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Project Management 412
Assignment 1
Team G2

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Executive Summary

In today's day and age, engineers are expected to be versatile in more aspects than ever before. One of these is project management. This assignment hopes to introduce and ready engineering students for project management and as close to reality as possible. For example, the teams of students are multi-disciplinary, and had most probably not had prior experience working together. For this particular assignment, a project structure has been designed in order to manage the creation of a beer brewery.

Throughout this document the team will be working to create the product in a 11 month period with a budget of $380 000. The students need to use these restrictions and plan how they will use the resources to complete the project. The resources will be bid on by using a simulation program called Sim4Projects. Using this program, the students have to bid against other teams to create a real life simulation. To bid on these resources they need to determine how much they are willing to spend on the different resources and how much they will be willing to spend on training these resources. By creating a budget that corresponds with the baseline plan they can determine how they can manage the resources.

To manage the resources, the team needs to identify the objectives of the project as part of the project scope. If the objectives are determined they can then create deliverables so that he project stays on track and on budget. Milestones are put together and the critical tasks will be identified. The milestones also help insure that the project will stay within the time frame. A work breakdown structure will also be structured to help insure that project will stay on schedule. By doing this the work can then be divided between the different engineers to ensure the skills of all the engineers are used optimally. Project requirements, limitations and exclusions must be identified so that it is clear what is possible and what is not possible during the process of creating the brewery. The last part of the project scope is to review and approve all the decisions made so that the process of creating the project can begin.

Using Microsoft Project, the students can create a baseline plan that will give a visual aid to determine if the project is on track with the estimated times. By putting more people on certain project they can then reduce the time that the project will and ensure that the project will be finished within the set time frame. Using this baseline, they can then setup an estimated budget.

The budget that is created is setup for a perfect scenario were everything runs smoothly and without any interruptions. In real life this will not always be the situation. In some circumstances there will be risks involved that may change the timeline and the budget of the project. The team need to be prepared for these situations. Risks need to be identified and analysed. A Risk Assessment Plan is set up to evaluate the risk and how these risks will be managed.

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1 Introduction

Stellenbosch is a beautiful town surrounded by magnificent wine lands and farms. However this town is in need of a beer brewery that will cater for the vibrant student life of Stellenbosch.

The well-know Stellenbrau company is interested in starting a local micro-brewery in the heart of Stellenbosch combined with a restaurant.

Using a multi-disciplinary group every member can contribute in a way to insures that an optimal solution can be found. This multi-disciplinary will consist out of an Electrical engineer, a civil engineer, a mechanical engineer, a chemical engineer and an industrial engineer. Having students from all these different field an optimal solution will definitely be found.

For this project market assessment will be done as well as design and system assessments. Quality control will also be assets during the different stages of development and manufacturing of the project. This project will consist out of a scope, baseline plan, a risk plan and a very detailed budget to determine the different resources that will be needed.

This project will run through twelve different simulations simultaneously. The project has a budget of $380 000 and will run from 15^{th} February 2017 – 31^{st} January 2018.

2 Project Scope Statement

2.1 Objectives

A local micro-brewery will be designed and constructed in the Stellenbosch area. The main objective of this product/service is to design a local brewery for in the Stellenbosch area, that will have a deliverance of 3 600 000 draft beers per annum which is equivalent to 1 800 000 liters.

Other objectives include the following:

- Designing a brewery that will be able to cater as a bar that can be used by the public of Stellenbosch.
- To create a product that is economically viable for the target market namely students.
- To create a local product that will make use of local based – products.
- To create a building that is environmentally friendly and also aesthetically appealing.

2.1.1 Project Objectives

The objective of this project is to efficiently utilize the resources, manage the time and cost of the project. The project must be completed within the budget of $380 000. The project must be completed within the 11 month period which will start from 15 February 2017 till 31 January 2018.

2.2 Deliverables

To ensure that the project stays on track the deliverables are submitted to approve the continuation of the project. These intermediate checks are listed below.

- *Market Assessment*
  Conducting a market research study with information about possible customers, prefaces and needs.

- *Business evaluation*
  Set up a preliminary budget and cost of the project. Identify the target market

- *Design & development*
  Designing necessary plans and schematizations of the project. Identify the specifications and technical requirements needed for the project.

- *Market*
  Setting up of Responsibility allocations and timetable for the marketing program.

- *Risk Analysis*
  Identify the possible risks that will influence the project negatively and have an effect on the timeline and budget of the project.

- *Develop Design*
  Set up a finalized design with all engineering specifications and that are in alignment with the customers requirements.

- *Identify possible Vendors & set up RFQ*
  Set up a requests for quotes developed and issued.

- *Prototype Development*
  Develop a functional prototype that is based on the final product design This prototype is then evaluated.

- *Process Engineering Plan*
  Set up a supply chain network for a larger scale production.

- *Production plan*
  Manufacturing, engineering and quality control signed approval. Machinery implemented for production. Set up schedule for delivering based on sales forecast.

- *Assess or RFQ*
  Review RFQ's and specify the terms of the contract.

- *Product Launch*
  Product is officially signed off from manufactures and launched into the industry.

- *Production Pilot Test*
  Run a test of the production with normal operation and staff. Assess whether any errors occur or if changes need to be made.

2.3 Milestones

Table 1: Milestones

Milestone	Critical Path Tasks	Task Group	Task Duration (Days)	Simulation Target Date	Baseline Target Date
1	Evaluate Market	Market Assessment	12	27-04-2017	2017-03-31
	Develop Business Opportunity		14		
	Customer Preference Study		21		
	Business Evaluation (NPV, etc.)		4		
2	Design and Development Plan	Design	6	06-06-2017	2017-04-25
	Design Specifications		22		
3	Advertising Campaign	Commercialization	28	14-07-2017	Wed 17-05-17
4	Design Labeling	Design	5	03-08-2017	Tue 17-05-30
	Approve Design		4		
	Initial Engineering Specifications	Engineering	5		
5	Design Verification Activities	Engineering	7	01-09-2017	2017-06-30
	Verification Design Review		4		
	Release Pre-production Specifications		10		
6	Build Functional Model	Engineering	18	27-09-2017	2017-07-18
7	Issue Sample (Production Equivalent)	Procurement	5	24-10-2017	2017-07-31
	Perform Supplier Process Capability	Supplier Quality	14		
8	Process Engineering Plan	Manufacturing	15	14-11-2017	2017-08-04
9	Validation Design Review	Engineering	4	24-11-2017	2017-08-14
	Approve Model Design		4		
10	Qualify Supplier	Supplier Quality	10	08-12-2017	2017-08-14
	Design Transfer Activities	Engineering	7		
	Product Release Meetings	Engineering Quality	3		
11	Develop Production Control Plan	Manufacturing	8,5	08-01-2018	2017-08-31
	Approve Production Parts		5		
	Contracting for Deliveries		8		
12	Submit Production Purchase Order	Manufacturing	2	31-01-2018	2017-09-14
	Production Pilot Test		5		
	Debugging Production System		4		
	Production Release		3		
	Product Launch	Commercialization	3		

2.4 Work Breakdown Structure

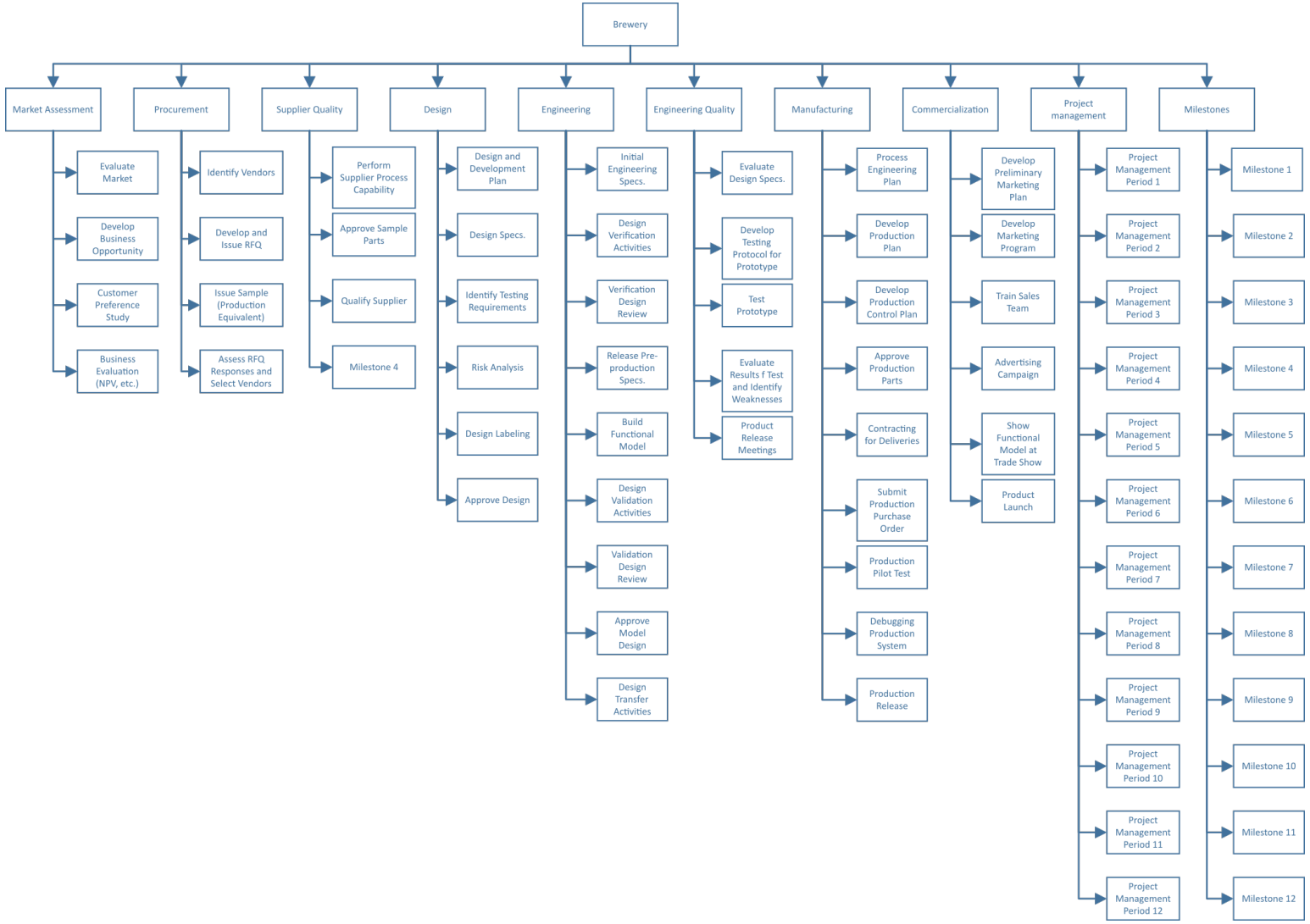

Figure 1: Work Breakdown Structure

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2.5 Work Responsibilities of disciplinary

Sarel Swart – Process Engineer
It will be the work of the process engineer to develop the process that needs to be followed from start to finish of the beer brewery production. This engineer will identify the different ingredients that will have to be added and processes during the development of this product. The engineer will identify the different stages of the process such as malting, mashing and fermentation process.

Biancé Huysamen – Civil Engineer
The engineer will have the responsibility of designing the factory/ building of the brewery. A finished building will be renovated and adapted to fit the purpose of a brewery. It is also necessary to use natural lighting and environmentally friendly materials for the building in the most cost efficient way. Civil engineers are also skilled in communicating with different parties. Huysamen also exhibits good financial qualities and will therefore be responsible for the setting up the budget.

Daniel Robinson & Eduard van der Merwe – Electrical Engineers
The brewery will be controlled by electronic systems that have to be developed and programmed. It will be the responsibility of the engineer to update this and ensure the working of the different machinery of the processes and assist will all the programming of the project. Electrical engineers also are focused on detail and therefore Robinson will act as the Quality engineer whilst van der Merwe will assist with the risk analysis.

Carmen Steyn – Industrial Engineer
The engineer will ensure that the whole project will run smoothly and will have a broad overview of the project. Industrial engineers are skilled in optimizing systems. The engineer will help with the efficiency of the production process. It's important that a logical process is developed and designed. The engineer will also oversee the administrative and financial aspects of the project, since industrial engineers are exposed to the business aspects. Steyn will therefore also focus on Marketing and Commercialization.

Peter Toulouras – Mechanical Engineer
Toulouras will be responsible for the designing of the different machinery, pumps and tanks that will be used in the brewery process. Toulouras also exhibits great leadership, communication and delegation skills and therefore will fulfill the position of Project leader. It is the responsibility of the project leader to ensure that deadlines are met, that the clients are happy and that the project stays within budget and timeline. Therefore Toulouse will assist with running the entire project.

2.6 Technical Requirements

2.6.1 Summary of product

There are four types of beer that need to be manufactured namely: Weiss, Ale and two different flavoured lagers. All the beers utilize the same brewing system with slight alterations needed to create each unique beer. These alterations include different fermenting processes and different grains used. There needs to be four brewing systems working simultaneously in order to produce a sufficient amount of all beers.

2.6.2 Product Requirements

- There should be 4 varieties of beer

- Each beer will be sold in 500ml glasses
- The temperature of the beer should always be carefully monitored from the brewing process until the product is sold to the customer
- Control systems should be put in place in order to monitor and control each stage of the brewing process
- The quality of the final product needs to be of a high standard in order to compete in the respective market
- The final product should be marked at a reasonable price in order to appeal to a wider target market (students)
- The process compromises of 12 stages that need to be carefully executed in order to produce the best possible product

2.6.3 Project Requirements

- Project commences 15^{th} February 2017 and terminates 31^{st} January 2018.
- All the suppliers of the company should be identified and have their capabilities assessed
- The final product must be designed completely. The components should include specifications, risk analysis, design analysis, production process and possible testing requirements.
- A full quality assessment must be done throughout all stages of production of the final product

2.7 Project Limitations

Limitations are either external or internal constraints placed on the project. In this project the limitations will be:

- Cost – the project must be completed within the budget of $380 000.
- Time – the project must be completed within the given time frame.
- Availability of required equipment and ingredients for the brewing process.
- Workforce/employees that will not work as efficiently as they possibly can.
- Unavailability of resources due to unforeseen circumstances.
- Construction limitations due to equipment being produced offsite – Difficulties in its transportation.
- Waiting Period to ensure a valid liquor licence from the National Liquor Authority which is a regulatory body within the Department of Trade and Industry (DTI) responsible for administering The National Liquor Act
- Workforce rights – influence on production and employment costs
- Environmental responsibility - The entire project must have a minimal effect on the environment.
- Specific standards and regulations – The overall project must adhere to all relevant standards and regulations to ensure legal rights.
- Size of the building itself – Since it is a small local brewing company, the company only caters for a limited number of people. This means that there are limited staff members.
- Can only have a limited number of vats that fit inside the building. This means that only a limited amount of beer will be processed at a time, which leads to not being able to supply large quantities of beer at a time.
- Beer brewing takes time – One cannot produce beverages out of a vat too early.
- Construction/building takes time – one needs enough capital for delays.
- Marketing – Needs to be well marketed to ensure that the company makes a profit.
- Health and safety regulations – Needs a fire exit and all the necessary precautions to ensure the safety of everyone in and around the building.
- Limited parking space – Needs enough parking for at least 30% of the customers at all times.
- Enough restrooms will be needed – Takes up space but it is crucial – could lead to unhappy staff that has to clean up after messy students.
- Competition – The price and the taste of the beer have to be on par or better than its rival companies.

2.8 Project Exclusions

These are often referred to as the project boundaries. Exclusions are components of the system in which the project is completed that will not be addressed by the project. These will include

- Maintenance, upgrading and operation of the brewing process.
- The availability of supporting infrastructure at the construction site (water pipes, power lines, access roads etc.)
- The project does not invest in broadening the variety of beers made.
- Municipal approval and authorization on project operations.
- Damage or theft of customer's belongings – Everything is at their own risk.

2.9 Review and Approval

When developing a product or service for a client it is very important to keep client satisfaction in mind. If the client is not happy then there the feasibility of the project in general is compromised. If the project is not feasible there is market for the product or service because the customers will not buy it. This is why it is very important to do a feasibility study early on in the process. The feasibility study must ensure that the customer will be willing to spend money on this product or service. To determine if the product will be feasible the customer must evaluate the following; cost, the benefits of the project, the likelihood that the project will succeed and the reputation of the contractor that is used for the project.

To be able to do a feasibility study all of the phases in the process need to be documented. These documents need to contain diagrams and schematic representations of the entire process and all the steps and resources that were used. By documenting everything it is easier for the customer to review all of the decisions made. It can also make it easier to see why these decisions were made. By making it easier for the customer to review the projects progress the contractor can be ensured of customer satisfaction. Customer approval procedure must be done regularly throughout the process, this ensures that if there are any errors early on in the process, they can be evaluated and alternative solutions can be made. By doing this regularly the contractor can ensure that the client stays satisfied throughout the process. If these errors are picked up early it can save the contractor a lot of money later in the process.

3 Project Baseline Plan

3.1 Baseline Commentary

A baseline following 40% quicker estimates compared to the original simulation estimates, seems to correlate well with the simulated runs.

need more

Table 2: Resource costs per hour

Resources	Rate
Engineer 1	$58.00
Engineer 2	$42.00
Junior Marketing Specialist	$57.00
Junior Product designer	$47.00
Marketing Manager	$95.00
Operation Specialist	$53.00
Quality Engineer	$71.00
Senior product designer	$84.00
Engineer 3	$55.00

4 Project Budget

The estimated budget and estimated hours provided by Sim4 project was used as a guideline of what should be spent during each period to ensure that the project would stay within the budget of $380 000.

To calculate the budget the effectiveness of the resources were brought into consideration. An assumption was made that all resources will work at an 80% effectiveness rate. The estimated hours of each task as well as the safety margin of 80% effectiveness was used to determine the hours worked for each task using the formula provided.

$$Actual\ time\ worked\ (hours)\ =\ \frac{Estimated\ time\ (hours)}{\%effectiveness}$$

The budget forecast is provided in Appendix A.

4.1 Direct Resource Costs

Table 2 provides the estimated cost of the different resources that will be hired. More than one engineer will be hired since the engineer will be working as a Project Manager for the period.

4.2 Training and Events prospective costs

There was decided that during the first period the engineer will be sent for training on project Management. This is to ensure that the engineer will be more effective as a project Manager. There was also decided to hire resources that are cheaper but have less skills and send them for training to improve their skills and effectiveness.

Managerial actions will also be rewarded to resources to improve their work ethic and effictiveness.

Table 3 provides information regarding the different training and managerial actions that will take place during the provided timeline.

4.3 Total Costs

The total cost estimate of each period is listed in Table 4.

Table 3: Training and Managerial Actions costs

Period	Action	Amount of People	Cost	Total Cost
1	Project Management	1	$1,000.00	$1,000.00
	Project Evaluation	1	$1,000.00	$1,000.00
3	Interpersonal training	2	$600.00	$1,200.00
5	company sponsored event	3	$100.00	$300.00
6	Pizza Party	6	$10.00	$60.00
	Process Engineering	1	$600.00	$600.00
8	Management Recognition event	4	$50.00	$200.00
9	Pizza Party	6	$10.00	$60.00
	Negotiation techniques	2	$600.00	$1,200.00
10	Principles of Quality	1	$600.00	$600.00
	Pizza Party	8	$10.00	$80.00
11	Milestone celebration	4	$1,000.00	$4,000.00
				$10,300.00

Table 4: Total estimated costs

Period	Cost of period	Total cumulative cost	Budget Left over
Period 1	$57,920.00	$57,920.00	$322,080.00
Period 2	$43,560.00	$101,480.00	$278,520.00
Period 3	$60,420.00	$161,900.00	$218,100.00
Period 4	$15,535.00	$177,435.00	$202,565.00
Period 5	$19,185.00	$196,620.00	$183,380.00
Period 6	$30,561.25	$227,181.25	$152,818.75
Period 7	$18,865.00	$246,046.25	$133,953.75
Period 8	$17,420.00	$263,466.25	$116,533.75
Period 9	$10,850.00	$274,316.25	$105,683.75
Period 10	$16,990.00	$291,306.25	$88,693.75
Period 11	$27,452.50	$318,758.75	$61,241.25
Period 12	$14,660.00	$333,418.75	$46,581.25

5 Risk Analysis

All risks pertaining to the simulator and product were identified and evaluated from project analogy. These risks were classified as internal or external based on the risk source, with 25 risk identified for each category. These risks were compiled and analysed in a special risk management meeting wherein the risks were identified and allocated to two group members to analyse in further detail. The minutes of the meeting may be found in Appendix F.

A comprehensive summary of the project risk may be found in Appendix B.1. The risk rank, management strategy, and frequency are shown for each risk identified. The risk management strategy are classified as risk acceptance, risk control, risk avoidance, and contingency plan. This includes a more detailed summary of the risk response for each risk.

The risks were identified through project analogy wherein the risks were classified according risk source. Risk assessment was carried out using a double variable five point scale method. The two factors considered were the probability of the risk occurring, and the impact of the realisation of the risk on the project. The evaluation scale ranged from very high (5) to very low(1). These factors are combined by multiplication to yield an overall rank for each risk. Table B.2 shows the risk evaluation matrix used with colour codes used to indicate the severity of the risk.

Appendices

A Budget Documentation and Analysis

A.1 Simulated Task Estimations

PERIOD 1

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Evaluate market	Market Assessment	$4 800,00	96	$50,00
Develop Business opportunity	Market Assessment	$10 080,00	112	$90,00
Customer preference study	Market Assessment	$8 400,00	168	$50,00
Business evaluation (NPV, etc.)	Market Assessment	$4 000,00	32	$125,00
Project Management Period 1	Project Management	$25 000,00	200	$125,00
		$52 280,00		

Total cost	$52 280,00
Budget left over	$327 720,00

PERIOD 2

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Design and development plan	Design	$2 400,00	48	$50,00
Design specs.	Design	$8 800,00	176	$50,00
Develop preliminary marketing plan	Commercialization	$3 600,00	40	$90,00
Develop marketing program	Commercialization	$10 800,00	120	$90,00
Project Management Period 2	Project Management	$14 000,00	112	$125,00
		$39 600,00		

Total cost	$91 880,00
Budget left over	$288 120,00

Figure 2: Budget Forecast from simulation (period 1 and 2)

PERIOD 3

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Identify testing requirements	Design	$4 000,00	80	$50,00
Risk analysis	Design	$10 000,00	80	$125,00
Train sales team	Commercialization	$8 800,00	176	$50,00
Advertising campaign	Commercialization	$11 200,00	224	$50,00
Project Management Period 3	Project Management	$14 000,00	112	$125,00
		$48 000,00		

Total cost	$139 880,00
Budget left over	$240 120,00

PERIOD 4

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Design labeling	Design	$2 000,00	40	$50,00
Approve design	Design	$1 600,00	32	$50,00
Initial engineering specs.	Engineering	$2 000,00	40	$50,00
Project Management Period 4	Project Management	$13 000,00	104	$125,00
		$18 600,00		

Total cost	$158 480,00
Budget left over	$221 520,00

Figure 3: Budget Forecast from simulation (period 3 and 4)

PERIOD 5

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Design verification activities	Engineering	$4 200,00	56	$75,00
Verification design review	Engineering	$1 600,00	32	$50,00
Release pre-production specifications	Engineering	$4 000,00	80	$50,00
Project Management Period 5	Project Management	$15 000,00	120	$125,00
		$24 800,00		
Total cost	$183 280,00			
Budget left over	$196 720,00			

PERIOD 6

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Identify vendors	Procurement	$2 800,00	56	$50,00
Develop and Issue RFQ	Procurement	$2 400,00	48	$50,00
Build functional model	Engineering	$10 800,00	144	$75,00
Evaluate design specifications	Engineering Quality	$4 000,00	80	$50,00
Project Management Period 6	Project Management	$9 000,00	72	$125,00
		$29 000,00		
Total cost	$212 280,00			
Budget left over	$167 720,00			

Figure 4: Budget Forecast from simulation (period 5 and 6)

PERIOD 7

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Issue sample (production equivalent)	Procurement	$3 000,00	40	$75,00
Perform supplier process capability	Supplier Quality	$5 600,00	112	$50,00
Develop testing protocol for prototype	Engineering Quality	$3 200,00	64	$50,00
Project Management Period 7	Project Management	$11 000,00	88	$125,00
		$22 800,00		

Total cost	$235 080,00
Budget left over	$144 920,00

PERIOD 8

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Approve sample parts	Supplier Quality	$4 800,00	64	$75,00
Design validation activities	Engineering	$2 000,00	40	$50,00
Test prototype	Engineering Quality	$4 000,00	80	$50,00
Process engineering plan	Manufacturing	$6 000,00	120	$50,00
Show functional model at trade show	Commercialization	$2 160,00	24	$90,00
Project Management Period 8	Project Management	$3 000,00	24	$125,00
		$21 960,00		

Total cost	$257 040,00
Budget left over	$122 960,00

Figure 5: Budget Forecast from simulation (period 7 and 8)

PERIOD 9

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Validation design review	Engineering	$4 000,00	32	$125,00
Approve model design	Engineering	$2 400,00	32	$75,00
aluate results of tests and identify weakn	Engineering Quality	$2 400,00	48	$50,00
Project Management Period 9	Project Management	$4 000,00	32	$125,00
		$12 800,00		

Total cost	$269 840,00
Budget left over	$110 160,00

PERIOD 10

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Qualify Supplier	Supplier Quality	$4 000,00	80	$50,00
Design transfer activities	Engineering	$4 200,00	56	$75,00
Product release meetings	Engineering Quality	$3 000,00	24	$125,00
Develop production plan	Manufacturing	$2 400,00	48	$50,00
Project Management Period 10	Project Management	$5 000,00	40	$125,00
		$18 600,00		

Total cost	$288 440,00
Budget left over	$91 560,00

Figure 6: Budget Forecast from simulation (period 9 and 10)

PERIOD 11

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Assess RFQ responses and select vendo	Procurement	$4 000,00	80	$50,00
Develop production control plan	Manufacturing	$3 400,00	68	$50,00
Approve production parts	Manufacturing	$2 000,00	40	$50,00
Contracting for deliveries	Manufacturing	$3 200,00	64	$50,00
Project Management Period 11	Project Management	$13 000,00	104	$125,00
		$25 600,00		

Total cost	$314 040,00
Budget left over	$65 960,00

PERIOD 12

Simulation Estimate

TASK NAME	TYPE	Estimated Cost ($)	Estimated Time (hours)	Estimated Cost per Hour
Submit production purchase order	Manufacturing	$800,00	16	$50,00
Production pilot test	Manufacturing	$2 000,00	40	$50,00
Debugging production system	Manufacturing	$1 600,00	32	$50,00
Production release	Manufacturing	$1 200,00	24	$50,00
Product launch	Commercialization	$3 000,00	24	$125,00
Project Management Period 12	Project Management	$10 000,00	80	$125,00
		$18 600,00		

Total cost	$332 640,00
Budget left over	$47 360,00

Figure 7: Budget Forecast from simulation (period 11 and 12)

A.2 Direct Resource, Managerial and Training Costs

PERIOD 1

Estimated Budget

Devision	Est Hours	RESOURCES: Assigned 1 Resource name	Hours worked	% effective	Actual Hours	Rate	Cost	Assigned 2 Resource name	Hours worked	% effective	Actual Hours	Rate	Cost	Total cost	MANAGERIAL Actions: Action	People	Cost	Total Cost
Project Management	200	Engineer 1	200	90	222,222	$58,00	$12 888,89							$12 888,89	Project Man	1	$1 000,00	$1 000,00
Market Assesment	100	Marketing Manage	100	100	100	$95,00	$9 500,00	Junior Marketing Sp	100	100	100	$57,00	$5 700,00	$15 200,00	Project Eval	1	$1 000,00	$1 000,00
Market Assesment	112	Marketing Manage	112	80	140	$95,00	$13 300,00							$13 300,00				
Market Assesment	32	or Marketing Speci	32	80	40	$57,00	$2 280,00							$2 280,00				
Market Assesment	96	or Marketing Speci	96	80	120	$57,00	$6 840,00							$6 840,00				
														$50 508,89				$2 000,00

Total cost	$52 508,89
Budget left over	$327 491,11

PERIOD 2

Estimated Budget

Devision	Est Hours	RESOURCES: Assigned 1 Resource name	Hours worked	% effective	Actual Hours	Rate	Cost	Assigned 2 Resource name	Hours worked	% effective	Actual Hours	Rate	Cost	Total cost	MANAGERIAL Actions: Action	Duration		Total Cost
Project Management	112	Engineer 1	112	90	124,444	$58,00	$7 217,78							$7 217,78				
Design	48	nior product design	24	100	24	$84,00	$2 016,00	Junior Product desi	24	100	24	$47,00	$1 128,00	$3 144,00				
Design	176	nior product design	88	80	110	$84,00	$9 240,00	Junior Product designe	88	100	88	$47,00	$4 136,00	$13 376,00				
Commercialization	40	Marketing Manage	20	80	25	$95,00	$2 375,00	Junior Marketing Speci	20	100	20	$57,00	$1 140,00	$3 515,00				
Commercialization	96	Marketing Manage	70	80	87,5	$95,00	$8 312,50	Junior Marketing Speci	70	100	70	$57,00	$3 990,00	$12 302,50				
														$39 555,28				

Total cost	$92 064,17
Budget left over	$287 935,83

Figure 8: Budget Forecast from estimation (period 1 and 2)

PERIOD 3

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision	Est Hours	Assigned 1						Assigned 2						Total cost	Action	peopl	cost	Total Cost
		Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost					
Project Managemer	112	Engineer 1	112	90	124,444	$58,00	$7 217,78							$7 217,78	Interperson	2	$600,00	$1 200,00
Design	80	nior product design	40	100	40	$84,00	$3 360,00	Junior Product desi	40	70	57,142857	$47,00	$2 685,71	$6 045,71				
Design	80	nior product design	40	80	50	$84,00	$4 200,00	Junior Product designe	40	80	50	$47,00	$2 350,00	$6 550,00				
Commercialization	176	Marketing Manage	88	90	97,7778	$95,00	$9 288,89	Junior Marketing Speci	88	80	110	$57,00	$6 270,00	$15 558,89				
Commercialization	224	Marketing Manage	112	80	140	$95,00	$13 300,00	Junior Marketing Speci	112	80	140	$57,00	$7 980,00	$21 280,00				
														$56 652,38				**$1 200,00**

Total cost	**$149 916,55**
Budget left over	**$230 083,45**

PERIOD 4

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision	Est Hours	Assigned 1						Assigned 2						Total cost	Action			Total Cost
		Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost					
Project Managemer	104	Engineer 1	104	85	122,353	$58,00	$7 096,47							$7 096,47				
Design	40	nior product design	20	80	25	$84,00	$2 100,00	Junior Product desi	20	70	28,571429	$47,00	$1 342,86	$3 442,86				
Design	32	nior product design	16	85	18,8235	$84,00	$1 581,18	Junior Product designe	16	80	20	$47,00	$940,00	$2 521,18				
Engineering	40	Engineer 2	40	90	44,4444	$42,00	$1 866,67							$1 866,67				
							$0,00							$0,00				
														$14 927,17				

Total cost	**$164 843,72**
Budget left over	**$215 156,28**

Figure 9: Budget Forecast from estimation (period 3 and 4)

PERIOD 5

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision		Assigned 1						Assigned 2						Total cost				
	Est Hours	Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost		Action			Total Cost
Project Managemer	120	Engineer 1	120	90	133,333	$58,00	$7 733,33					FALSE		$7 733,33	compony sp	3	$100,00	$300,00
Engineering	56	Engineer 2	28	85	32,9412	$42,00	$1 383,53	Engineer 3	28	70	40	$55,00	$2 200,00	$3 583,53				
Engineering	32	Engineer 2	16	85	18,8235	$42,00	$790,59	Engineer 3	16	80	20	$55,00	$1 100,00	$1 890,59				
Engineering	80	Engineer 2	40	90	44,4444	$42,00	$1 866,67	Engineer 3	40	80	50	$55,00	$2 750,00	$4 616,67				
							$0,00							$0,00				
														$17 824,12				$300,00

Total cost	$182 967,84
Budget left over	$197 032,16

PERIOD 6

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision		Assigned 1						Assigned 2						Total cost				
	Est Hours	Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost		Action			Total Cost
Project Managemer	72	Engineer 1	72	90	80	$58,00	$4 640,00							$4 640,00	Pizza Party	6	$10,00	$60,00
Procurement	56	Marketing Manage	28	85	32,9412	$95,00	$3 129,41	Junior Product desi	28	80	35	$47,00	$1 645,00	$4 774,41	Process Eng	1	$600,00	$600,00
Procurement	48	Marketing Manage	48	85	56,4706	$95,00	$5 364,71							$5 364,71				
Engineering	114	Engineer 2	57	90	63,3333	$42,00	$2 660,00	Engineer 3	57	80	71,25	$55,00	$3 918,75	$6 578,75				
Engineering Qualit	80	Quality Engineer	80	85	94,1176	$71,00	$6 682,35							$6 682,35				
														$28 040,22				$660,00

Total cost	$211 668,06
Budget left over	$168 331,94

Figure 10: Budget Forecast from estimation (period 5 and 6)

PERIOD 7

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision	Est Hours	Assigned 1						Assigned 2						Total cost	Action			Total Cost
		Resource name	urs work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost					
Project Managemer	88	Engineer 1	88	90	97,7778	$58,00	$5 671,11							$5 671,11				
Procurement	40	Marketing Specialis	20	85	23,5294	FALSE	$0,00	Junior Product desi	20	80	25	$47,00	$1 175,00	$1 175,00				
Engineering Quality	64	Quality Engineer	32	85	37,6471	$71,00	$2 672,94	Engineer 2	32	85	37,647059	$42,00	$1 581,18	$4 254,12				
Supplier quality	112	Engineer 2	56	90	62,2222	$42,00	$2 613,33	Engineer 3	56	80	70	$55,00	$3 850,00	$6 463,33				
							$0,00							$0,00				
														$17 563,56				

Total cost	$229 231,62
Budget left over	$150 768,38

PERIOD 8

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision	Est Hours	Assigned 1						Assigned 2						Total cost	Action			Total Cost
		Resource name	urs work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost					
Project Managemer	24	Engineer 1	24	90	26,6667	$58,00	$1 546,67					FALSE		$1 546,67	Manageme	4	$50,00	$200,00
Supplier Quality	64	Engineer 2	32	85	37,6471	$42,00	$1 581,18	Engineer 3	32	80	40	$55,00	$2 200,00	$3 781,18				
Engineering	40	Engineer 2	20	85	23,5294	$42,00	$988,24	Engineer 3	20	85	23,529412	$55,00	$1 294,12	$2 282,35				
Engineering Quality	80	Quality Engineer	40	90	44,4444	$71,00	$3 155,56	Engineer 2	40	80	50	$42,00	$2 100,00	$5 255,56				
Manufacturing	120	nior Product desig	60	91	65,9341	$47,00	$3 098,90	Senior product designe	60	81	74,074074		$0,00	$3 098,90				
Commercialization	24	or Marketing Speci	24	92	26,087	$57,00	$1 486,96							$1 486,96				
														$15 964,65				$200,00

Total cost	$245 396,27
Budget left over	$134 603,73

Figure 11: Budget Forecast from estimation (period 7 and 8)

PERIOD 9

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision	Est Hours	Assigned 1						Assigned 2						Total cost	Action			
		Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost					Total Cost
Project Managemer	32	Engineer 1	32	80	40	$58,00	$2 320,00							$2 320,00	Pizza Party	6	$10,00	$60,00
Engineering	32	Engineer 2	16	85	18,8235	$42,00	$790,59	Engineer 3	16	80	20	$55,00	$1 100,00	$1 890,59	Negotiatior	2	$600,00	$1 200,00
Engineering	32	Engineer 2	16	85	18,8235	$42,00	$790,59	Engineer 3	16	70	22,857143	$55,00	$1 257,14	$2 047,73				
Engineering Quality	48	Quality Engineer	24	70	34,2857	$71,00	$2 434,29	Engineer 2	24	80	30	$42,00	$1 260,00	$3 694,29				
														$9 952,61				$1 260,00

Total cost	**$256 608,88**
Budget left over	**$123 391,12**

PERIOD 10

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision	Est Hours	Assigned 1						Assigned 2						Total cost	Action			
		Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost					Total Cost
Project Managemer	40	Engineer 1	40	80	50	$58,00	$2 900,00							$2 900,00	Principles c	1	$600,00	$600,00
Supplier Engineer	80	peration Specialis	40	85	47,0588	$53,00	$2 494,12	Junior Marketing Sp	40	85	47,058824	$57,00	$2 682,35	$5 176,47	Pizza Party	8	$10,00	$80,00
Engineering	56	Engineer 2	28	85	32,9412	$42,00	$1 383,53	Engineer 3	28	70	40	$55,00	$2 200,00	$3 583,53				
Engineering Quality	24	Quality Engineer	12	70	17,1429	$71,00	$1 217,14	Engineer 2	12	80	15	$42,00	$630,00	$1 847,14				
Manufacturing	48	nior Product desigr	48	70	68,5714	$47,00	$3 222,86							$3 222,86				
														$16 730,00				$680,00

Total cost	**$274 018,88**
Budget left over	**$105 981,12**

Figure 12: Budget Forecast from estimation (period 9 and 10)

PERIOD 11

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision		Assigned 1						Assigned 2						Total cost				
	Est Hours	Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost		Action			Total Cost
Project Managemer	104	Engineer 1	104	75	138,667	$58,00	$8 042,67							$8 042,67	Milestone	4	$1 000,00	$4 000,00
Procurement	80	or Marketing Speci	80	80	100	$57,00	$5 700,00							$5 700,00				
Manufacturing	68	Engineer 2	34	85	40	$42,00	$1 680,00	Operation Specialist	34	80	42,5	$53,00	$2 252,50	$3 932,50				
Manufacturing	40	Engineer 2	20	70	28,5714	$42,00	$1 200,00	Operation Specialist	20	80	25	$53,00	$1 325,00	$2 525,00				
Manufacturing	64	Engineer 2	32	70	45,7143	$42,00	$1 920,00	Operation Specialist	32	75	42,666667	$53,00	$2 261,33	$4 181,33				
														$24 381,50				$4 000,00

Total cost	$302 400,38
Budget left over	$77 599,62

PERIOD 12

Estimated Budget

		RESOURCES													MANAGERIAL Actions			
Devision		Assigned 1						Assigned 2						Total cost				
	Est Hours	Resource name	ours work	% effectiv	ctual Hou	Rate	Cost	Resource name	lours worke	% effective	Actual Hours	Rate	Cost		Action			Total Cost
Project Managemer	80	Engineer 1	80	75	106,667	$58,00	$6 186,67							$6 186,67				
Commercializatior	24	peration Specialis	24	80	30	$53,00	$1 590,00							$1 590,00				
Manufacturing	16	peration Specialis	16	85	18,8235	$53,00	$997,65							$997,65				
Manufacturing	40	or Marketing Speci	40	70	57,1429	$57,00	$3 257,14							$3 257,14				
Manufacturing	32	nior product desigr	32	70	45,7143	$84,00	$3 840,00							$3 840,00				
Manufacturing	24	Engineer 2	24	70	34,2857	$42,00	$1 440,00											
														$15 871,46				

Total cost	$318 271,83
Budget left over	$61 728,17

Figure 13: Budget Forecast from estimation (period 11 and 12)

B Risk Register

B.1 Risk Assessment Plan

Table 5: Internal Project Risks

Risks	Probability	Impact	Risk Rank	Risk Response Strategy	Risk Management	Expected Frequency
Overestimation of resource effectiveness leading to delays	4	4	16	Contingency Plan	Reassess resource capability and change taks allocation strategy.	Every Period
Budget Cuts	4	4	16	Contingency Plan	Revise budget, and redirect costs where necessary. Allocate funds for unexpected costs in budget.	Once-off
Mismanagement causing demotivation and inefficiency	4	3	12	Contingency Plan	Take managerial action. Consider reallocating or terminating resource employment.	Quarterly
Idle/Un-allocated resources	3	4	12	Contingency Plan	Consider firing idle resources.	Monthly
Product causes legal liability	2	5	10	Risk Avoidance	Maintain strict product quality procedures and tests	Once-off
Bad working relationships between resources.	3	3	9	Contingency Plan	Take managerial action. Consider reallocating or terminating resource employment.	Monthly
Low paid workers causing low effectiveness	3	3	9	Contingency Plan	Allocate funds for pay raises if necessary.	Yearly
Inaccurate cost estimate	3	3	9	Risk Avoidance	Add contingency to budget. Use locally available equipment instead of importing.	Once-off
Resources inexperienced	3	3	9	Contingency Plan	Pair inexperienced resources up to allow for lower efficiency	Quaterly
Unflexible design	3	3	9	Contingency Plan	Identify problematic process areas, and consult specialist for possible solutions.	Once-off
Recruiting process incurrs delays	3	3	9	Risk Avoidance	Ensure critical task resources are hired early to account for a possible delay.	Yearly
Extended deadline	2	4	8	Risk Acceptance	Evaluate influence on costs and take appropriate action.	Once-off
Low communications within project team	2	4	8	Risk Avoidance	Set up standard communication platforms.	Once-off
Design fails technical review	2	4	8	Contingency Plan	Allocate funds to accomodate for project delays	Once-off
Monitoring and control components lack stability	2	4	8	Contingency Plan	Include testing procedure to identify and assess control system performance. Allocate funding for project delays.	Once-off
Unreliable control system	2	4	8	Contingency Plan	Include testing procedure to identify and assess control system performance. Allocate funding for project delays.	Once-off
Resource training inadequate	2	3	6	Risk Avoidance	Send multiple resources for the same training.	Monthly
Stake holders become disengaged	2	3	6	Risk Control	Meet up with stakeholders and give progress of product development.	Yearly
Monitoring and control components are overengineered	2	3	6	Risk Avoidance	Maintain conformity to international standards.	Once-off
Low moral among resources	1	4	4	Contingency Plan	Tank managerial action (pizza party)	Monthly
Infeasible design	1	4	4	Risk Control	Extend design period. Allocate more resources.	Once-off
Design not fit for purpose	1	4	4	Riks Avoidance	Set up a testing procedure to identify problematic areas.	Once-off
Monitoring and control components not fit for purpose	1	4	4	Risk Avoidance	Set up a testing procedure to identify problematic areas.	Once-off
Loss of intellectual property	1	3	3	Risk Avoidance	Inform resources on a need-to-know basis regarding processing specifics.	Once-off

Table 6: External Project Risks

Risks	Probability	Impact	Risk Rank	Risk Response Strategy	Risk Management	Expected Frequency
Legal & regulatory changes	4	5	20	Risk Avoidance	Anticipate legal and regulatory changes, and make provisions based on forecasts. Seek professional legal advice.	Yearly
Strike causes delays	4	4	16	Contingency Plan	Assessing the time lost, if any, and determine strategy to make-up for delay in next period. Allocate funds for unexpected costs in budget.	Once-off
Low product demand	3	5	15	Risk Control	Develop marketing strategy for product promotion	Once-off
Low quality infrastructure	3	4	12	Risk Control	Work closely with manicipality and surrounding businesses for improvement of relevant infrastructure.	Once-off
Market changes	4	3	12	Risk Control	Monitor market trends, and keep design flexible for process and supplier changes	Yearly
Vendors start late	3	4	12	Contingency Plan	Allocate funds to accomodate for project delays	Once-off
Required resources not available	2	5	10	Contingency Plan	Hire alternative resources, and send for appropriate training.	Once-off
Response to RFP of low quality	3	3	9	Risk Control	Send RFP to international companies to assess alternatives proposals.	Once-off
Low service quality	3	3	9	Contingency Plan	Allocate reserve funds for delay. Consider changing service provider.	Once-off
Training delay	3	3	9	Risk Acceptance	Allow extra time for training.	Once-off
Sudden property price increase	3	3	9	Contingency Plan	Consider hiring options for brewery site.	Yearly
Power Failures	2	4	8	Contingency Plan	Check load shedding notifications. Hire generators when neccessary.	Monthly
Vendor components fail to meet requirements	2	4	8	Contingency Plan	Make contact with another vendor as soon as possible. Allocate funds for unwanted costs. Seek legal advice.	Once-off
Low quality vendor components	2	4	8	Contingency Plan	Send items back to vendor if they do not adhere to requiments in contract. Allocate funds for project delays.	Once-off
Unplanned leave for resources	2	4	8	Contingency Plan	Consider re-allocation of available resources or hiring tempory resources.	Once-off
Demage to facilities due to fire	2	4	8	Risk Avoidance	Install fire exstinghuisers throughout facililties	Once-off
Petrol Price Increases	4	2	8	Contingency Plan	Consider searching for closer main suppliers.	Yearly
Contract terms and price unreasonable	2	3	6	Risk Control	Make contact with other local or international suppliers.	
Unexpected legal action against company causing delays and cost increases.	2	3	6	Risk Acceptance	Allocate funds for unforeseen cost increaases.	Once-off
Unexpected brewery site change.	2	3	6	Contingency Plan	Keep list of possible alternative sites for brewery.	Yearly
Exchange rate	4	1	4	Risk Avoidance	Provide reserve fund for cost increases associated with exchange rate instability. Use local vendors.	Once-off
No response to RFP	1	3	3	Contingency Plan	Extend RFP internationally to possibly import.	Once-off
Conflict between vendors	1	3	3	Risk Avoidance	Review contracts and schedules to avoid clashes between vendors caused by misanderstandings.	Once-off
Material Cost Increases for Prototype	3	1	3	Risk Control	Explore other material suppliers.	Once-off

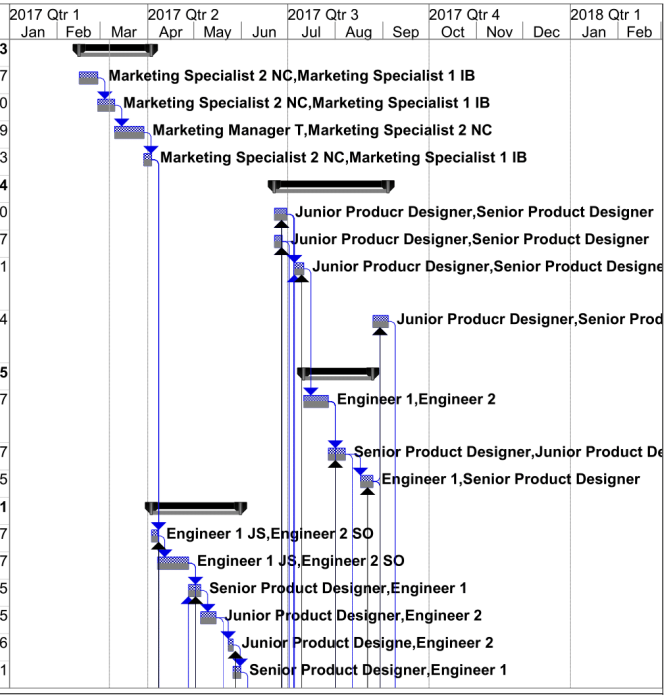
B.2 Risk Classification

Table 7: Risk Matrix

Probability \ Impact	**VL**	**L**	**M**	**H**	**VH**
VH	M	M	H	H	VH
H	L	M	M	H	H
M	L	L	M	M	H
L	VL	L	L	M	M
VL	VL	VL	L	L	M

C Baseline

ID	Task Name	Duration	Start	Finish
1	**Market Assessment**	33 days	**Wed 17/02/15**	**Mon 17/04/03**
2	Evaluate market	8 days	Wed 17/02/15	Mon 17/02/27
3	Develop Business opportunity	9 days	Mon 17/02/27	Fri 17/03/10
4	Customer preference study	13 days	Fri 17/03/10	Wed 17/03/29
5	Business evaluation (NPV, etc.)	3 days	Wed 17/03/29	Mon 17/04/03
6	**Procurement**	52 days	**Thu 17/06/22**	**Mon 17/09/04**
7	Identify vendors	6 days	Thu 17/06/22	Fri 17/06/30
8	Develop and Issue RFQ	3 days	Thu 17/06/22	Tue 17/06/27
9	Issue sample (production equivalent)	4 days	Wed 17/07/05	Tue 17/07/11
10	Assess RFQ responses and select vendors	6 days	Fri 17/08/25	Mon 17/09/04
11	**Supplier Quality**	33 days	**Tue 17/07/11**	**Fri 17/08/25**
12	Perform supplier process capability	12 days	Tue 17/07/11	Thu 17/07/27
13	Approve sample parts	7 days	Thu 17/07/27	Mon 17/08/07
14	Qualify Supplier	6 days	Thu 17/08/17	Fri 17/08/25
15	**Design**	42 days	**Mon 17/04/03**	**Wed 17/05/31**
16	Design and development plan	4 days	Mon 17/04/03	Fri 17/04/07
17	Design specs.	14 days	Fri 17/04/07	Thu 17/04/27
18	Identify testing requirements	6 days	Thu 17/04/27	Fri 17/05/05
19	Risk analysis	6 days	Fri 17/05/05	Mon 17/05/15
20	Design labeling	3 days	Tue 17/05/23	Fri 17/05/26
21	Approve design	3 days	Fri 17/05/26	Wed 17/05/31



Project: 17770_5274_215201791514A
Date: Tue 17/03/07

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

Page 1

Figure 14: Baseline Part 1

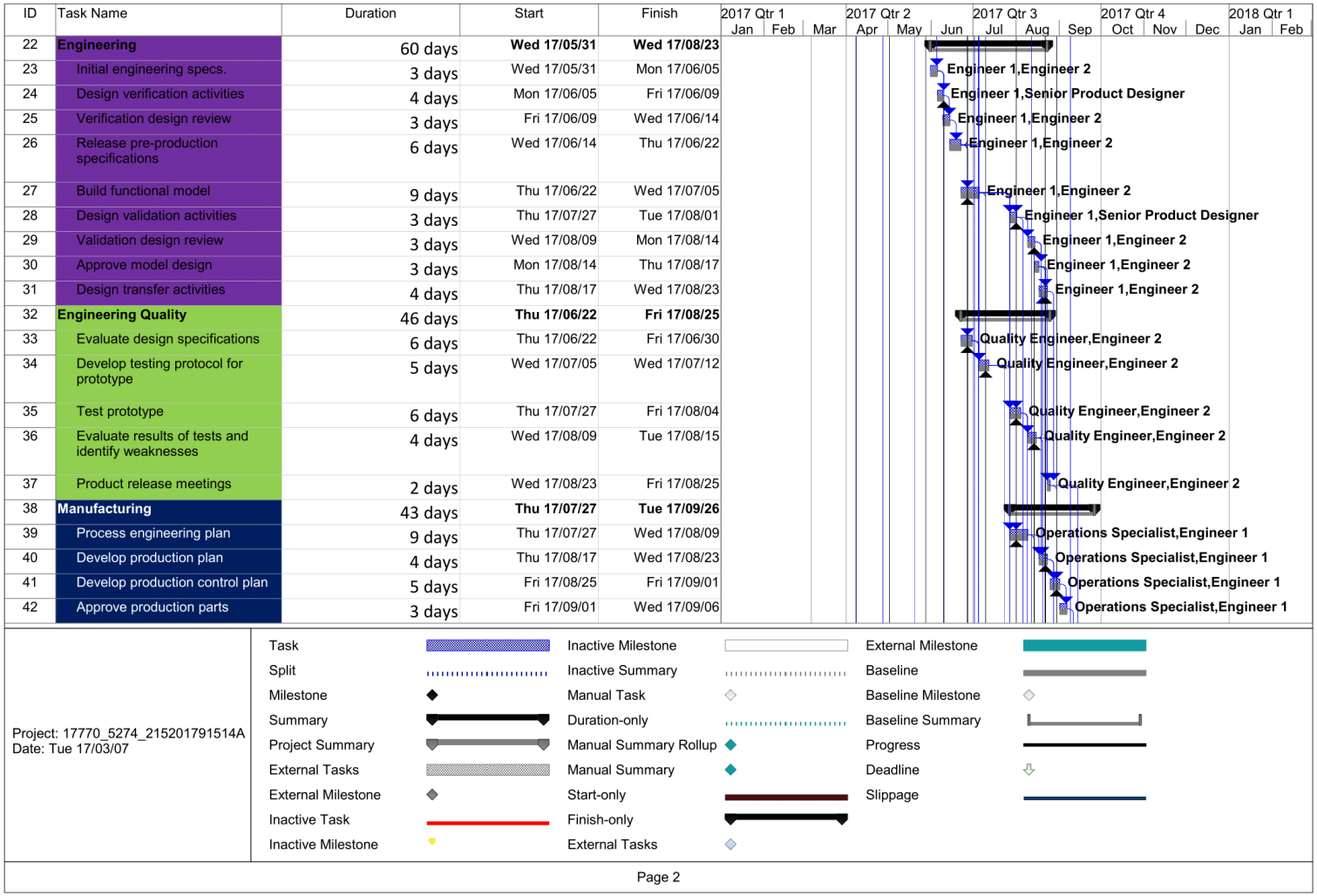


Figure 15: Baseline Part 2

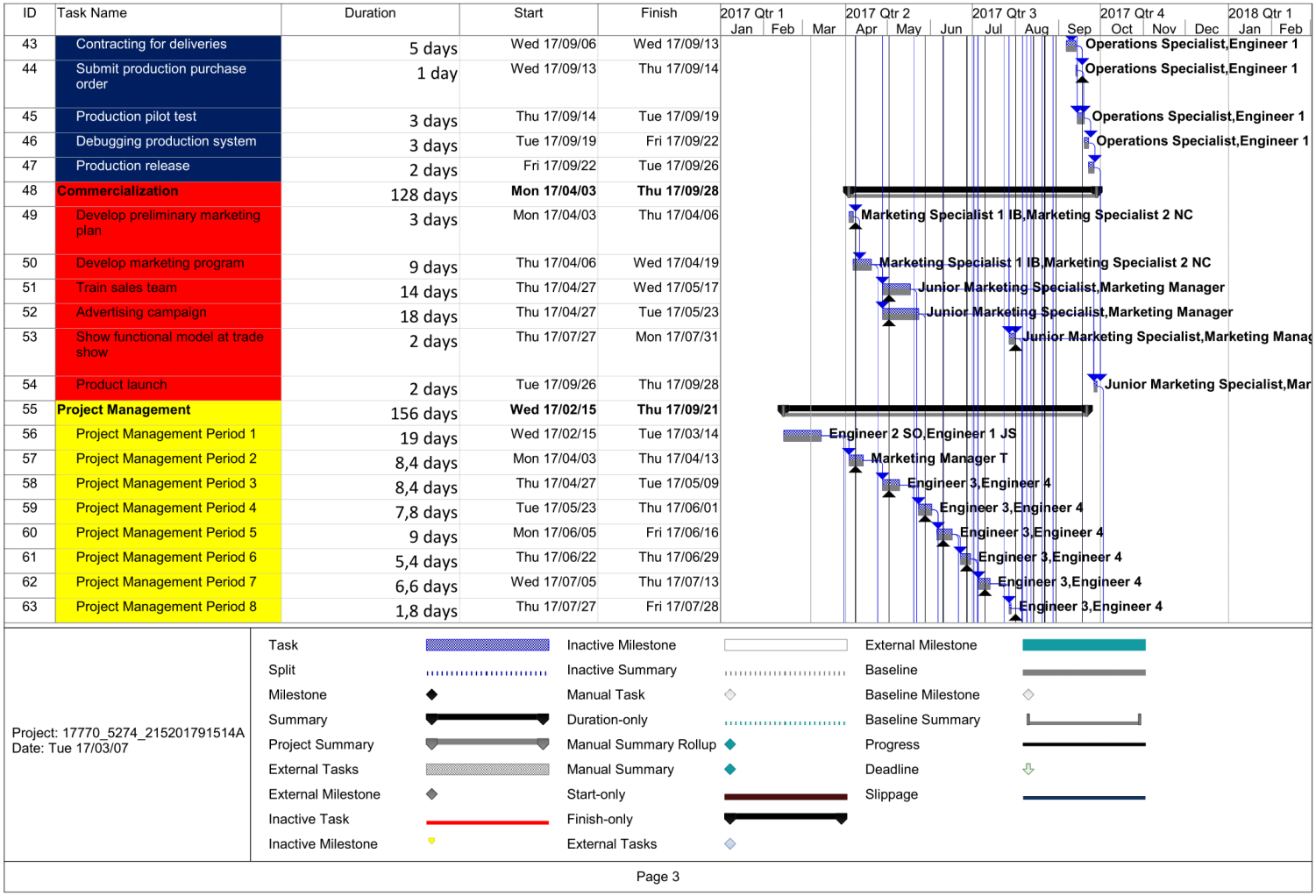


Figure 16: Baseline Part 3

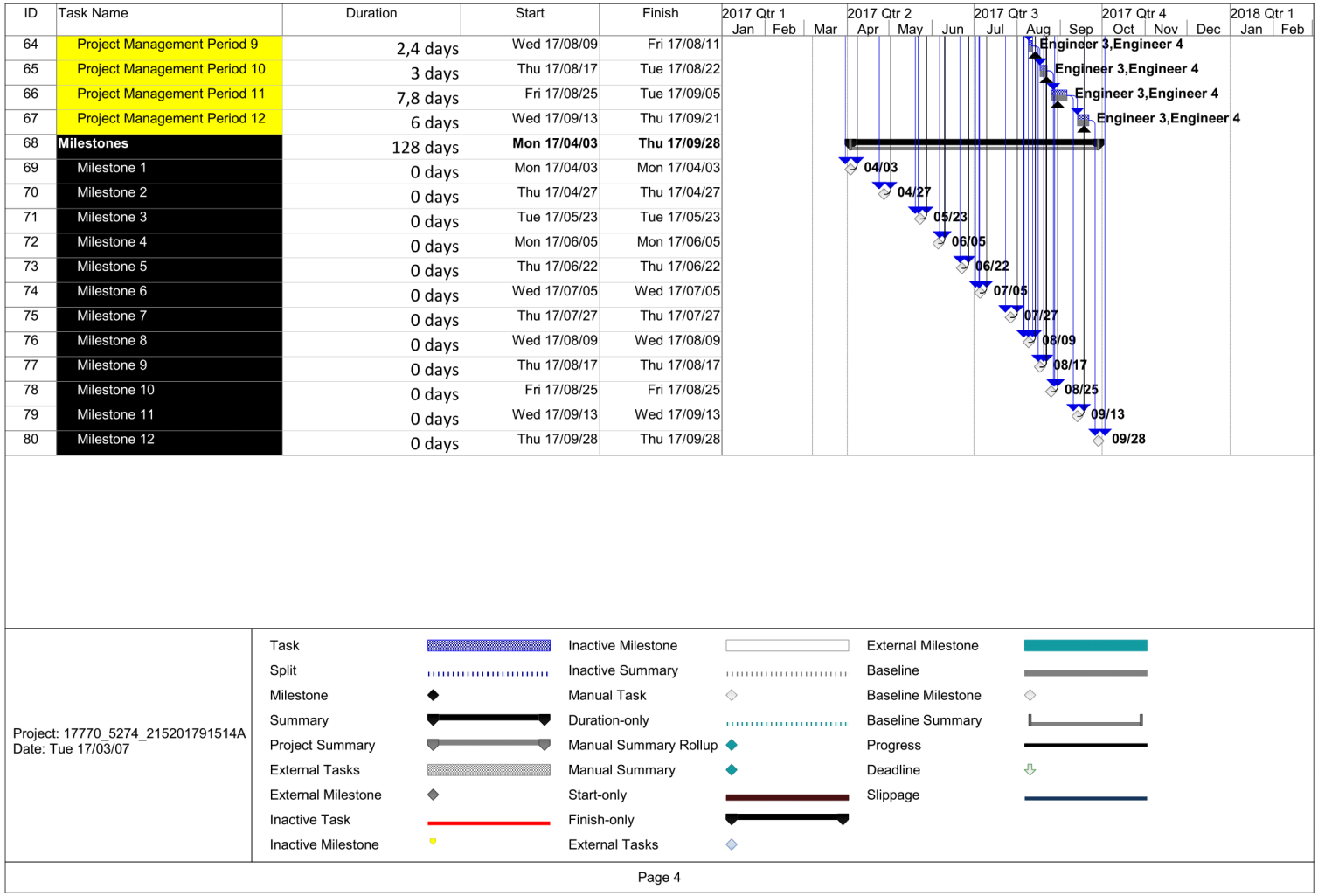


Figure 17: Baseline Part 4

D Network Diagram

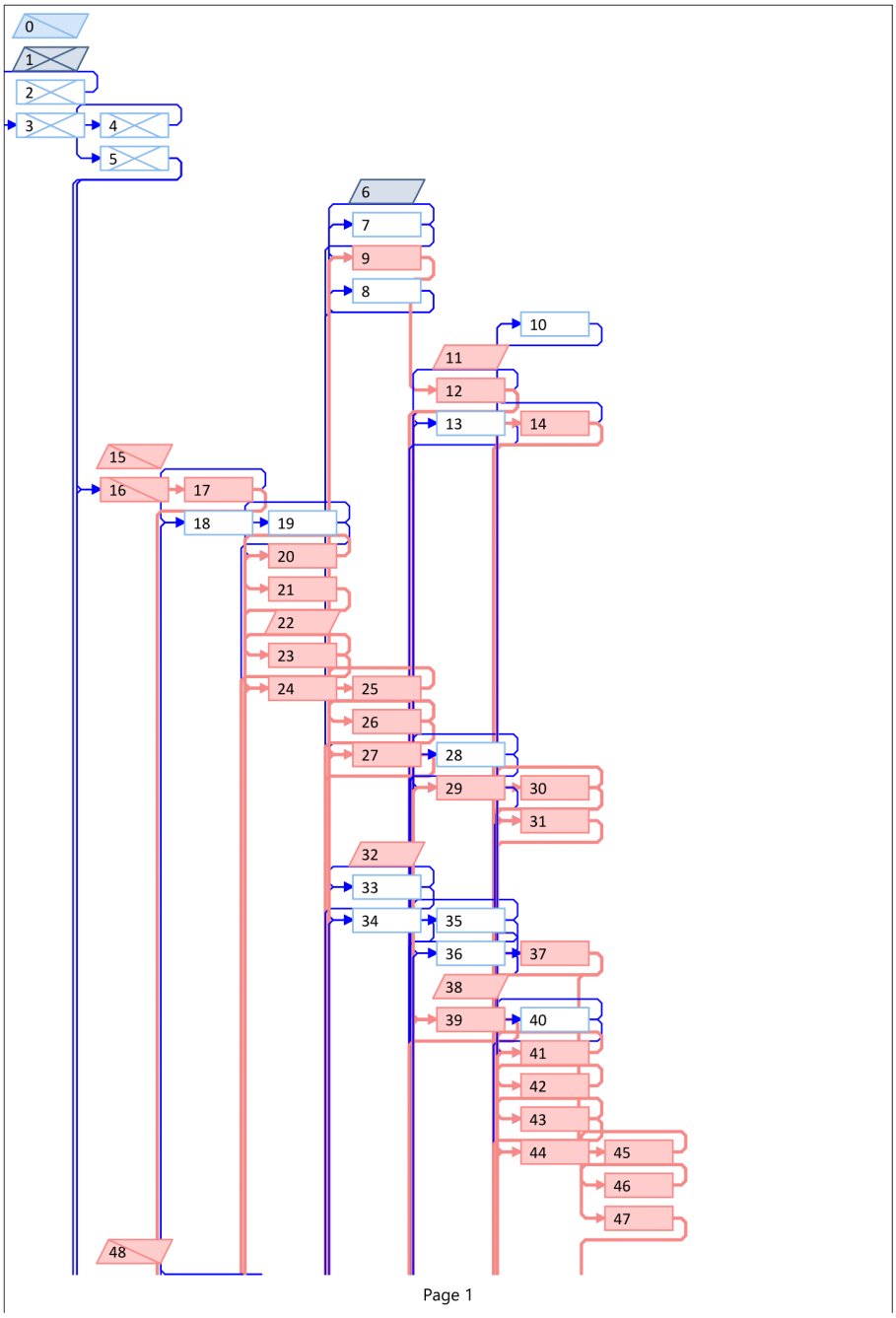


Figure 18: Network Diagram Part 1

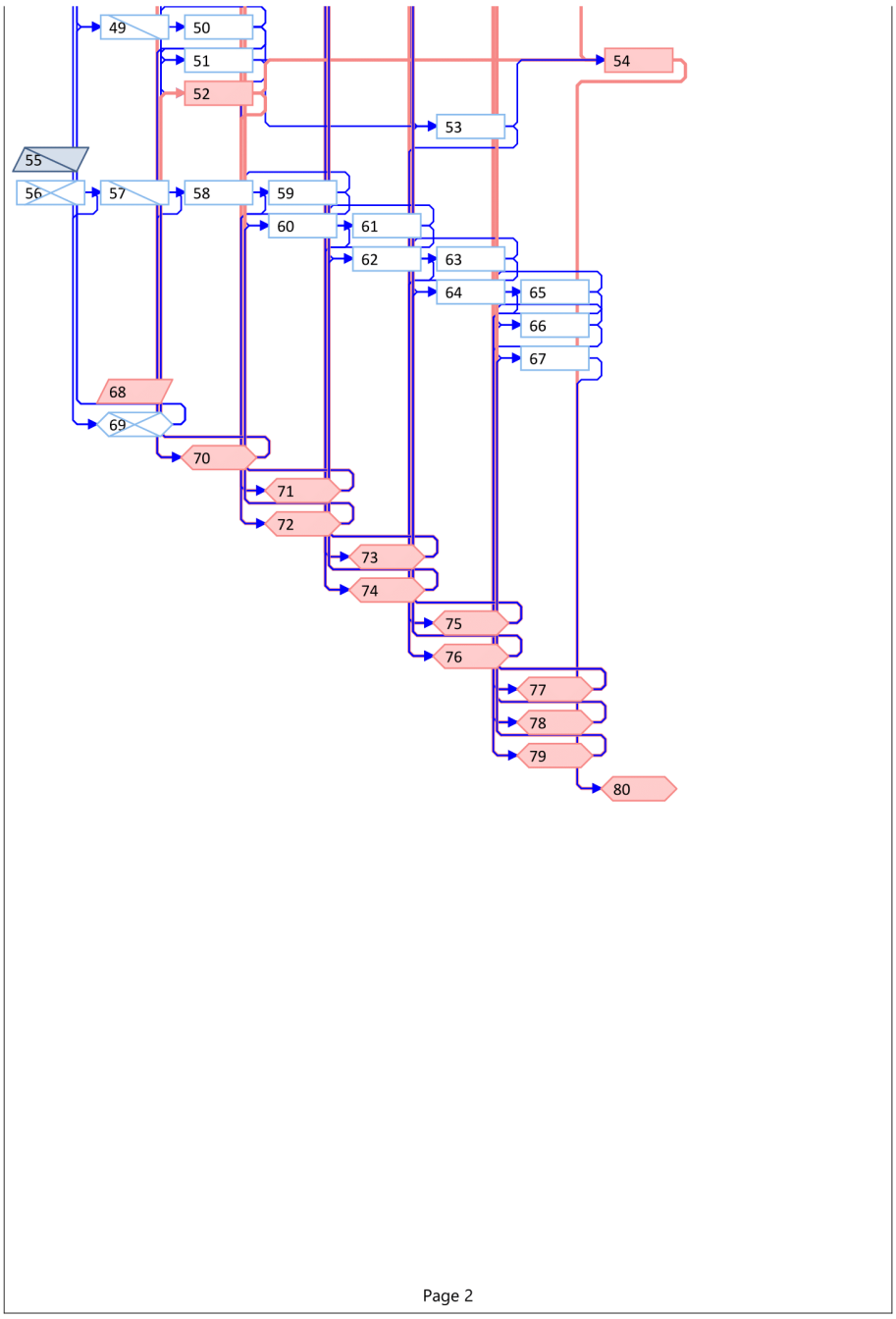


Figure 19: Network Diagram Part 2

E Timeline

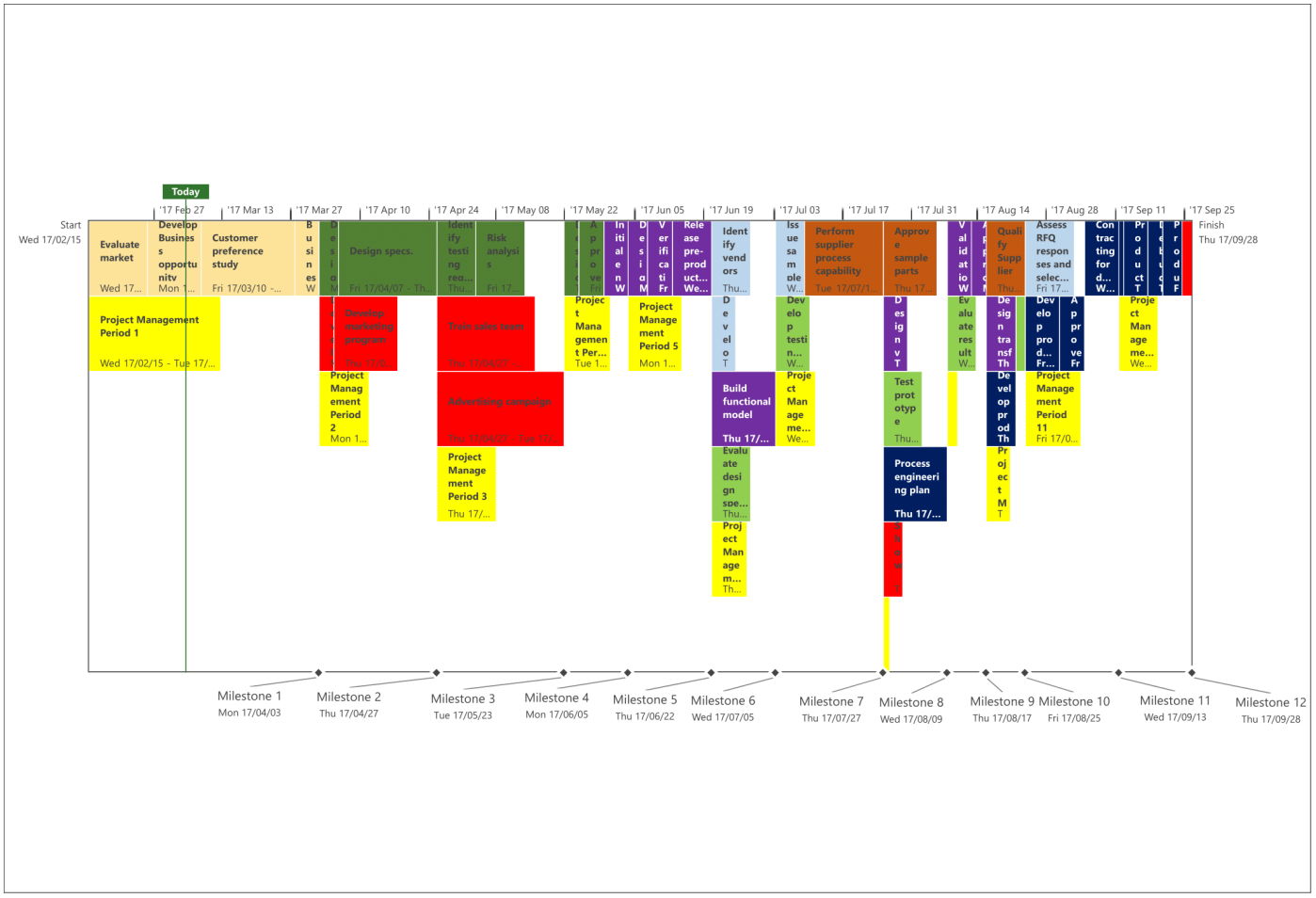


Figure 20: Timeline

F Meeting Minutes

Introduction and Meeting times

MINUTES FEBRUARY 16, 2017 08:00 AM ENGINEERING STUDY SENTRUM

MEETING CALLED BY	Peter Toulouras
TYPE OF MEETING	Introduction
FACILITATOR	Peter Toulouras
NOTE TAKER	Carmen Steyn
ATTENDEES	Sarel Swart Daniel Robinson Eduard van der Merwe Peter Toulouras Biance Huysamen Carmen Steyn

Agenda topics

INTRODUCTION

DISCUSSION	All of the team members arrived and introductions were made. Daniel created a Google Drive where the team can share all of their files.

DISCUSSION OF MEETING TIMES

DISCUSSION	All the team members were requested to bring their weekly rosters so a common meeting time could be scheduled. lunch times on Mondays were proposed but was then declined because some of the team members had tutorials Monday afternoons
CONCLUSIONS	The outcome of this discussion was that we will meet at 17:00 on Monday afternoons. The team will also be meeting in the allocated time of 08:00 on Thursdays.

DISCUSSION OF GROUP LEADER

DISCUSSION	The group determined who the group leader would be for the remainder of the project and who the secretary would be.
CONCLUSIONS	Peter would be the group leader and Carmen would be the secretary.

NAME & SIGNATURE	
Sarel Swart	
Carmen Steyn	
Biance Huysamen	
Peter Toulouras	
Eduard van der Merwe	
Daniel Robinson	

Figure 21: Minutes 16 Feb

Task allocation

MINUTES

FEBRUARY 20, 2017 17:00 PM ENGINEERING STUDENT CENTER

MEETING CALLED BY	Peter Toulouras
TYPE OF MEETING	General
FACILITATOR	Peter Toulouras
NOTE TAKER	Biance Huysamen
ATTENDEES	Sarel Swart Daniel Robinson Eduard van der Merwe Peter Toulouras Biance Huysamen

Agenda topics

COMPLETE ASSIGNMENT 0

DISCUSSION	All of the team members had to write down their name and student numbers. And feedback on the trail simulation and decided on a product. Ideas that were given is production of a crane, water treatment system and a brewery.
CONCLUSIONS	The product that was decided on is a Brewery.

TASK ALLOCATION

DISCUSSION	All of the task that are needed to be done for Assignment 1 were divided between team members.

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
Milestones	Sarel	27/02/2017
Technical requirements	Peter	27/02/2017
Objectives, deliverables, work break down	Biance	27/02/2017
Limitations	Eduard	27/02/2017
Customer review and approval process	Carmen	27/02/2017

SPECIAL NOTES	Carmen could not attend this meeting because she had to go to the airport, spoke to Daniel earlier to discuss anything she could help with.

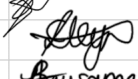
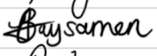
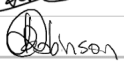
NAME & SIGNATURE	
Sarel Swart	
Carmen Steyn	
Biance Huysamen	
Peter Toulouras	
Eduard van der Merwe	
Daniel Robinson	

Figure 22: Minutes 20 Feb

Feedback and Brainstorming

MINUTES

FEBRUARY 23, 2017 08:00 AM ENGINEERING STUDENT CENTER

MEETING CALLED BY	Peter Toulouras
TYPE OF MEETING	General
FACILITATOR	Peter Toulouras
NOTE TAKER	Carmen Steyn
ATTENDEES	Sarel Swart, Daniel Robinson, Peter Toulouras, Biance Huysamen, Carmen Steyn

Agenda topics

SIMULATION FEEDBACK AND BRAINSTORMING

DISCUSSION	How to improve the efficiency from the trial run? Hiring less people and assign them to task so that everyone can work.
	Cost was managed well. Hire an engineer as a project manager that can be trained instead of using a project manager.
	Need to increase functionality.
	Need to improve stakeholders. Cost in stakeholder satisfaction is related. Limitations: size of building, time of the process , target market (over 18), supplier s destination.

JOB ASSIGNMENT

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
Budget	Biance, Carmen and Daniel	05/03/2017
Start risk analysis	Sarel and Eduard	26/03/2017
Gant chart baseline	Peter	05/03/2017

LAST WEEKS TASKS

DISCUSSION	Discuss what was done by each team member and giving ideas.
	Brainstorming about a cheaper beer for the students. Local resources.
	Helping Biance with deciding what some of the objectives can be.

NAME & SIGNATURE	
Sarel Swart	
Carmen Steyn	
Biance Huysamen	
Peter Toulouras	
Eduard van der Merwe	
Daniel Robinson	

Figure 23: Minutes 23 Feb

GENERAL MEETING

MINUTES

FEBRUARY 27, 2017 17:00 ENGINEERING STUDENT CENTER

MEETING CALLED BY	Peter Toulouras
TYPE OF MEETING	General
FACILITATOR	Peter Toulouras
NOTE TAKER	Carmen Steyn
ATTENDEES	Sarel Swart Daniel Robinson Peter Toulouras Biance Huysamen Carmen Steyn Eduard van der Merwe

Agenda topics

REVIEW OF PREVIOUS WEEK

DISCUSSION	Preliminary budget has been setup in Excel by Baince. The group reviewed the estimated costs and approved.
This budget will be used as a baseline to determine that the team do not over spend. Sarel and Eduard have started the process of	
setting up the risk analysis, but they are waiting for the lecture on this specific subject that will be given later in the week.	
Daniel has taken all the data of the different resources and wrote a Matlab program so that it is easier to compare the strengths and	

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
Compiling the document	Carmen and Daniel	Sunday Night
Buddy ratings	All team members	Thursday
Introduction and executive summary	Carmen	Sunday night

STRATEGY FOR THE NEXT BIDDING ROUND

DISCUSSION	The team discussed the strategy that will be used for the next round of bidding. The team discussed the possibility
of hiring as much as possible resources per category and then see how many of the will except the offer and then fire the	
unnecessary resources.	

NAME & SIGNATURE	
Sarel Swart	
Carmen Steyn	
Biance Huysamen	
Peter Toulouras	
Eduard van der Merwe	
Daniel Robinson	

Figure 24: Minutes 27 Feb

Overview

MINUTES MARCH 2, 2017 09:00 ENGENEERING STUDENT CENTRE

MEETING CALLED BY	Daniel Robinson
TYPE OF MEETING	General
FACILITATOR	Daniel Robinson
NOTE TAKER	Carmen Steyn
ATTENDEES	Sarel Swart Daniel Robinson Eduard van der Merwe Biance Huysamen Carmen Steyn

Agenda topics

RISK ANALYSIS

DISCUSSION	Sarel and Eduard have compiled a list of possible risks that might occur. The team is then deciding what the probability id that the risk will occur. Solutions for the possible risks so they do happen that there are alternative solutions.
CONCLUSIONS	The team has set up the risks that might be faced during the development and planning of the brewery and they and they are waiting for the lecture on risk analysis so that they can complete the risk analysis.

REVIEW OF PROGRESS

DISCUSSION	The team discussed all the different aspects of assignment 1 so that they can insure that all of the parts are finished. All of the components of the assignment are done except for the baseline Gant chart and the risk analysis.

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
Gant chart baseline	Peter	05/03/2017
Risk analysis	Sarel and Eduard	06/03/2017

SPECIAL NOTES	Peter Toulouras is absent. He is booked off for the week.

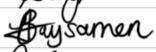
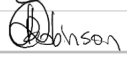
NAME & SIGNATURE	
Sarel Swart	
Carmen Steyn	
Biance Huysamen	
Peter Toulouras	
Eduard van der Merwe	
Daniel Robinson	

Figure 25: Minutes 2 March

References

Anon., n.d. Stellenbrau. [Online] Available at: http://stellenbrau.co.za/pages/our-beers.php [Accessed 20 02 2017].

M.Nicholas, J. & Steyn, H., 2008. Project Managment for Engineering. In: Business and Technology. New York: Routledge, pp. 43, 347.