use of a white paper is necessary. [Please refer to appendix 5]

## 4.5 Human Resource Management Plan

### 4.5.1 Human Resource Management Introduction

Human resource management is an important part of the tester transfer to CRML project. The human resource management plan is a tool which will aid in the management of this project's human resource activities throughout the project until its completion. The human resource management plan includes:

- Roles and responsibilities of team members throughout the project.
- Project organization chart.
- Staffing management plan to include how resources will be acquired.
- Project team management and development.

The purpose of the human resource management plan is to achieve project success by ensuring the appropriate human resources with the necessary skills are acquired, resources are trained if any gaps in skills are identified, team building strategies are clearly defined, and team activities are effectively managed.

### 4.5.2 Roles and Responsibilities

The roles and responsibilities for the tester transfer to CRML project are essential to project success. All team members must clearly understand their roles and responsibilities in order to successfully perform their portion of the project. For the ester transfer to CRML project the following project team roles and responsibilities have been established:

**Project Manager:** The project coordinator was pre-assigned by the Sponsor and has experience of working on similar projects. The project manager is responsible for the overall success of the project. The PM must authorize and approve all project expenditures. The PM is also responsible for ensuring that work activities meet have established acceptability criteria and have fallen within acceptable variances. The PM will be responsible for reporting project status in accordance with the communications management plan. The PM will evaluate the performance of all project team members. The PM must possess the following skills: leadership and management, budgeting, scheduling, and effective communication.

**CRML Module Engineer:** Responsible for tracking installation progress, solving technical issues, and releasing the equipment to production. The CRML module engineer is responsible for creating the list of required spares and consumables and is in charge of sending weekly reports on the progress of the project to the PM.

**CRML Buyer:** Submit all the purchase orders for spares and consumables.

**EHS Engineer:** Responsible for auditing all the steps in the project to meet Intel Safety and Environmental policies.

**Corporate Services Representative:** Responsible for enabling required facilities (including electrical and mechanical facilities).

**Logistics Manager**: Outlines the characteristics of the shipping process; this includes shipping timeframe and estimating logistics costs.

**Field Service Engineer (FSE):** Responsible for equipment installation process and delivering training to OPS team.

**OPS Team:** Responsible to receive the tool after installed and verify that it meets all the expected requirements. In charge of the sustaining of the tool on 24/7 basis.

### 4.5.3 Project Organizational Chart

The following RACI chart shows the relationship between project tasks and team members. Any proposed changes to project responsibilities must be reviewed and approved by the project manager. Changes will be proposed in accordance with the project's change control process. As changes are made, all project documents will be updated and redistributed accordingly.

**Chart 11. RACI Matrix [Source: F. Gen, April 2018]**

| | Project Manager | CRML Engineer | EHS Engineer | Field Service Engineer | CS Rep | Buyer | Logistics Manager | OPS Team |
|---|---|---|---|---|---|---|---|---|
| Requirements Gathering | A | R | | | I | | A | A |
| Change Requests | A | R | I | I | | | | I |
| Site Management | A | | C | | | | | |
| Permits/ Approvals | A | R | C | | | | | |
| Project Scope | A | I | | R | R | | I | R |
| Project Communications | A | R | | R | | | | R |
| Project Quality | A | R | | | | | | R |
| Stakeholder Management | A | I | | | | | | |
| Accounting | A | | | | | R | | |
| Status Reports | A | R | | | | | | |
| Manage Site Workers | A | R | | | | | | |
| Procurements | A | | | | | R | | |

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

### 4.5.4 Staffing Management

#### 4.5.4.1 Staff Acquisition

For the tester transfer to CRML project, the project staff will be supplied with internal resources of Intel CRML. However, part of the heavy work related to

equipment installation will be subcontracted to external resources (Field Service Engineer). The managerial staff and office workers will work at CRML site. The subcontractors and site workers will work on site until contract completion.

### 4.5.5 Resources Calendar

This project will last for two months (41 days). All resources are required before the project can begin. The chart below will explain in detail resources allocation.

**Chart 12. Resources Calendar Chart [Source: F. Gen, April 2018]**

| Task Name | Description of Work | Duration | Resources | Start | Finish |
|---|---|---|---|---|---|
| Collect requirements | Meet with project key stakeholders to gather project's needs. | 4 days | Project Manager CRML Engineer | Mon 3/5/18 | Thu 3/8/18 |
| Request EHS preliminary assessment | EHS site contact will perform assessment of the project. | 5 days | EHS Engineer | Fri 3/9/18 | Thu 3/15/18 |
| Design changes in layout | Update CRML layout. | 3 days | Project Manager CRML Engineer | Fri 3/16/18 | Tue 3/20/18 |
| Design changes in infrastructure | Submit all changes required in facilities to corporate services. | 8 days | CRML Engineer | Wed 3/21/18 | Fri 3/30/18 |
| Remove existing equipment | Space clean-up to install the new tool. | 3 days | CRML Engineer | Mon 4/2/18 | Wed 4/4/18 |
| Prepare site for new equipment | Space readiness to install the new tool, including the installation of required facilities. | 8 days | CS Rep | Mon 4/2/18 | Wed 4/11/18 |
| Ship equipment and collaterals | Equipment and collaterals shipment from Malaysia to CRML. | 15 days | Logistics Manager | Fri 3/16/18 | Thu 4/5/18 |
| Purchase equipment | Identify spares needed and submit the purchase orders | 3 days | CRML Engineer | Fri 3/16/18 | Tue 3/20/18 |

| | | | | | |
|---|---|---|---|---|---|
| spares | required. | | Buyer | | |
| Purchase equipment consumables | Identify consumables needed and submit the purchase orders required. | 3 days | CRML Engineer Buyer | Fri 3/16/18 | Tue 3/20/18 |
| Install equipment | Works related to assemble the equipment and connecting all the facilities. | 5 days | CRML Engineer Field Service Expert | Thu 4/12/18 | Wed 4/18/18 |
| Validate equipment | Process of tool qualification and validation. | 2 days | CRML Engineer | Thu 4/12/18 | Fri 4/13/18 |
| Release equipment to production | Deliver a validated equipment to Operations Team. | 1 day | CRML Engineer | Thu 4/12/18 | Thu 4/12/18 |
| Develop training programs | Works related to develop a training program. | 8 days | Field Service Expert | Thu 4/19/18 | Mon 4/30/18 |
| Select appropriate personnel | Headcount allocation to run the new equipment. | 2 days | CRML Engineer | Thu 4/19/18 | Fri 4/20/18 |
| Train personnel | Training execution to chosen personnel. | 5 days | Field Service Expert | Thu 4/19/18 | Wed 4/25/18 |
| Planning | Planning and updating project activities throughout project lifecycle. | 41 days | Project Manager | Mon 3/5/18 | Mon 4/30/18 |
| Scheduling | Planning of project activities, assigning timeline and dates to determine and control project duration. | 41 days | Project Manager | Mon 3/5/18 | Mon 4/30/18 |
| Accounting | Monitoring the financial expenditures of the project throughout the project lifecycle. | 41 days | CRML Engineer Buyer | Mon 3/5/18 | Mon 4/30/18 |
| Reporting | Documenting project activities, preparing reports, and presenting to the appropriate stakeholders. | 41 days | Project Manager CRML | Mon 3/5/18 | Mon 4/30/18 |

| | | | | | |
|---|---|---|---|---|---|
| | | | Engineer | | |
| Meetings | All meetings held to control the management of the project. | 41 days | Project Manager CRML Engineer | Mon 3/5/18 | Mon 4/30/18 |

### 4.5.6 Training

Training is required for OPS team members in order to operate the new equipment. This training will equip the workers with the necessary knowledge to run the new equipment. To guide these sessions, field service engineer will be contracted to guide and instruct OPS technicians.

In regard to the other employees, (internal resources) they are all fully capable of functioning in the capacity for which they have been hired.

### 4.5.7 Performance Reviews

The Project Manager will review the overall performance of the project during the project lifecycle. At the onset of the project, the Project Manager will communicate with the CRML Engineer and Field Service Expert to inform them of all the expectations of the work to be performed. Once the CRML Engineer turns over the weekly work order to the Field Service Expert, it is his responsibility to manage and evaluate each team member's performance and judge how effectively they are completing the assigned work. Concurrently, it is the CRML Engineer's responsibility to evaluate each of her team members in the office and judge how effectively they are completing the work assigned. Prior to releasing project resources in accordance to the payment schedule, the Project Manager will meet with the CRML Engineer and provide feedback on employee project performance. In turn, the CRML Engineer will meet with the Field Service Expert to review the formal performance reviews on each team member weekly.

### 4.5.8 Recognitions and rewards

The system to recognize internal employees will be Intel Recognition Program and a certain amount of dollars will be deposited to their account. The amount will depend directly on customer satisfaction results.

## 4.6 Communications Management Plan

### 4.6.1 Communications Management Introduction

The communications plan will serve as a guide to assist in communication between the stakeholders of the tester transfer to CRML project. The Project Manager and CRML Engineer will take the primary role in ensuring effective communications on this project. The communications matrix is a major section of this plan. It documents the communication requirements, the information being communicated, the audience for each communication, the frequency of communication, and the individual responsible for the communication or dissemination of the information to the appropriate audience.

### 4.6.2 Communications Management Approach

In order to ensure that the information flows in a straightforward manner and that key stakeholders are communicated about the project during the project lifecycle at the correct time, the communications management plan a chart was developed using the *PMBOK® Guide*. The plan details how each stakeholder would receive information from members of the project team, the frequency of communication, the information that would be communicated to them and the person responsible for ensuring that the correct information was received by the communication sent.

**Chart 13. Communications Plan [Source: F. Gen, April 2018]**

| Communication Type | Deliverable | Description | Delivery Method | Frequency | Owner | Audience |
|---|---|---|---|---|---|---|
| Personal | Project updates | Regular | Telephone | Needs | Project | Project |

| | | | | | | |
|---|---|---|---|---|---|---|
| Communication | | communication. | Calls | basis | Manager CRML Engineer | Sponsor |
| | Project updates | Regular communication. | Telephone Calls E-mail | Needs basis | Project Manager CRML Engineer | OPS Team |
| | Project updates | Regular communication. | Telephone Calls E-mail Meetings | As needed | Project Manager | CRML Engineer |
| | Project updates | Regular communication. | Telephone Calls E-mail | Daily | CRML Engineer | Field Service Expert |
| | Project updates | Regular communication. | E-mail | Needs basis | CRML Engineer | Buyer |
| | Procurement update | Update on status of products and shipping. | E-mail Conversation Web conference | Weekly | Logistics Manager | Project Manager |
| Reports | Project status report (Project Process) | Regular update on critical project issues. | E-mail | Weekly | Project Manager | Project Sponsor Project Team |
| | Quality audit report | Regular updates on project quality performance. | E-mail | Weekly | CRML Engineer | Project Manager Project Team |
| | Financial report | Regular updates on project finances. | E-mail | Weekly | Project Manager | Project Sponsor |
| | Compliance report | Regular updates on pending permits, extensions, deviations, request for | E-mail | Weekly | Project Manager | Project Sponsor |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | information (RFI), etc. | | | | |
| | Task report | Regular updates on critical project issues pertaining to the external team. | E-mail | Weekly | CRML Engineer | Project Sponsor |
| Presentations | Project review | Project status updates. | Meeting | Weekly | Project Manager | Project Manager Project Sponsor Project Team |
| | Final account | A complete audit of project finances from the project, done at the end of the project. In addition to operational costs' projections. | Meeting | Once | Project Manager CRML Engineer | Project Sponsor Project Team |
| Project Announcements | Task reminders | Task owner schedule reminders. | E-mail | Daily | CRML Engineer | Project Manager Project Team |
| | Change Request/Orders | Request to add or remove scope from the project. | Written (Standard Form) | Needs basis | Project Manager | Project Sponsor Project Team |
| | Project updates | Project updates for Community Members. | Written | Needs basis | Project Manager | Community Members |

| | | | | | | |
|---|---|---|---|---|---|---|
| Reviews and Meetings | Team meeting | Meeting to review project status. | Planning Meeting | Weekly First thing Monday Morning | Project Manager | Project Sponsor Project Team |
| | Financial report | Regular updates on project finances. | Progress Meeting | Weekly | CRML Engineer Buyer | Project Manager Project Sponsor |
| | Project status meetings (Project Process) | Regular updates on critical project issues. | Progress Meeting | Weekly | Project Manager | Project Sponsor Project Team |
| | Planning | Regular updates and project planning. | Progress and Planning Meeting | Daily | Project Manager | Assistant Project Manager |

### 4.6.3 Communications Change Management

In order to keep the right register of changes and communications, please see flow below:

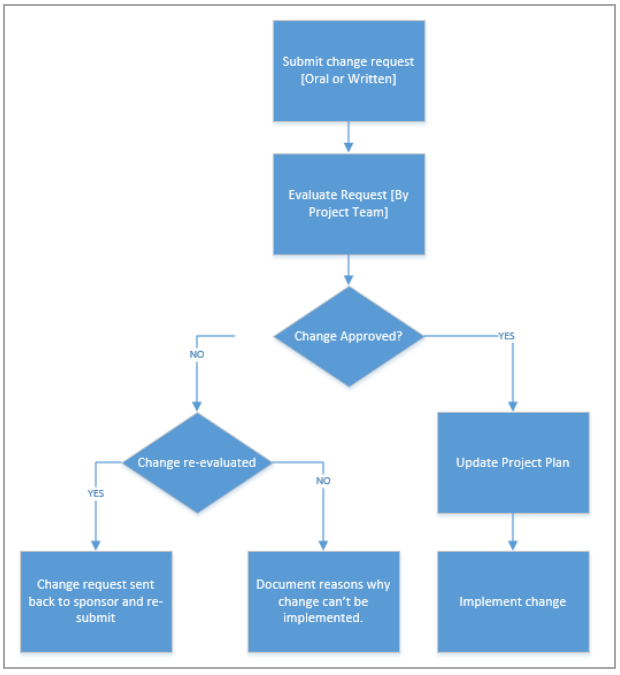



**Figure 16. Response Flow [Source: F. Gen, April 2018]**

#### 4.6.3.1 Issue Log

An issue log will be maintained by the project coordinator that will record all issues that arise in the execution of the project. Relevant personnel will be assigned according to their expertise and competence to ensure continuation of the project in the event of a disruption. Choices will also be influenced by current project status based on forecasts having to do with scope, cost, and schedule control.

**Chart 14. Issue Log [Source: F. Gen, April 2018]**

| # | Description | Report by | Date | Responsible Officer | Priority | Actions or progress notes | Status | Date Resolved |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

## 4.7 Risk Management Plan

### 4.7.1 Risk Management Introduction

This consists of the development of a full qualitative risk analysis for a project chosen by the group members using the standard proposed in the PMBOK® Guide. A risk register was created focusing on the following four processes of project risk management: create the risk management plan, identify risks, perform qualitative risk analysis, and plan risk responses. This analysis allows the identification and statement of threats, opportunities, probabilities, impacts, reserves, and response strategies based on the practices recommended for PMI by the project risk management.

### 4.7.2 Risk Identification

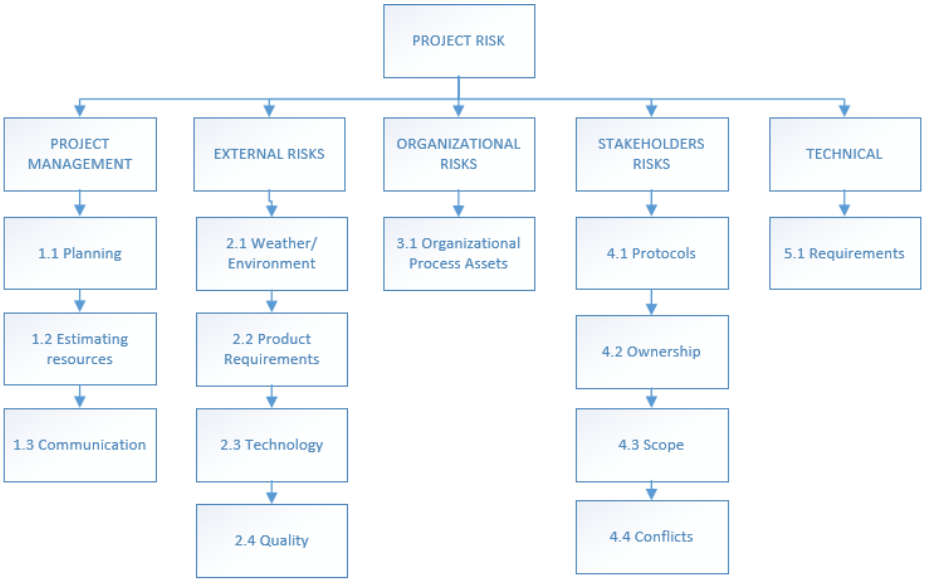



**Figure 17. RBS [Source: F. Gen, April 2018]**

### 4.7.3 Risk Analysis

#### 4.7.3.1 Probability and Impact Scales

To obtain optimal benefit from the risk analysis, it is necessary to define the levels of probability and impact of the project risks. Based on the basic information provided about the project, there is a total budget of two hundred thirty two thousand dollars and an estimated execution time of three months. With the help of these data and the estimates collected from the PMBOK, the following values have been calculated:

**Chart 15. Definition of Probability and Impact Scale [Source: F. Gen, April 2018]**

| Scale/Project Objectives | Very Low (0.05) | Low (0.10) | Moderate (0.20) | High (0.40) | Very high (0.80) |
|---|---|---|---|---|---|
| **Cost** | Insignificant cost increase | $ 232 000 | $ 232 000 - 500 000 | $ 500 000 - 1 750 000 | > $ 1000 000 |
| **Schedule** | Insignificant time | < 1,5 days | 1,5 - 3 days | 3 - 6 days | > 6 days |

| | | | | | |
|---|---|---|---|---|---|
| | increase | | | | |
| **Scope** | Insignificant scope reduction | Small areas of scope affected | Considerable areas of scope affected | Complete areas of scope affected | Project is inoperative |
| **Quality** | Unnoticeable quality reduction | Minor quality reduction | Quality reduction required sponsor approval | Quality reduction unacceptable to sponsor | Project is inoperative |

Risk score is used to rank a risks priority relative to the other identified risks. The risk with the highest risk score is ranked first in priority, the risk with the next highest risk score is ranked second in priority, and so forth. The closer the risk score is to one the highest the priority; the closer a risk score is to zero the lowest the priority.

**Chart 16. Probability and Impact Scale [Source: F. Gen, April 2018]**

| PxI Scale | | | | |
|---|---|---|---|---|
| **Risks** | **Probability** | **Impact** | **Risk Score** | **Risk rank with the project** |
| Estimating resources | 0.50 | 0.80 | 0.40 | 1 |
| Weather/ environment | 0.50 | 0.80 | 0.40 | 2 |
| Product requirements | 0.50 | 0.80 | 0.40 | 3 |
| Quality | 0.50 | 0.80 | 0.40 | 4 |
| Protocols | 0.50 | 0.80 | 0.40 | 5 |
| Technology | 0.30 | 0.80 | 0.24 | Not a priority |
| Human Resources | 0.30 | 0.80 | 0.24 | Not a priority |

| | | | | |
|---|---|---|---|---|
| Communication | 0.30 | 0.40 | 0.12 | Not a priority |
| Technical Requirements | 0.30 | 0.40 | 0.12 | Not a priority |
| Conflicts | 0.10 | 0.80 | 0.08 | Not a priority |
| Planning | 0.30 | 0.20 | 0.06 | Not a priority |
| Ownership | 0.30 | 0.20 | 0.06 | Not a priority |
| Scope | 0.30 | 0.20 | 0.06 | Not a priority |
| Total Risk Score | | | 2.98 | |

#### 4.7.3.2 Probability and Impact Matrix

In order to evaluate the importance of each risk and to subsequently classify the risks according to their priority as well as to carry out their corresponding quantitative analysis, the probability and impact matrix will be utilized. This matrix consists of two axes: a vertical axis where the probability ranges from zero (impossible) to one (always) are established and a horizontal axis where the risk impact values are established about the objectives of our project, where zero implies that the risk would not affect and one that it would greatly impede the fulfillment of the project's objectives. The matrix is divided into two parts, on the left the threats are represented and on the right side the opportunities are indicated. On both sides the cells have been colored according to their values, which are the result of multiplying the probability by the impact of the risk, thus obtaining values between zero and one. The highest values correspond to the most critical risks and appear in red and the lowest that are the least relevant appear in green. Due to the characteristics of the project and the urgency to improve the problem of the lack of garbage collection and the possible infection of rodents, it has been decided to classify the values of the risks according to the following ranges: < 0,05: LOW; 0.05 - 0.15: MEDIUM; 0.15: HIGH.

In this way, the risks that the project incurs to all stakeholders can be put on the table so that each one assumes his or her own responsibilities and likewise avoid or minimize possible contingencies. The matrix obtained is as follows:

**Chart 17. Probability and Impact Matrix [Source: F. Gen, May 2018]**

| Likelihood | Threats | | | | |
|---|---|---|---|---|---|
| **FREQUENT (0,90)** | 0.05 | 0.09 | 0.18 | 0.36 | 0.72 |
| **LIKELY (0.70)** | 0.04 | 0.07 | 0.14 | 0.28 | 0.56 |
| **POSSIBLE (0.50)** | 0.03 | 0.05 | 0.1 | 0.2 | 0.4 |
| **UNLIKELY (0.30)** | 0.02 | 0.03 | 0.06 | 0.12 | 0.24 |
| **RARE(0.10)** | 0.01 | 0.01 | 0.02 | 0.04 | 0.08 |
| | **VERY LOW (0,05)** | **LOW (0,10)** | **MODERATE (0.20)** | **HIGH (0.40)** | **VERY HIGH (0.80)** |

### 4.7.4 Risk Register

**Chart 18. Risk Register [Source: F. Gen, May 2018]**

| RBS Code | Cause | Risk | Consequence | Probability | Impact | PXI | Trigger | Owner | Strategy |
|---|---|---|---|---|---|---|---|---|---|
| 1.2 | Lack of information, benchmark. | Inaccurate cost estimates. | Cost overruns. | 0.5 | 0.8 | 0.4 | Quotations of higher amounts during procurement process. | CRML Engineer Buyer | **Mitigate -** Realistic estimation of the costs of the project. Seek more affordable alternative source of resources. Consult with sponsors to explore increasing budget. |
| 2.2 | Late start to procurement process. | Possibility of late delivery of materials and supplies. | Delay in tool installation. | 0.5 | 0.8 | 0.4 | Late material request to the supplier. | Project Manager | **Mitigate -** Plan for possible delays. Initiate procurement process earlier to eliminate effect on the critical path. |
| 4.3 | EHS having other priorities running concurrently. | Delays in facilities installation. | Schedule delays. | 0.5 | 0.8 | 0.4 | Schedule delayed by week one. | EHS Engineer | **Mitigate -** Establish an exclusive agreement with EHS to finish the project on time. |
| 4.1 | Environmental policies/ impact | There is a possibility of EHS determining some consumables as not allowed for the Costa Rican site. | Increased time spent searching for other suppliers and other consumables to replace the first ones. | 0.50 | 0.80 | 0.40 | No approval for proposed sites. | EHS Engineer | **Mitigate -** Establish an agreement with EHS to determine the suitable suppliers. Prior to start the project. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4.4 | Poor communications. | Possibility of conflict arising between project stakeholders. | Delay in agreement on project scope. | 0.30 | 0.40 | 0.12 | Lack of agreement during scope and schedule planning. | Project Manager CRML Engineer | **Mitigate -** Ensure that each stakeholder understands their roles and responsibilities and that communication follows the communication matrix. Establish clear definitions of stakeholder roles and responsibilities. Adhere to communication structure as established in the communication matrix. |
| 5.1 | Lack of training. Inadequate training process. | Inadequate number of skilled workers from the technical agencies. | Reduction in quality of work. | 0.30 | 0.40 | 0.12 | Outsourced company without experience in this type of projects. | CRML Engineer Field Service Expert | **Mitigate -** Review training programs with Field Service Expert Engineer and align it to business needs. |
| 3.1 | Organizational process assets / human resource challenges | Possibility of headcount allocation constraint due to CRML priorities. | Deliverables/ targets not met. | 0.10 | 0.80 | 0.08 | Priorities re-spin. | Project Manager | **Mitigate -** Acquire written agreements from project sponsor outlining their commitment(s) to the project. |
| 1.1 | Inadequate stakeholder engagement | Emergence of overlooked project stakeholder. | Change in project scope, cost, and schedule. | 0.3 | 0.2 | 0.06 | Incorrect/lack of data on “Stakeholder Matrix” | Project Manager | **Mitigate -** Plan integrative stakeholder management throughout the life of the project. |
| 1.3 | Inadequate stakeholder engagement | Possibility of stakeholders having inaccurate expectations because of poor communications. | Minimized participation and community buy-in. | 0.3 | 0.2 | 0.06 | Requests being made outside of agreed scope. | Project Manager | **Mitigate -** Ensure that communication channels chosen for each stakeholder are easily accessible and agreed upon and that timely communication is done. |
| 4.2 | Inadequate stakeholder engagement | Possibility of stakeholders becoming disengaged. | Minimized participation and community buy-in. | 0.3 | 0.2 | 0.06 | Low attendance to meetings/ feedback sessions. | Project Manager CRML Engineer | **Mitigate -** CRML Engineer’s engagement/involvement in order to avoid gaps in the project. |

## 4.8 Procurement Management Plan

### 4.8.1 Procurement Management Introduction

This procurement management plan sets the procurement framework for this project. It will serve as a guide for managing procurement throughout the life of the project and will be updated as acquisition needs change. A make-or-buy analysis will not be used for this project as some of this information already exists in the architectural specifications and requirements defined during project initiation, which can be found in the project charter. In addition, due to the vast experience and technical expertise of the project management team, the items to be purchased, made, or constructed on site are already known. This plan identifies and defines the items to be procured, the types of contracts to be used in support of this project, the contract approval process, and decision criteria. The importance of coordinating procurement activities, establishing firm contract deliverables, and utilizing metrics in measuring procurement activities is included. Other items included in the procurement management plan are procurement risks and procurement risk management considerations and how costs will be determined, how standard procurement documentation will be used, and which could be the procurement constraints.

### 4.8.2 Procurement Management Approach

In order for a project to be successful, it must be able to acquire all the necessary items needed to meet project objectives. In regard to this, a procurement management plan acts as the guideline as it sets the procurement framework for the project. This project, due to its nature, had a simple procurement management approach as there were no contractual agreements. The Project Manager had the overall responsibility for the procurement of the project items and delegated specific responsibilities to project team members to ensure that all items were procured for the successful completion of the project. The project team, along with major project stakeholders, made the make-or-buy decision for each procurement item on a meeting. The procurement list was frequently reviewed to ensure that

items to be purchased were ordered, delivery dates were within the project schedule, and any approved changes were inputted. The procurement management plan was well defined and clear enough to identify the necessary steps and responsibilities for procurement from the project initiation to its closing.

### 4.8.3 Procurement Definition

The following procurement items or services have been determined to be essential for project completion and success. The following list of items, justification, and timeline are pending Project Manager review for submission to the assistant project manager for purchasing to commence:

**Chart 19. Procurement Items [Source: F. Gen, May 2018]**

| Item | Justification | Needed By |
|---|---|---|
| Th Head Asy A | To pick and place the units (microprocessors) to be tested in the equipment. | Thu 4/12/18 |
| Th Head Asy B | To pick and place the units (microprocessors) to be tested in the equipment. | Thu 4/12/18 |
| GMA 999210-001(REF MIXED GAS UTCS) | To supply the equipment with gas in order to run the chiller system. | Thu 4/12/18 |
| CHILLER ASSEMBLY | To control temperature while units are tested. | Thu 4/12/18 |
| BATTERY | For power supply of the equipment. | Thu 4/12/18 |
| FRC Th Head Valve | To control the liquid for each head. | Thu 4/12/18 |
| WHITE ICE 517 (GREASE_ THERMAL_ COMPOUND) | To lubricate mechanical parts of the equipment. | Thu 4/12/18 |
| THERMAL COUPLE CH3, | To control temperature while units are tested. | Thu 4/12/18 |
| SHAFT,ROTARY | To support mechanical system of the equipment. | Thu 4/12/18 |
| HIFIX CABLE DM250 | To connect the test head with the | Thu 4/12/18 |

| | | |
|---|---|---|
| | Test Interface units. | |
| IUO,CABLE (FT1_HIFIX_250M_DM) | To connect the test head with the Test Interface units. | Thu 4/12/18 |
| CMT DM250 Module 128 M | To run functional tests to the units. | Thu 4/12/18 |
| CMT, LCDPS, HCDPS HiFix cable | To run functional tests to the units. | Thu 4/12/18 |
| IUO, T2000 52TH LCDPS HCDPS HIFIX CABLE | To run functional tests to the units. | Thu 4/12/18 |
| LCDPS, PCB, CMT | To run functional tests to the units. | Thu 4/12/18 |
| CMT,Sync MTX-2 HiFix cable | To run functional tests to the units. | Thu 4/12/18 |
| IUO, T2000 52th Sync_MTX2 Hifix Cable for RND440 | To connect the test head with the test interface units. | Thu 4/12/18 |
| WD Caviar 80 GB 3.5" Internal Hard Drive | To store system information in order to allow the tool to run. | Thu 4/12/18 |
| Field Service Expert Hours | To install the tool. | Thu 4/12/18 |
| Field Service Expert Training | To train all the technicians in CRML to know how to operate the tool. | Thu 4/19/18 |

In addition to the above list of procurement items, the following individuals are authorized to approve purchases for the project team:

- Project Manager: Flor Gen
- Project Sponsor: Max Ramirez

For make-buy analysis, it should be straightforward since all the items need to be bought due to the complexity of the parts and the mechanical precision.

### 4.8.4 Type of Contract to be Used

Services required for works such as the training and field service expert hours to be procured for this project will be solicited under Intel contract through Factories Connected to Equipment Training Systems (FACets) platform.

The project team will work with the CRML engineer to define the item types, quantities, services, and required delivery dates. Then, the buyer will help the CRML engineer to request bids from various vendors. Once the vendor is selected, procurement of the items within the required period and at a reasonable cost

(based on contract conditions) will commence. All additional items to be procured for this project will be solicited under materials purchase through WIINGS (Intel Inventory Management System).

### 4.8.5 Cost Determination

For this project, the team will issue a Request for Quote (RFQ) in order to solicit proposals from the vendor for equipment installation and training, which describe how they will meet our requirements and its cost. All proposals will include vendor support for all items from the procurement definition paragraph as well as the base and out-year costs. The vendors will outline how the work will be accomplished, who will perform the work, vendors' experience in providing these goods, customer testimonials, backgrounds and résumés of employees performing the work, and a line item breakdown of all costs involved.

All information must be included in each proposal, as the proposals will be used as the foundation of the selection criteria. Proposals which omit solicited information or contain incomplete information will be discarded from consideration.

## 4.9 Stakeholder Management Plan

### 4.9.1 Stakeholder Management Introduction

Stakeholder management includes the processes required to identify the people, groups, and organizations that could affect or be affected by the project, to analyze the stakeholder's expectations and their impact on the project, and to develop strategies and tactics for effectively engaging the stakeholders in an appropriate manner to their interest and involvement in the project. The stakeholder management plan helps to ensure that stakeholders are effectively involved in project decisions and execution (PMBOK 5th Edition) throughout the lifecycle of the project, to gain support for the project, and anticipate resistance, conflict, or competing objectives among the project's stakeholders. The stakeholder management plan includes several sections:

- 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.
- Manage stakeholder engagement: it outlines the processes and steps that will be undertaken to carry out the planned strategies.
- Control Stakeholder Engagement – it describes the methods that will be used to monitor stakeholder engagement and alert the project team if problems are surfacing.

### 4.9.2 Stakeholders Identification

In order to develop an effective plan for managing stakeholders, they first need to be clearly identified and assessed. Stakeholders will be identified by performing a stakeholder analysis in which potential stakeholders and relevant information such interests, involvement, interdependencies, influence, and potential impact on project success are gathered, documented, and analyzed. (PMBOK 5th Edition).

**Chart 20. Stakeholders Identification [Source: F. Gen, May 2018]**

| Stakeholders | Functional Area | Roles - Responsibilities |
|---|---|---|
| Folsom PDE Team | End User | To submit complaints (feedback) to the CRML regarding tester activities. |
| Project Manager | Staff | Authorize and approve all project expenditures.<br>Ensure that work activities meet established acceptability criteria and fall within acceptable variances.<br>Report project status.<br>Evaluate the performance of all project team members. |

| | | |
|---|---|---|
| CRML Engineer | Design, engineering and construction | Release new equipment to OPS team meeting quality and safety criteria<br>Track installation progress and solve technical issues.<br>Create the list of required spares and consumables.<br>Send weekly reports on the progress of the project to the PM |
| EHS Engineer | Staff | Audit all the steps in the project to meet Intel Safety and Environmental policies. |
| Field Service Engineer | Service Provider | Responsible for equipment installation process and delivering training to OPS team. |
| Corporate Services Rep | Design, engineering and construction | Enable required facilities (including electrical and mechanical facilities). |
| Buyer | Staff | Submit all the purchase orders for spares and consumables. |
| Logistics Manager | Staff | Outline the characteristics of the shipping process; this includes shipping timeframe and estimating logistics costs. |
| CRML Manager | Sponsor | To provide strategic vision to project manager and expedite approval processes. |
| OPS Team | Sustaining | Receive the tool after installed and verify that it meets all the expected requirements. In charge of the sustaining of the tool on 24/7 basis. |

It is necessary to develop a stakeholder analysis register to assist with stakeholder identification and analysis. The stakeholder analysis register captures the following information: stakeholder, functional area, roles and responsibilities, main expectations, major requirements, influence and impact, and classification.

## Chart 21. Stakeholder Register Matrix [Source: F. Gen, May 2018]

| Stakeholder Register Matrix | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Project Name** | Tester Transfer to CRML | Tester Transfer to CRML - Stakeholder Analysis | | | | | | |
| **Main Sponsor** | CRML Manager | | | | | | | |
| **NOTE:** Stakeholder Register will be consulted and updated on a regular basis. As stakeholders may change thoughout th lifecycle of the project. | | | | | | | | |
| **ID** | **Stakeholders** | **Functional Area** | **Roles - Responsibilities** | **Main Expectations** | **Major Requirements** | **Influence/Impact (Low-Medium-High)** | **Priority** | **Additional Comments** |
| 1 | Folsom PDE Team | End User | To submit complaints (feedback) to the CRML regarding tester activities | - Give visibility of the issues related to CRML support.<br>- Report out customer satisfaction level | - 24/7 activities support in CRML<br>- Minimum (controlled) in Test Program development activities | Influence: Low<br>Impact: High | High | External |
| 2 | Project Manager | Staff | Authorize and approve all project expenditures.<br>Ensure that work activities meet established acceptability criteria and fall within acceptable variances.<br>Report project status.<br>Evaluate the performance of all project team members. | - Ensure low cost of operations<br>- Meet customer expectations | -Maximizing CRML support on test program development activities, minimizing delays in tool up to production date. | Influence: High<br>Impact: Medium | High | Internal |
| 3 | CRML Engineer | Design, engineering and construction | Release new equipment to OPS team meeting quality and safety criteria<br>Track installation progress and solve technical issues.<br>Create the list of required spares and consumables.<br>Send weekly reports on the progress of the project to the PM | - Ensure on-time equipment delivery<br>- Ensure safety of operations | - Optimize installation process timeline<br>- Maximize tool utilization | Influence: Medium<br>Impact: High | Medium | Internal |
| 4 | EHS Engineer | Staff | Audit all the steps in the project to meet Intel Safety and Environmental policies. | - Provide guidance on EHS requirements<br>- Ensure installation processes meet safety criteria | - Minimize risks during construction and installation processes. | Influence: Low<br>Impact: Low | Low | Internal |
| 5 | Field Service Engineer | Service Provider | Responsible for equipment installation process and delivering training to OPS team. | - Ensure new equipment in CRML installation on time<br>- Ensure OPS team is capable to operate the tool and troubleshoot. | - Minimize installation process time<br>- Optimize training program to OPS team | Influence: Low<br>Impact: Low | Low | External |
| 6 | Corporate Services Rep | Design , engineering and construction | Enable required facilities (including electrical and mechanical facilities) | - Ensure facilties are delivered on time and meeting the technical criteria. | - Optimize facilities installation process | Influence: Low<br>Impact: Low | Low | External |
| 7 | Buyer | Staff | Submit all the purchase orders for spares and consumables. | - Ensure purchase orders for consumales and spares are submitted on time.<br>- Verify suppliers meet Intel policies. | - Optimize supplier selection process and delivery dates | Influence: Low<br>Impact: Low | Low | Internal |
| 8 | Logistics Manager | Staff | Outline the characteristics of the shipping process; this includes shipping timeframe and estimating logistics costs. | - Ensure shipping process happens on time.<br>- Solve customs issues if any. | - Minimize delays related to shipping process. | Influence: Medium<br>Impact: Low | Low | Internal |
| 9 | CRML Manager | Sponsor | To provide strategic vision to project manager and expedite approval processes. | - Assure tester transfer and installation are align to Intel strategy and needs. | -Lobby for customer feedback. | Influence: High<br>Impact: High | Medium | Internal |
| 10 | OPS team | Sustaining | Receive the tool after installed and verify that it meets all the expected requirements. In charge of the sustaining of the tool on 24/7 basis. | - Ensure on-time support on 24/7<br>- Ensure safety of operations | -Maximizing CRML support on test program development activities, minimizing delays in tool up to production date. | Influence: Low<br>Impact: High | Low | Internal |

#### 4.9.2.1 Power-Interest Classification

As mentioned above, the tester transfer to CRML project is assessing each group's position as well as their impact on the project or how they are impacted by the project. One purpose of this activity is to help identify and categorize groups so that appropriate attention can be given to each group, according to the level of engagement needed. To help in this process, the project will use the PMBOK Power/Interest Grid to categorize each stakeholder group. The Power/Interest Grid analyzes stakeholder groups in a visual manner to further establish stakeholders' level of interest or concern and their ability to influence the project outcomes.

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 so that a focused stakeholder management strategy and plan can be developed and executed.

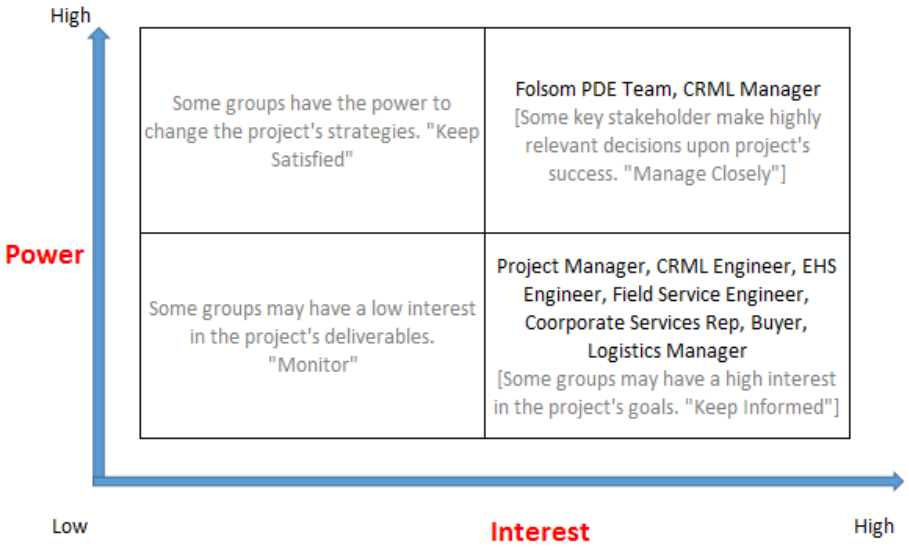



**Figure 18. Power-Interest Classification [Source: F. Gen, May 2018]**

#### 4.9.2.2 Stakeholder Interviews

To confirm that the stakeholder identification and analysis process is accurate and complete, the project team led by the Project Manager will help facilitate a series of reviews with the CIO and others. In addition, optional qualitative interviews may be conducted to the stakeholder groups identified as most influential or most impacted by the project to validate that their issues and concerns have been captured accurately.

### 4.9.3 Plan Stakeholder Management

The plan stakeholder management is the process of developing appropriate management strategies to effectively engage stakeholders throughout the lifecycle of the project based on the analysis of their needs, interests, and potential impact on project success. The key benefit of this process is that it provides a clear, actionable plan to interact with project stakeholders to support the project's interests (PMBOK 5th Edition).

Based upon the information gathered in the stakeholder analysis register and communication plan, the Project Manager will be responsible for engaging stakeholders throughout the lifecycle of the project. The level of engagement required for each stakeholder may vary over the course of the project. For example, during the early stages of the project, it might be necessary for the Project Manager to engage key stakeholders to be highly engaged. Highly engaged key stakeholders in the early stages of the project are pivotal for project commencement, achieving staff buy-in, and clearing obstacles. As the project progresses, the level of engagement will shift from key stakeholders to the broader project team and end users.

### 4.9.4 Manage Stakeholder Engagement

Stakeholder engagement management is the process of communicating and working with stakeholders to meet their needs and expectations and to address issues as they occur. Stakeholder engagement management is the process to systematically foster appropriate stakeholder engagement in project activities throughout the life of the project. The key benefit of this process is that it allows the Project Manager to increase support and minimize resistance from stakeholders; thus, significantly increasing the chances to achieve project success (PMBOK 5th Edition).

To effectively manage stakeholder engagement, the tester transfer to CRML project will utilize the communication plan and strategies identified above to communicate project related information to key stakeholders in a proactive and timely manner. Leveraging the information provided in the communication plan (i.e. stakeholder groups, communication items, purpose, method of communication, and frequency), the project will have the ability to increase support and minimize stakeholder resistance throughout the life of the project. Managing stakeholder engagement helps to increase the probability of project success by ensuring that stakeholders clearly understand the project goals, objectives, benefits, and risks.

In line with the analysis above, the project team will also be actively listening and soliciting input and feedback to make sure communications are not only being received and understood, but also to capture important information to help make adjustments and respond to problem areas.

Other project artifacts will factor into stakeholder management as well, including the list of business process changes and the change control process, both of which consider the impact on stakeholders. The project issues log is another tool to collect, document, and address concerns raised by stakeholders and stakeholder management risks that have materialized into issues that must be managed.

### 4.9.5 Monitor Stakeholder Engagement

Monitor stakeholder engagement is the process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders. Monitor stakeholder engagement involves collecting data, assessing the level of engagement, and using insights from the data collection to adjust strategies and tactics for engaging effectively with stakeholders.

As mentioned in the communications plan and the risk management plan, the tester transfer to CRML project will have mechanisms to receive ongoing direct feedback from key stakeholders.

Individual stakeholders will be encouraged to participate and to voice questions and concerns. In regard to the most serious issues and concerns that are raised, they should be addressed in a formal, rigorous process through the issues and risk logs.

As described in the scope management plan, the project will solicit broad participation in the collection and validation of requirements, which will uncover issues and concerns early on, so they can be addressed. Stakeholders are critical to the project's success. The project team has planned to involve, engage, and listen to all key stakeholders throughout the project lifecycle and they will work to achieve it.

# 5 CONCLUSIONS

1. This project management plan added structure and improved operational competencies for CRML through the use of templates and documented processes on how to communicate, request, and track changes along the project development in order to prevent the stakeholders to be miscommunicated in regards to the project.
2. Scope management plan including WBS, WBS dictionary, captured the information regarding project requirements and stakeholders' needs through meetings. These requirements were listed keeping in the loop assumptions and constraints as well.
3. Regarding the second specific objective of this project, which is the schedule or time management plan, it was created based on a detailed activity list. By having this ready, a project Gantt chart was developed in order to adequately identify each project activity to ensure the project's completion within the time constraints.
4. Cost management plan, the third specific objective, involves project costs planning, structure, and control. With activity cost estimates, the project budget was calculated including reserve and baseline costs.
5. For the fourth subsidiary plan, which is the quality management plan, it specified the processes needed in order to ensure quality along with the use of templates and checklists that are required by Intel guidelines that will help to forget any key item.
6. In regard to the human resource management plan, as the fifth specific objective, roles and responsibilities identification was critical in order to create a RACI chart to show the relationship between project tasks and team members. In addition, a resources calendar was developed to have more visibility around resources allocation.
7. The Communications Management Plan refers to the specific objective number six. In order to achieve it, communications matrix

was developed, detailing all project stakeholders' names, titles, information, and format throughout the project lifecycle and ensuring that the information disseminated during the project was done at the right time, in the right format, for the right people, and by the right person.

8. The deliverable number seven, which is the risk management plan, was based on risk identification and a detailed analysis on probability and impact in order to evaluate the importance of each risk and to subsequently classify the risks according to their priority as well as to carry out their corresponding quantitative analysis and its priority.
9. In relation to the procurement management plan, all the items to be procured were identified and listed along with the required date. This plan also includes the type of contacts to be used and the cost determination approach.
10. Regarding the stakeholder management plan, it is important to ensure that anyone who can influence or who will be affected by the project is identified. This plan, besides the identification plan, also provides the process to classify and manage the stakeholders in a detailed way through stakeholders register.
11. PMBOK® Guide 5th Edition provided a set of good project management practices in order to develop a more systematic project management plan and to ensure if any key item is missing from the beginning to the end of the project.

# 6 RECOMMENDATIONS

1. Intel must use the documented processes for project management to minimize the risk of missing critical items for projects completion.
2. For internal projects (Intel internal organizations), a simpler standard template should be created for each of the subsidiary plans in project management that covers from small to big projects.
3. CRML needs to create a single repository share drive to store all the projects developed for the organization in order to have more accessibility to historical information and previous learnings.
4. CRML should explore the creation of a project management team to consistently repeat project management methodologies in all projects to minimize variability from project to project.
5. To pursue the implementation of project management culture by creating awareness on the importance of meeting milestones and meeting products life cycles target dates without issues.

# 7 BIBLIOGRAPHY


Albert, G. (n.d.). *Estimación del coste del proyecto.* Retrieved from: http://www.recursosenprojectmanagement.com/estimacion-del-coste-del-proyecto/

Bright Hub Project Management Bright Hub Project Management. (2015). *The Project Management Life Cycle.* Retrieved from: http://www.brighthubpm.com/monitoring-projects/1907-successfully-guide-your-projects-to-completion-with-the-pm-life-cycle/

Community Tool Box. (n.d.). *Chapter 6. Communications to Promote Interest. Section 1. Developing a Plan for Communication.* Retrieved from: http://ctb.ku.edu/en/table-of-contents/participation/promoting-interest/communication-plan/main

Do It. Project Management Advisor v2.2. (2007). *How to: develop Quality Management Plan.* Retrieved from: https://pma.doit.wisc.edu/plan/3-2/how.html

Gbegnedji, G. (2012). *Controlar los costes del proyecto.* Retrieved from: https://whatisprojectmanagement.wordpress.com/2012/12/05/controlar-los-costos-del-proyecto/

Intel Corporate Information. (2017). *Corporate Info.* Retrieved from: https://www.intc.com/investor-relations/investor-education-and-news/corporate-info/default.aspx

Milosevic, D. Z. (2003). *Project management toolbox: Tools and techniques for the practicing project manager.* Hoboken, NJ: John Wiley & Sons.

Miloševic, D., & Srivannaboon, S. (2006). *A theoretical framework for aligning project management with business strategy. Paper presented at PMI® Research Conference: New Directions in Project Management, Montréal, Québec, Canada.* Newtown Square, PA: Project Management Institute.

OBS Business School. (2016). *Project Management.* Retrieved from http://www.obs-edu.com/es/blog-project-management/estrategias-clave-

para-minimizar-los-riesgos-de-un-proyecto/aseguramiento-de-la-calidad-de-proyecto-en-10-pasos

Praxis. (2015). *Probability-impact assessment.* Retrieved from: https://www.praxisframework.org/library/probability-impact-assessment

Project Management Docs. (2018). *Risk Management Plan Template.* Retrieved from: http://www.projectmanagementdocs.com/project-planning-templates/risk-management-plan.html#ixzz4qXd0p1qC

Project Management Institute. (2006). *Practice Standard for Work Breakdown Structures.* Second ed. Four Campus Boulevard Newtown Square, Pennsylvania 19073-3299, USA: Project Management Institute, Inc.

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

Rose, K. (2014). *Project Quality Management Why, What and How.* Second Edition. Plantation, Florida: J. Ross Publishing Inc.

Study.com. (n.d.). *Project Management Consultant: Education Requirements and Career Info.* Retrieved from: http://study.com/articles/Project_Management_Consultant_Education_Requirements_and_Career_Info.html

# 8 APPENDICES

## Appendix 1: FGP Charter

<table>
<tr><th colspan="2">PROJECT CHARTER<br>Formalizes the project start and confers the project manager with the authority to assign company resources to the project activities. Benefits: it provides a clear start and well defined project boundaries.</th></tr>
<tr><td>Date</td><td>Project Name:</td></tr>
<tr><td>13-Nov-2017</td><td>Project Management Plan for Tester transfer to Costa Rica Mega Lab</td></tr>
<tr><td>Knowledge Areas / Processes</td><td>Applicacion Area (Sector / Activity)</td></tr>
<tr><td>Knowledge areas<br>Integration, Scope, Time, Cost, Quality, Communication, Risk, Procurement and Stakeholders<br>Process groups<br>Initiation, Planning, Executing, Monitoring and Controlling, Closing</td><td>Logistics – Technology Industry</td></tr>
<tr><td>Start date</td><td>Finish date</td></tr>
<tr><td>13-Nov-2017</td><td>13-Jul-2018</td></tr>
<tr><td colspan="2">Project Objectives (general and specific)</td></tr>
<tr><td colspan="2">General objective<br>To develop a project management plan, based on PMI and UCI guidelines, for the transfer of a tester from Malaysia to Costa Rica Mega Lab to support US business partners within the same time zone.<br>Specific objectives<br>1. To create a scope management plan to define and control what will be included and what will not in the project through clear requirements.<br>2. To develop a sustainable time management plan that includes the processes required to manage the timely completion of the project.<br>3. To create a cost management plan so the project can be completed within the approved budget.<br>4. To create a robust quality management plan to satisfy the needs for which the project was undertaken, through meeting product requirements, and validating those.<br>5. To develop a human resource management plan to organize, manage, and lead the project team.<br>6. To create a communications management plan to define the appropriate communication strategy to ensure timely and effective information distribution across stakeholders.<br>7. To develop a risk management plan to identify, analyze, respond, and control the risks in the project.<br>8. To create a procurement management plan to define the neccesary processes to purchase or acquire products, services or results needed from outside the project team.<br>9. To create a stakeholders management plan to identify the people, groups, or organizations that could imact or be impacted by the project and develop an effective startegy to engage them in project decisions and execution.</td></tr>
<tr><td colspan="2">Project purpose or justification (merit and expected results)</td></tr>
<tr><td colspan="2">The project of the Tester Transfer from Malaysia to Costa Rica has been originated from the need of support in the same geography (time zone) for one internal customer located in United States. This transfer must be completed flawlessly in order to provide the required support to the end customer. The customer needs to execute several tests through the use of this tester within a really tight schedule, that is why it is important to clearly state the risks and time management plan. This tester will be one of a kind tester in Costa Rica, so it will be critical to meet the expected timeline since there will be no back-up machine. The project management plan then becomes critical, since it will provide all the required documentation to the main stakeholders and by having done it, the quality of the project will be easily tracked and the communication with the stakeholders will become more fluid and crisp.</td></tr>
</table>

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

Project Management Plan with its subsidiaries:

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

**Assumptions**

1. Project scope will not change in the short to medium term.
2. Organization will provide the project team/staffing to work in this project.

**Constraints**

Time: 3 months

**Preliminary risks**

1. Insufficient time to meet deliverables deadlines.
2. Understimate project's complexity in regards to scope and requirements,
3. Poor or lack of communication with the stakeholders in order to provide timely inputs to meet deadlines.

**Budget**

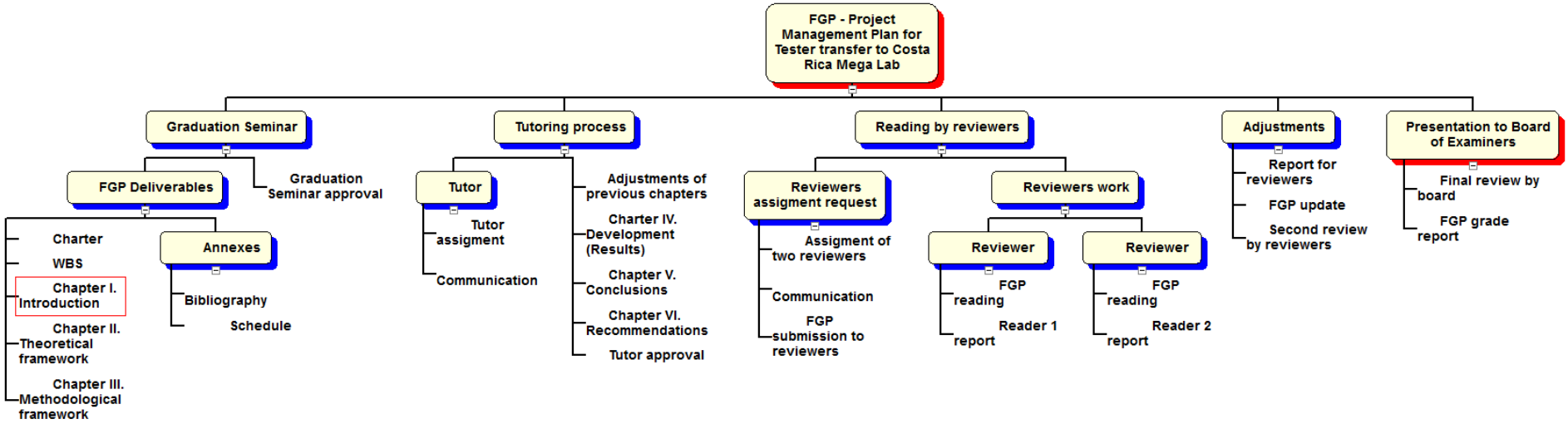
Approved budget: $232k

**Milestones and dates**

| Milestone | Start date | End date |
|---|---|---|
| Project Charter | Mon 11/13/17 | Fri 11/17/17 |
| WBS | Mon 11/13/17 | Fri 11/17/17 |
| Chapter I. Introduction | Mon 11/20/17 | Fri 11/24/17 |
| Chapter II. Theoretical framework | Mon 11/27/17 | Fri 12/1/17 |
| Chapter III. Methodological framework | Mon 12/4/17 | Fri 12/8/17 |
| Bibliography | Mon 12/4/17 | Fri 12/8/17 |
| Schedule | Mon 11/20/17 | Fri 11/24/17 |
| Graduation Seminar approval | Mon 12/11/17 | Fri 12/15/17 |
| Tutor assignment | Mon 2/19/18 | Mon 2/19/18 |
| Adjustments of previous chapters | Thu 2/22/18 | Wed 2/28/18 |
| Charter IV. Development (Results) | Thu 3/1/18 | Fri 5/4/18 |
| Chapter V. Conclusions | Mon 5/7/18 | Fri 5/11/18 |
| Chapter VI. Recommendations | Mon 5/14/18 | Fri 5/18/18 |
| Tutor approval | Fri 5/18/18 | Fri 5/18/18 |
| Assignment of two reviewers | Mon 5/21/18 | Tue 5/22/18 |
| Reviewers Communication | Wed 5/23/18 | Thu 5/24/18 |
| FGP submission to reviewers | Fri 5/25/18 | Fri 5/25/18 |
| Report for reviewers | Mon 6/11/18 | Thu 6/21/18 |
| FGP update | Fri 6/22/18 | Fri 6/22/18 |
| Second review by reviewers | Mon 6/25/18 | Fri 7/6/18 |
| Final review by board | Mon 7/9/18 | Tue 7/10/18 |
| FGP grade report | Wed 7/11/18 | Fri 7/13/18 |

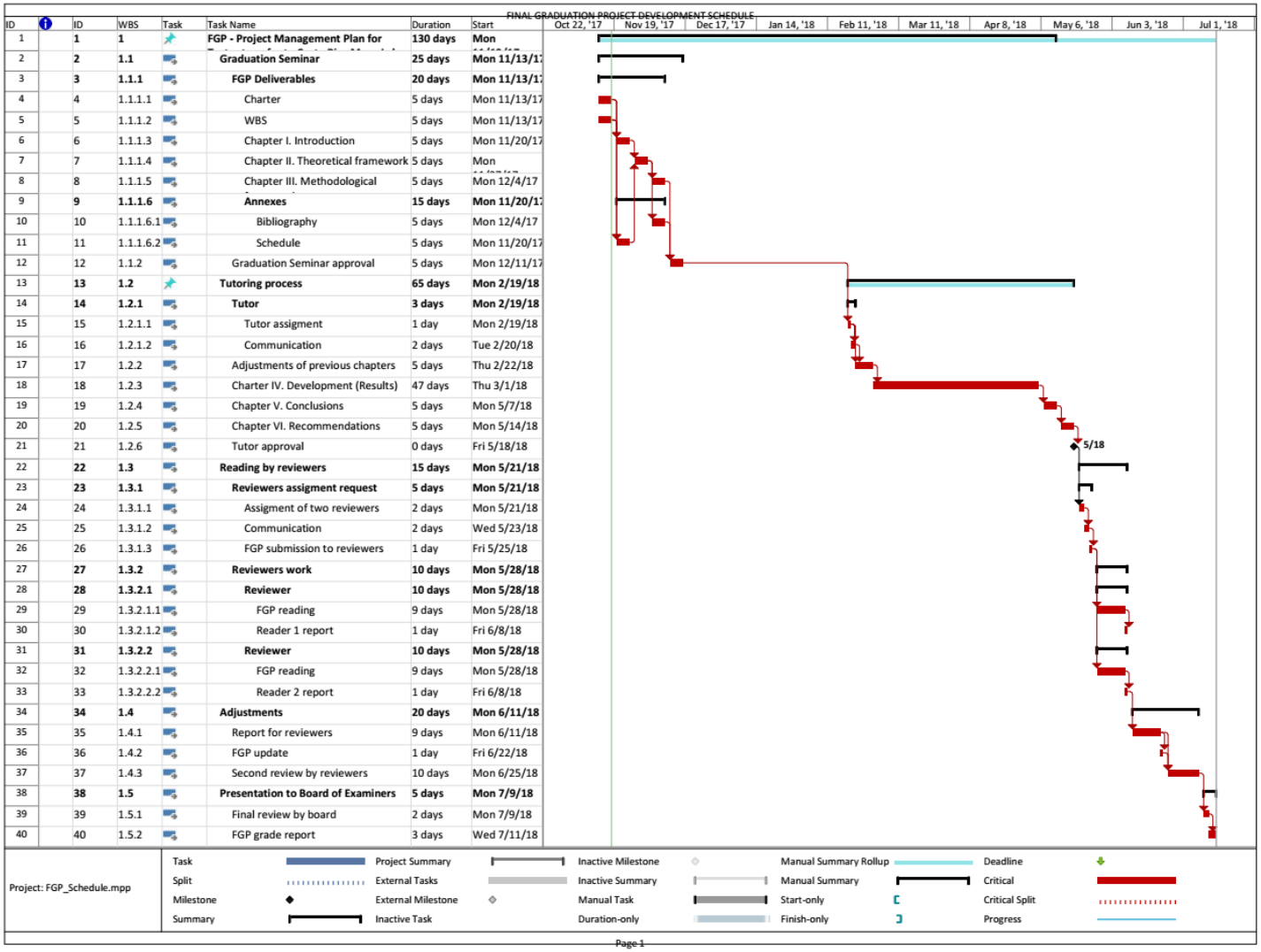
| **Relevant historical information** | |
|---|---|
| N/A | |
| **Stakeholders** | |
| Direct stakeholders:<br>- FGP Lecturer: Carlos Brenes<br>- Project Manager: Flor Gen<br>- Tutor<br>Indirect stakeholders:<br>- Academic Assistant: Gabriela Zuniga<br>- Reviewers | |
| **Project Manager:** Flor Maria Gen Ulate | **Signature:**  |
| **Authorized by:** | **Signature:** |

## Appendix 2: FGP WBS



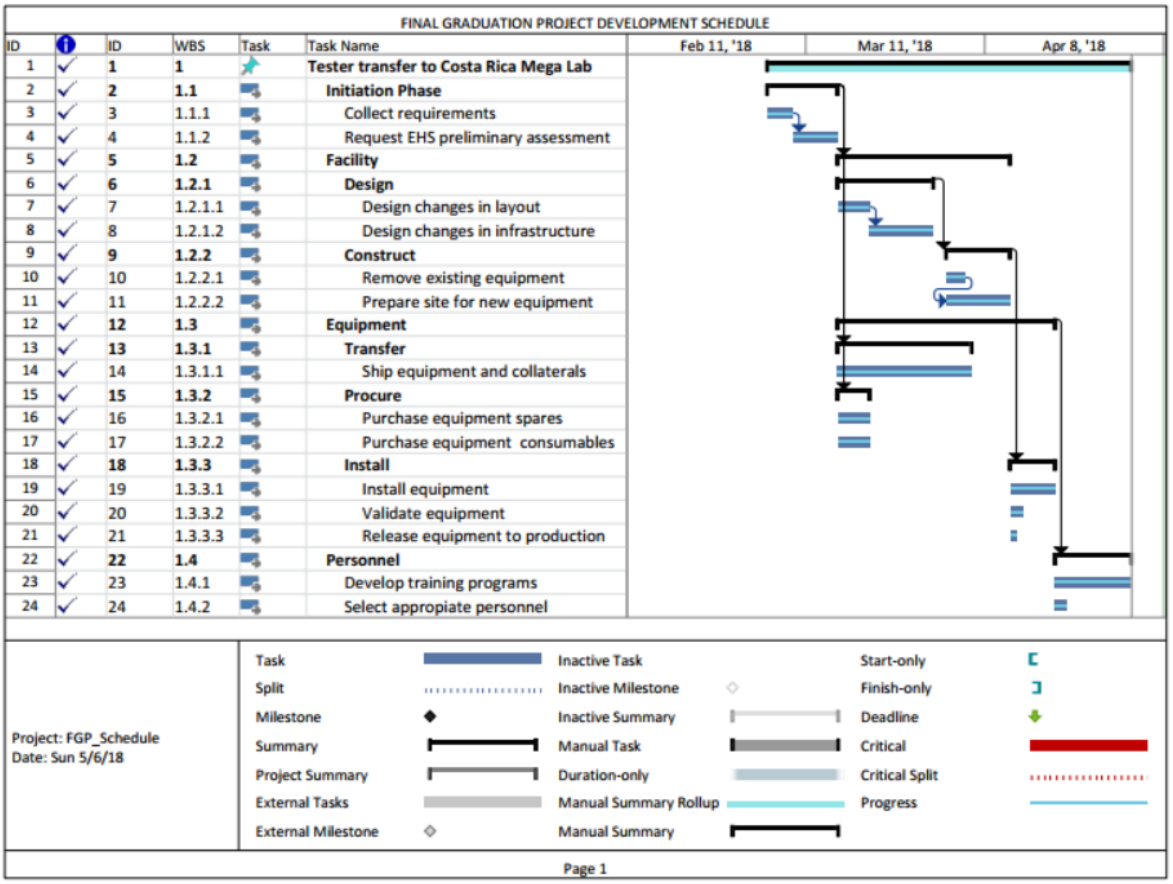
| WBS | Task Name |
|---|---|
| **1** | **FGP - Project Management Plan for Tester transfer to Costa Rica Mega Lab** |
| **1.1** | **Graduation Seminar** |
| **1.1.1** | **FGP Deliverables** |
| 1.1.1.1 | Charter |
| 1.1.1.2 | WBS |
| 1.1.1.3 | Chapter I. Introduction |
| 1.1.1.4 | Chapter II. Theoretical framework |
| 1.1.1.5 | Chapter III. Methodological framework |
| **1.1.1.6** | **Annexes** |
| 1.1.1.6.1 | Bibliography |
| 1.1.1.6.2 | Schedule |
| 1.1.2 | Graduation Seminar approval |
| **1.2** | **Tutoring process** |
| **1.2.1** | **Tutor** |
| 1.2.1.1 | Tutor assignment |
| 1.2.1.2 | Communication |
| 1.2.2 | Adjustments of previous chapters |
| 1.2.3 | Charter IV. Development (Results) |
| 1.2.4 | Chapter V. Conclusions |
| 1.2.5 | Chapter VI. Recommendations |
| 1.2.6 | Tutor approval |
| **1.3** | **Reading by reviewers** |
| **1.3.1** | **Reviewers assignment request** |
| 1.3.1.1 | Assignment of two reviewers |
| 1.3.1.2 | Communication |
| 1.3.1.3 | FGP submission to reviewers |
| **1.3.2** | **Reviewers work** |
| **1.3.2.1** | **Reviewer** |
| 1.3.2.1.1 | FGP reading |
| 1.3.2.1.2 | Reader 1 report |
| **1.3.2.2** | **Reviewer** |
| 1.3.2.2.1 | FGP reading |
| 1.3.2.2.2 | Reader 2 report |
| **1.4** | **Adjustments** |
| 1.4.1 | Report for reviewers |
| 1.4.2 | FGP update |
| 1.4.3 | Second review by reviewers |
| **1.5** | **Presentation to Board of Examiners** |
| 1.5.1 | Final review by board |
| 1.5.2 | FGP grade report |

## Appendix 3: FGP Schedule




| ID | ID | WBS | Task | Task Name | Duration | Start |
|---|---|---|---|---|---|---|
| 1 | **1** | **1** | | **FGP - Project Management Plan for** | **130 days** | **Mon** |
| 2 | **2** | **1.1** | | **Graduation Seminar** | **25 days** | **Mon 11/13/17** |
| 3 | **3** | **1.1.1** | | **FGP Deliverables** | **20 days** | **Mon 11/13/17** |
| 4 | 4 | 1.1.1.1 | | Charter | 5 days | Mon 11/13/17 |
| 5 | 5 | 1.1.1.2 | | WBS | 5 days | Mon 11/13/17 |
| 6 | 6 | 1.1.1.3 | | Chapter I. Introduction | 5 days | Mon 11/20/17 |
| 7 | 7 | 1.1.1.4 | | Chapter II. Theoretical framework | 5 days | Mon |
| 8 | 8 | 1.1.1.5 | | Chapter III. Methodological | 5 days | Mon 12/4/17 |
| 9 | **9** | **1.1.1.6** | | **Annexes** | **15 days** | **Mon 11/20/17** |
| 10 | 10 | 1.1.1.6.1 | | Bibliography | 5 days | Mon 12/4/17 |
| 11 | 11 | 1.1.1.6.2 | | Schedule | 5 days | Mon 11/20/17 |
| 12 | 12 | 1.1.2 | | Graduation Seminar approval | 5 days | Mon 12/11/17 |
| 13 | **13** | **1.2** | | **Tutoring process** | **65 days** | **Mon 2/19/18** |
| 14 | **14** | **1.2.1** | | **Tutor** | **3 days** | **Mon 2/19/18** |
| 15 | 15 | 1.2.1.1 | | Tutor assigment | 1 day | Mon 2/19/18 |
| 16 | 16 | 1.2.1.2 | | Communication | 2 days | Tue 2/20/18 |
| 17 | 17 | 1.2.2 | | Adjustments of previous chapters | 5 days | Thu 2/22/18 |
| 18 | 18 | 1.2.3 | | Charter IV. Development (Results) | 47 days | Thu 3/1/18 |
| 19 | 19 | 1.2.4 | | Chapter V. Conclusions | 5 days | Mon 5/7/18 |
| 20 | 20 | 1.2.5 | | Chapter VI. Recommendations | 5 days | Mon 5/14/18 |
| 21 | 21 | 1.2.6 | | Tutor approval | 0 days | Fri 5/18/18 |
| 22 | **22** | **1.3** | | **Reading by reviewers** | **15 days** | **Mon 5/21/18** |
| 23 | **23** | **1.3.1** | | **Reviewers assigment request** | **5 days** | **Mon 5/21/18** |
| 24 | 24 | 1.3.1.1 | | Assigment of two reviewers | 2 days | Mon 5/21/18 |
| 25 | 25 | 1.3.1.2 | | Communication | 2 days | Wed 5/23/18 |
| 26 | 26 | 1.3.1.3 | | FGP submission to reviewers | 1 day | Fri 5/25/18 |
| 27 | **27** | **1.3.2** | | **Reviewers work** | **10 days** | **Mon 5/28/18** |
| 28 | **28** | **1.3.2.1** | | **Reviewer** | **10 days** | **Mon 5/28/18** |
| 29 | 29 | 1.3.2.1.1 | | FGP reading | 9 days | Mon 5/28/18 |
| 30 | 30 | 1.3.2.1.2 | | Reader 1 report | 1 day | Fri 6/8/18 |
| 31 | **31** | **1.3.2.2** | | **Reviewer** | **10 days** | **Mon 5/28/18** |
| 32 | 32 | 1.3.2.2.1 | | FGP reading | 9 days | Mon 5/28/18 |
| 33 | 33 | 1.3.2.2.2 | | Reader 2 report | 1 day | Fri 6/8/18 |
| 34 | **34** | **1.4** | | **Adjustments** | **20 days** | **Mon 6/11/18** |
| 35 | 35 | 1.4.1 | | Report for reviewers | 9 days | Mon 6/11/18 |
| 36 | 36 | 1.4.2 | | FGP update | 1 day | Fri 6/22/18 |
| 37 | 37 | 1.4.3 | | Second review by reviewers | 10 days | Mon 6/25/18 |
| 38 | **38** | **1.5** | | **Presentation to Board of Examiners** | **5 days** | **Mon 7/9/18** |
| 39 | 39 | 1.5.1 | | Final review by board | 2 days | Mon 7/9/18 |
| 40 | 40 | 1.5.2 | | FGP grade report | 3 days | Wed 7/11/18 |

## Appendix 4: Project Schedule



FINAL GRADUATION PROJECT DEVELOPMENT SCHEDULE

| ID | ID | WBS | Task | Task Name |
|---|---|---|---|---|
| 1 | **1** | **1** | | **Tester transfer to Costa Rica Mega Lab** |
| 2 | **2** | **1.1** | | **Initiation Phase** |
| 3 | 3 | 1.1.1 | | Collect requirements |
| 4 | 4 | 1.1.2 | | Request EHS preliminary assessment |
| 5 | **5** | **1.2** | | **Facility** |
| 6 | **6** | **1.2.1** | | **Design** |
| 7 | 7 | 1.2.1.1 | | Design changes in layout |
| 8 | 8 | 1.2.1.2 | | Design changes in infrastructure |
| 9 | **9** | **1.2.2** | | **Construct** |
| 10 | 10 | 1.2.2.1 | | Remove existing equipment |
| 11 | 11 | 1.2.2.2 | | Prepare site for new equipment |
| 12 | **12** | **1.3** | | **Equipment** |
| 13 | **13** | **1.3.1** | | **Transfer** |
| 14 | 14 | 1.3.1.1 | | Ship equipment and collaterals |
| 15 | **15** | **1.3.2** | | **Procure** |
| 16 | 16 | 1.3.2.1 | | Purchase equipment spares |
| 17 | 17 | 1.3.2.2 | | Purchase equipment consumables |
| 18 | **18** | **1.3.3** | | **Install** |
| 19 | 19 | 1.3.3.1 | | Install equipment |
| 20 | 20 | 1.3.3.2 | | Validate equipment |
| 21 | 21 | 1.3.3.3 | | Release equipment to production |
| 22 | **22** | **1.4** | | **Personnel** |
| 23 | 23 | 1.4.1 | | Develop training programs |
| 24 | 24 | 1.4.2 | | Select appropiate personnel |



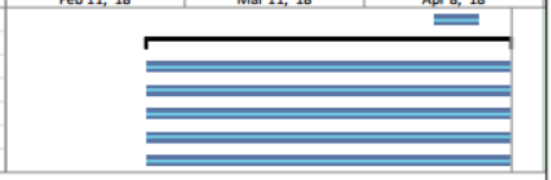
Project: FGP_Schedule
Date: Sun 5/6/18

| | | |
|---|---|---|
| Task | Inactive Task | Start-only |
| Split | Inactive Milestone | Finish-only |
| Milestone | Inactive Summary | Deadline |
| Summary | Manual Task | Critical |
| Project Summary | Duration-only | Critical Split |
| External Tasks | Manual Summary Rollup | Progress |
| External Milestone | Manual Summary | |

Page 1

FINAL GRADUATION PROJECT DEVELOPMENT SCHEDULE

| ID | | ID | WBS | Task | Task Name |
|---|---|---|---|---|---|
| 25 | ✓ | 25 | 1.4.3 | | Train personnel |
| 26 | ✓ | **26** | **1.5** | | **Project Management** |
| 27 | ✓ | 27 | 1.5.1 | | Planning |
| 28 | ✓ | 28 | 1.5.2 | | Scheduling |
| 29 | ✓ | 29 | 1.5.3 | | Accounting |
| 30 | ✓ | 30 | 1.5.4 | | Reporting |
| 31 | ✓ | 31 | 1.5.5 | | Meetings |




Project: FGP_Schedule
Date: Sun 5/6/18

| | | |
|---|---|---|
| Task | Inactive Task | Start-only |
| Split | Inactive Milestone | Finish-only |
| Milestone | Inactive Summary | Deadline |
| Summary | Manual Task | Critical |
| Project Summary | Duration-only | Critical Split |
| External Tasks | Manual Summary Rollup | Progress |
| External Milestone | Manual Summary | |

Page 2

## Appendix 5: White Paper Template

### Change Scope

| | | | |
|---|---|---|---|
| 1. Horizon # | YEARMONTHDAYCONSECUTIVE-CCB | | |
| 2. White Paper Type | Final | | |
| 3. Classification | Class 3N | | |
| 4. Name of Owner | Owner Mail | | |
| 5. Title of Change | Installation and Qualification | | |
| 6. Originator LAB | Costa Rica | 7. Affected LABs | Costa Rica |
| 8. Module Affected | | 9. Reference Module | N/A |
| 10. Area Affected | Test | | |

### Technology

| Factor | Range Covered by this WP |
|---|---|
| Program | |
| Product | |
| Form Factor | |
| Product envelop | |

### Concerns and Considerations

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

### Experiment Strategy

| Quality Characteristics | Measurement Method | Ideal Target or Target Spec | Present Mean | Present Std. Dev | Expected change |
|---|---|---|---|---|---|
| ESD | ESD/EMI Procedure as per Spec 20-0354 | | | | |
| Copy Exactly | Checklist | 100% CE (Hardware) | | | |
| Visual Mechanical Defects | Visual Inspection | 0% | | | |
| Kpp: Thermal Calibration | CTH handler Calibration Method | Pass | | | |
| Tester Calibrations | Tester Cal/Diags | Pass | | | |
| MiniRob Pick and Place 2 trays 4 corners | Visual inspection | N/A | | | |

### Experiment Details

| Quality Characteristics | Material | Accept Criteria | Statistical Method |
|---|---|---|---|
| ESD | N/A | Pass | Other: ESD procedure as per spec 20-0354 |
| `Copy Exactly | N/A | 100% CE (Hardware) | Other: CE compliance |
| Visual Mechanical Defects | 3000 | SB 0.0999% | ZDS |
| Kpp: Thermal Calibration | N/A | Pass | Other: CTH cal procedure |
| Tester Calibrations | N/A | Pass | Other: Tester procedures |
| MiniRob Pick and Place 2 trays 4 corners | N/A | N/A | N/A |

### Experiment Results

| Quality Characteristics | Ideal Target or Target Spec | Present Mean | Present Std. Dev | New Mean | New Std Dev | Mean Results | Std Results |
|---|---|---|---|---|---|---|---|
| ESD | Decay time < 10s 1kv to 100V/ Grounding < | Pass | N/A | Pass | None | | |
| Copy Exactly | 100% CE (Hardware) | 100% CE (Hardware) | N/A | 100% CE | None | | |
| Visual Mechanical Defects | 0% | 0% (no baseline available) | N/A | 0% (0/3000) | None | | |
| Kpp: Thermal Calibration | Pass | Pass | N/A | Pass | None | | |
| Tester Calibrations | Pass | Pass | N/A | Pass | None | | |
| MiniRob Pick and Place 2 trays 4 corners | N/A | N/A | N/A | N/A | N/A | | N/A |

### Conclusions

| |
|---|
| 1. |

### Recommendations

REV. 0

| 1. Release the XXXXXX for LAB activities | |
|---|---|
| Experiment #1: ESD<br><br>Key takeaway: | Experiment#2: Copy Exactly<br><br>Key takeaway:<br>. |
| | Experiment#4: Kpp Thermal Calibration<br><br>Key takeaway: |
| Experiment#3: Visual Mechanical Defects<br><br>Key takeaway: | Experiment #5: Tester Diags<br><br>Key takeaway: |

## Appendix 6: Environmental Checklist

| ENVIRONMENTAL NEW EQUIPMENT CHECKLIST | |
|---|---|
| Date | |
| Project Manager & Phone number | |
| Equipment Owner & Phone number | |
| Building Number | |
| Platform (FC PGA, C4, Chipsets, OLGA, etc) | |
| Area name (FOL, Assembly, Test, Finish, etc.) | |
| Narrative description of new or replacement equipment: | |
| **1. Exhaust System Information:** | N/D |
| Exhaust flow rate ($m^3$/hr or cfm): | |
| Exhaust stack ID (number, letter, height, etc): | |
| Check the one which applies:<br>☐ Direct discharge solvent<br>☐ Direct discharge heat ☐ Scrubbed ☐ Other (explain)_____ | |
| **2. Equipment Information:** | |
| Operating temperature (°C): | |
| Operating pressure (psi): | |
| Does the equipment contain refrigerant? Yes ☐ No ☐ | |
| Is the equipment outdoors and produce noise?<br>Yes☐ No☐ | |
| Equipment make: | |
| Equipment model number: | |
| Intel Equipment ID number: | |
| Number of units to be installed: | |
| **3. Trade name of chemicals used in equipment:** | **Attach MSDS for each chemical (keep on file for ESO 123)** |
| Chemical Name: | Estimated monthly usage, indicate appropriate units: (kg/month) of (L/month) |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |

| **4. Waste Generation Information:** | | |
|---|---|---|
| Waste stream name/description | Generation rate (kg/month) or (L/month) | Waste Type (hazardous, trash, recyclable, industrial) |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| Is the equipment connected to any liquid drains ? | ☐ Yes | ☐ No |
| If yes, check which drain applies:<br>☐ Sanitary ☐ Acid ☐ Industrial ☐ Solvent ☐ Other | | |
| Describe waste disposal procedures: (call EHS if you have any questions)<br><br>Tool is drained when needed to be moved out. Refrigerant is placed in containers (specifically identifying the tool it came) and it is placed on the disposal point at Manufacturing Floor | | |

Person who filled this form _____ Signature _____ Date _____

Site Environmental Engineer _____ Signature _____ Date _____

## Appendix 7: Equipment Sign Off Level 3

Equipment Sign-Off: Safety Level 3

# Equipment Sign-off (ESO)
# Safety Level 3 Checklist

| Equipment Information | |
|---|---|
| **Tool ID** | |
| **Functional Area** | |
| **Location** | **Fab Bay Subfab @** |
| **Tool Install Type** | **First of a Kind (FOK)** ☐<br>**Duplicate of a Kind (DOK)** ☐<br>**Equipment Modification** ☐ |

| | Name & Signature | Date |
|---|---|---|
| **Equipment Owner** | | |
| **Safety Engineer** | | |

- Before You Begin:
  - The Tool Owner must have completed Equipment Sign Off Training (00001543 My Learning).

## SL3 Supporting Documents: Tool Owner Checks Applicable Documents

**Intel QA/QC:**

☐ Tool Owner verifies all appropriate documentation is posted with Intel QA/QC

**Intel EHS:**

☐ Industrial Hygiene Survey (RF, X-Ray)

**Tool Owner needs to bring the following documents to SL3 sign-off**

☐ Completed SL3 Checklist
☐ EHS Training Assessment (FOK Only)
☐ Abatement unit commissioning checklist (to be provided to Site Environmental)

Equipment Sign-Off: Safety Level 3

**General SL3 Requirements (All Tools)**

| Description | Passed | Not applicable |
|---|---|---|
| 1. All Level 2 punch list items have been completed? | | |
| 2. Appropriate Industrial Hygiene Surveys have been completed: | | |
| a. Survey requirements:<br>Non-ionizing radiation (RF/μW, UV, IR)? Type:_____<br>Ionizing Radiation (e.g. X-ray)<br>Noise<br>Other?<br>Completed surveys will be managed per site QA/QC process. | | |
| 3. Are the equipment's operation and maintenance specifications on-line and approved by EHS? | | |
| 4. If applicable, has the initial Electrical IR scan been completed?<br>*Note: This is a non-gating EHS item. The requirements for IR scan are managed by each individual site and module.*<br>**Date Completed:** | | |
| 5. For tools with Abatement Systems for Perfluorocarbons (PFC): Provide commission checklist for abatement with vendor certification that the abatement is installed and setup per manufacture recommendation to Site Environmental. | | |

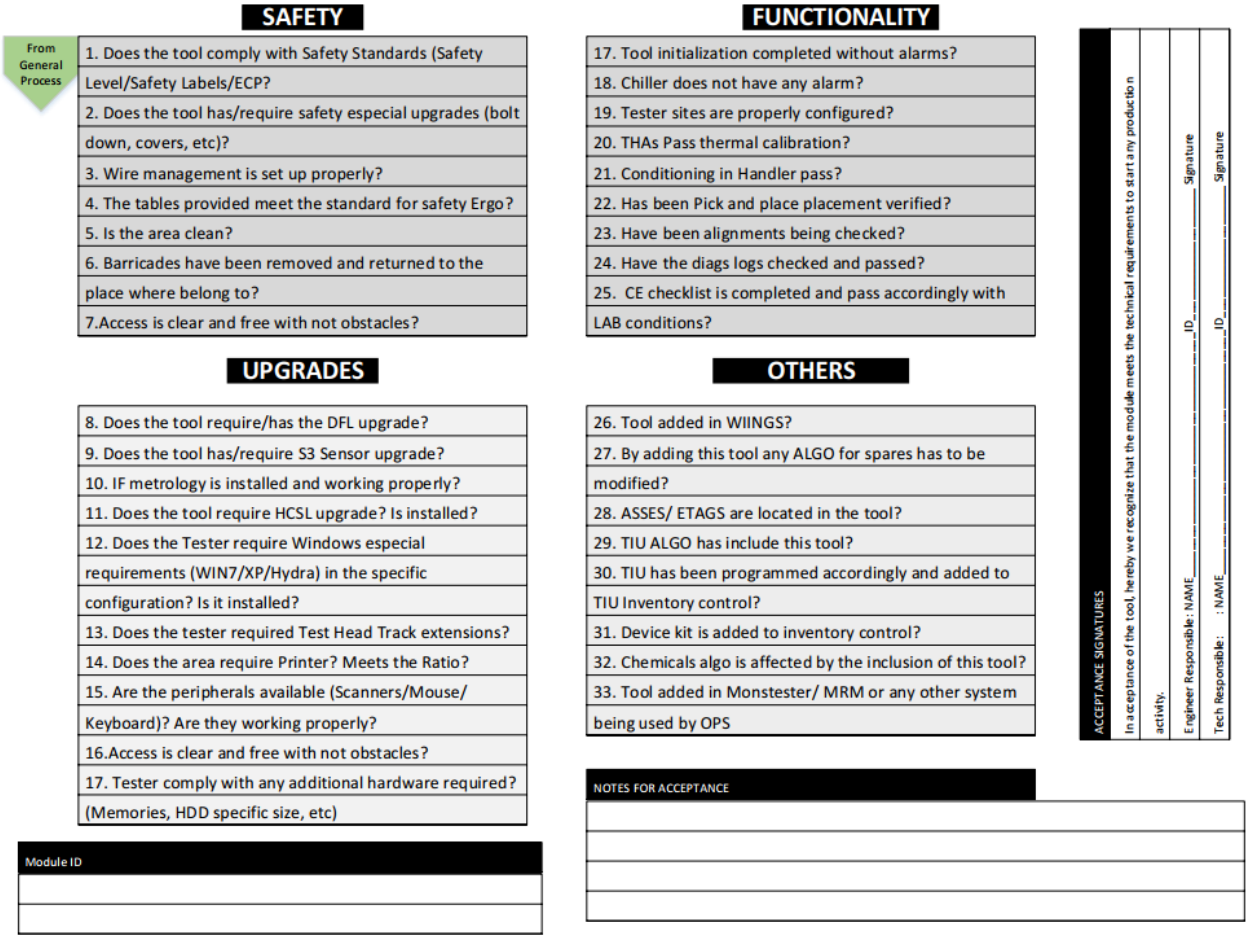
**First of a Kind (FOK) Documentation Requirements ( ☐ Check if Section is N/A)**

| Description | Pass or N/A | |
|---|---|---|
| 1. Has an EHS training assessment been completed?<br>EHS Training Assessment for FoK Tools<br>Completed form needs to be emailed to Intel Training. | | |
| **PM and Ops. Spec. Review:** | **Ops. Spec.** | **PM spec.** |
| 1. Have PPE requirements been documented in the PM and Ops specs ? Copy the information from the PPE assessment performed on FoK tools. PPE assessments must be approved by site Industrial Hygiene. | | |
| 2. Have training requirements been documented in your certification tracking application? Does the Ops and PM specs state 'Refer to your certification tracking application for requirements'? | | |
| 3. Have the emergency procedures been completed in the Ops and PM specs? | | |
| 4. Have General EHS hazards been documented in the Ops. Spec. This is not applicable for PM specs. | | |
| 5. Have tool specific chemical and their hazards been documented in the Ops and PM specs? | | |
| 6. Has MSDS access been documented in the Haz Com section of the Ops and PM specs? | | |
| 7. Have ventilation controls used on the tool been documented in the PM spec (e.g. primary exhaust systems, secondary exhaust systems)? | | |

Equipment Sign-Off: Safety Level 3

| | | | |
|---|---|---|---|
| 8. | If applicable, the PM spec. include the following Annual Ventilation Checks:<br>All exhaust ventilated secondary enclosures and hoods:<br>a. Inspection of exhaust enclosure integrity<br>b. Check for proper operation of the flow or static pressure monitoring device (Photohelic, flow switch, etc.)<br>Primary control exhaust ventilation hoods (excluding wet stations):<br>a. Annual Face or capture velocity measurements (Site EHS will perform annual checks)<br>Documentation that the checks made above pass must be maintained. | | |
| 9. | Does the PM spec. include the following Quarterly Ventilation Checks (Applies to all hoods designed to control open surface tanks such as wet benches)<br>a. Confirm and test alarm set points. Document quarterly checks. | | |
| 10. | Have ergonomic hazards and their controls been documented in the Ops and PM specs? | | |
| 11. | Have the equipment hazardous energies been documented in the PM Spec? | | |
| 12. | Where applicable, has dual valve isolation been defined for pressurized HPM chemicals within the energy control procedure (ECP) of the PM spec? | | |
| 13. | Where applicable, has LOTO requirements for FOUP purge of Mini Environments (ME) been documented?<br>If the ME is a confined space, are requirements specified (e.g. alternate entry, permit entry)? | | |
| 14. | Have the vendor/suppliers recommend EMO and safety related interlock changes been documented in the PM specs? | | |
| 15. | Energized Electrical Work has been identified in the PM spec? | | |
| 16. | Have the radiation sources and hazards been identified in the PM spec? | | |
| 17. | Does the PM spec include a radiation leak check at least annually or whenever shielding or interlocks have been removed or defeated? | | |
| 18. | Are noise hazards above 80 dBA documented in the Ops and PM specs? | | |
| 19. | Laser hazards, sources and laser warning statements have been documented in the PM spec? | | |
| 20. | Have Fire/Pyrophoric hazards and controls been documented in the PM spec? | | |
| 21. | Are testing procedures for equipment specific fire protection systems documented in the PM spec? | | |
| 22. | Have the types of waste generated and proper disposal been documented in the Ops and PM specs? | | |
| 23. | Are wipe down emissions minimized (e.g. can DI water be used for wipe downs in place of IPA) | | |
| 24. | For HPM pump exhaust lines only: Have He leak testing and flange/pump alignment verifications been included in the equipment PM specs for invasive pump maintenance activities? | | |
| 25. | Have equipment parts, contamination amounts and proper decontamination requirements been documented in the PM spec? | | |
| 26. | Have external and internal hoists/lifting equipment been documented in the PM or Ops spec? | | |
| 27. | Has the hoist daily pre-use inspection checklist been added and periodic inspection requirements documented in the procedures section of the PM spec? | | |
| 28. | Have confined spaces been documented in the PM spec with guidance on access requirements / procedures? | | |
| 29. | Have fall protection requirements (if any) been documented in the PM specs? | | |

## Appendix 8: OPS Release Hands-Off Template



**SAFETY**

From General Process

| |
|---|
| 1. Does the tool comply with Safety Standards (Safety Level/Safety Labels/ECP? |
| 2. Does the tool has/require safety especial upgrades (bolt down, covers, etc)? |
| 3. Wire management is set up properly? |
| 4. The tables provided meet the standard for safety Ergo? |
| 5. Is the area clean? |
| 6. Barricades have been removed and returned to the place where belong to? |
| 7.Access is clear and free with not obstacles? |

**FUNCTIONALITY**

| |
|---|
| 17. Tool initialization completed without alarms? |
| 18. Chiller does not have any alarm? |
| 19. Tester sites are properly configured? |
| 20. THAs Pass thermal calibration? |
| 21. Conditioning in Handler pass? |
| 22. Has been Pick and place placement verified? |
| 23. Have been alignments being checked? |
| 24. Have the diags logs checked and passed? |
| 25. CE checklist is completed and pass accordingly with LAB conditions? |

**UPGRADES**

| |
|---|
| 8. Does the tool require/has the DFL upgrade? |
| 9. Does the tool has/require S3 Sensor upgrade? |
| 10. IF metrology is installed and working properly? |
| 11. Does the tool require HCSL upgrade? Is installed? |
| 12. Does the Tester require Windows especial requirements (WIN7/XP/Hydra) in the specific configuration? Is it installed? |
| 13. Does the tester required Test Head Track extensions? |
| 14. Does the area require Printer? Meets the Ratio? |
| 15. Are the peripherals available (Scanners/Mouse/ Keyboard)? Are they working properly? |
| 16.Access is clear and free with not obstacles? |
| 17. Tester comply with any additional hardware required? (Memories, HDD specific size, etc) |

**OTHERS**

| |
|---|
| 26. Tool added in WIINGS? |
| 27. By adding this tool any ALGO for spares has to be modified? |
| 28. ASSES/ ETAGS are located in the tool? |
| 29. TIU ALGO has include this tool? |
| 30. TIU has been programmed accordingly and added to TIU Inventory control? |
| 31. Device kit is added to inventory control? |
| 32. Chemicals algo is affected by the inclusion of this tool? |
| 33. Tool added in Monstester/ MRM or any other system being used by OPS |

**ACCEPTANCE SIGNATURES**

In acceptance of the tool, hereby we recognize that the module meets the technical requirements to start any production activity.

Engineer Responsible: NAME_____ ID_____ Signature_____

Tech Responsible: : NAME_____ ID_____ Signature_____

**Module ID**

**NOTES FOR ACCEPTANCE**

## Appendix 9: Change Log Template

**CHANGE MANAGEMENT LOG**

| | |
|---|---|
| Project Name: | <optional> |
| National Center: | <required> |
| Project Manager Name: | <required> |
| Project Description: | <required> |

| ID | Current Status | Priority | Change Request Description | Assigned To Owner | Expected Resolution Date | Escalation Required (Y/N)? | Action Steps | Impact Summary | Change Request Type | Date Identified | Assoc ID | Entered By | Actual Resolution Date | Final Resolution & Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Open | Critical | **EXAMPLE:** Request for product functionality increase | | | Yes | **EXAMPLE:** Analyze impact of requested change and then meet with the change control board (CCB) to present findings for final decision on the requested change | **EXAMPLE:** Project scope, schedule, resources, and potentially budget may all be impacted | Product | 01/01/06 | | | | **EXAMPLE:** The CCB has approved the change |
| | Work In Progress | High | **EXAMPLE:** The schedule slipped due to unexpected weather related events | | | No | **EXAMPLE:** Adjust the schedule to account for the weather related events | **EXAMPLE:** Project schedules, resources, and possibly budget may all be impacted | Project | 01/01/06 | | | | **EXAMPLE:** Updated schedule reviewed and approved |
| | Closed | Medium | | | | | | | Other | | | | | |
| | | Low | | | | | | | | | | | | |

**CHANGE MANAGEMENT LOG**

| | |
|---|---|
| Project Name: | <optional> |
| National Center: | <required> |
| Project Manager Name: | <required> |
| Project Description: | <required> |

## Appendix 10: Review Letter

Cartago, May 28th, 2018

Universidad para la Cooperación Internacional

To whom it may concern

Cristina Maria Solano, identification number 304470513, Bachelor and Licenciada in English Teaching as Second Language and part of the Colegio de Licenciados y Profesores en Letras, Filosofía, Ciencias y Artes de Costa Rica under the code 64964, hereby states that the Project **"Project Management Plan for Tester Transfer to Costa Rica Mega Lab"** carried out by the student Flor Gen Ulate, has been checked.

The project was done to obtain the Master's degree in Project Management. Aspects such as paragraph form, language quirks in written language, orthography, punctuation, and other aspects related to syntax and grammar were checked and proofread. Therefore, taking into account the changes made, the project is ready to be presented.

Sincerely,


Cristina Solano Solano

Colegio de Licenciados y Profesores. Código 64964

cristina.solano@filologos.cr