King Fahd University of petroleum and Minerals
College of Computer Science and Engineering
Information and Computer Science Department

Software Management Document

Pothole Tracking System

SWE 387
Final Phase
Version 4.0

Team members	ID
Abdalaziz AL-Zahrani	201176050
Abdullah Al-Hazmi	201178690
Abdulrahman Al-Hareth	201064760
Abdullah Al-Yami	201039120
Mohammed Al-Sayed	201256520
Fahd Al-Hassan	201181830

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Document History and Distribution

Revision History

Revision Number	Revision date	Description of Change	Author (s)
1	19/October/2015	Collect and organize each individual work.	Abdalaziz Alzahrani
2	29/October/2015	Collect and organize each individual work, collect feedback for the document.	Mohammed El-Sayed / Abdalaziz Alzahrani
3	30/November/2015	Collect and organize each individual work, collect feedback for the document.	Abdalaziz Alzahrani
3	14/Decmber/2015	Collect and organize each individual work, collect feedback for the document.	Abdalaziz Alzahrani

1- Overview

1.1 Project Overview and Brief :

To begin with, the Riyadh Municipality proposed a project for local companies in Saudi Arabia. The aim of the project is to handle road potholes in Riyadh city as a beginning. However, the project came up due to the need of repairing potholes as fast as possible to avoid any damages arise from potholes. Therefore, the project is going to deliver a new web system that manages the maintenance distribution work and damage execute claims. As regards the project will approximately cost 2,000,000 SAR and it will take nearly 3 months to deliver a complete and integrated system. Senior students of Software engineering in KFUPM will take over developing the “Web based pothole tracking and repair system”.

2- Goals and Scope

2.1 Project Goals

2.1.1 Functional Goals

1- Develop complete native iOS and Android apps for the user for reporting purposes and refund requests.
2-Develop an app for the responsible authority to help them to monitor the reports and weather the contractor has fixed them or not .
3- Develop complete native iOS and Android apps to notify the contractors about the reported street holes.
4- Design API that enables any governmental authority to get statistical data about the number of reported holes , locations and weather were it fixed or not.
5- Develop a subsystem to process the compensation procedure for the affected cars.

2.1.2 Strategic goal

1- The system is aiming to eliminate the time required to discover any street hole and fix it , so it decreases the harm might happen to residents cars .

2.1.3 Business goals

1- Deliver the product within two months .
2- Work within budget of 2,000,000 SR for cost.

2.1.4 Technological goal

1- Introduce the product as the leading technological revolution for other governmental sectors.

2.1.5 Quality goal

1- The code written must be robust and follow the government coding standards.

2.1.6 Organizational goals

1-Test and evaluate Scrum methodology.
2- To apply matrix project management style to ensure a smoother communication with the client.

2.1.7 Other goals

1- Construct the system considering Scalability factor , since other cities might build similar systems if it became successful .

2.1.8 Constraints

1- The application is depending mainly on the availability of good internet connection .

2.1.9 Prioritize the project goals

Project Goal	Priority	Comment/Description/Reference
Functional Goals:	2	
Residents App	High	
Responsible Authority Website	High	
Contractors App	High	
API	Low	
Compensation processing system	Medium	
Business Goals:		
To deliver it to market within two months	Medium	
the cost shouldn't exceed 2000,000 SR	Medium	
Technological Goals:		
<technical goal #1>	Medium	
Quality Goals:	2	
Robustness and Following Code Standards	High	
Constraints:		
Good Internet Connection	High	
<appl. specific standards>	-	
<national standards>	-	

2.2 Project Scope

The scope of this project includes building iOS and Android app to enable the residents to report any street hole that they see. In addition , it includes building iOS and Android apps for the contractors to receive reported street holes . Also , it includes building monitoring website for the use of the responsible authority to help them monitor contractor reactions towards reports submitted by residents .In addition , it includes building and API to enable other authorities to get statistics about street holes and number of affected cars ,etc .Finally , it includes building a subsystem that process the procedure of compensation for the affected cars.

2.2.1 Included

The deliverables of this project and their receivers are listed in detail in the delivery plan section 8.

2.2.2 Excluded

This project excludes the hardware infrastructure as it is assuming that the hardware infrastructure is ready to use .

2.3 References

<Doc. No.1> Project Management Plan Template for <IEEE>

3- Project Management Approach :

3.1 Project Management Approach

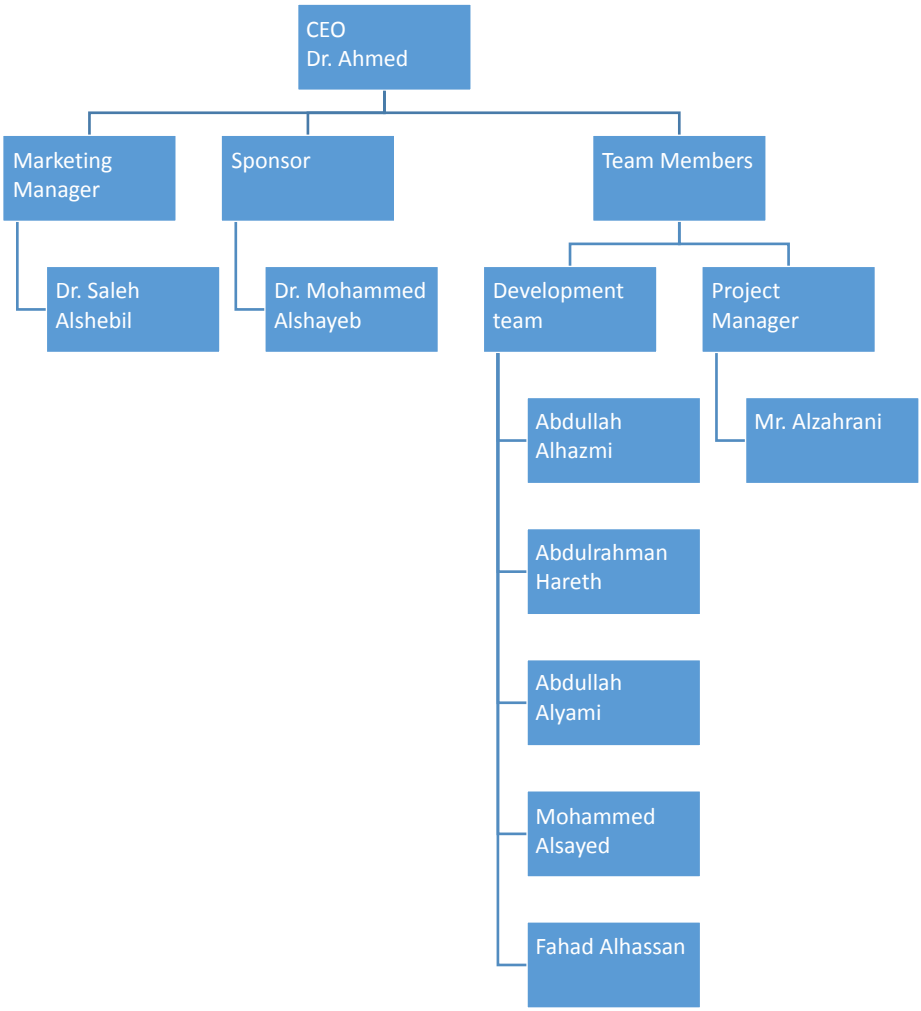
The Project Manager, Abdalaziz Alzahrani, has the overall authority and responsibility for managing and executing this project according to this Project Plan and its Subsidiary Management Plans. The project team will consist of personnel from the coding group, quality control/assurance group, configuration management group, and testing group. The project manager will work with all resources to perform project planning. All project and subsidiary management plans will be reviewed and approved by the project sponsor. All funding decisions will also be made by the project sponsor. Any delegation of approval authority to the project manager should be done in writing and be signed by both the project sponsor and project manager.

The project team will be a matrix in that team members from each organization continue to report to their organizational management throughout the duration of the project. The project manager is responsible for communicating with organizational managers on the progress and performance of each project resource.

4- Organization

The project organization is consisting of King Fahd University of Petroleum and minerals, vehicle drivers, traffic police and road maintains companies. Results of the project will directly affect the companies responsible for maintaining roads and eventually affecting people using them. The system heavily depends on users feedback and reports

4.1 Project Organization



The organization is structured as having Dr. Ahmad as CEO, Dr. Saleh Alshebil as the lead marketing manager, Dr. Mohammed Alshayeb as Sponsor, where as Mr. Alzahrani will be the project manager. The development team consists of System tester Mr. Alhazmi, Validation lead Mr. Hareth, head of Configuration management Mr. Alsayed, change management leader Mr. Alyami and Quality assurance manager Mr. Alhassan. The Project Manager, Mr. Alzahrani, will meet with the sponsor on a weekly basis to report progress as well as overall advancements and drawbacks.

4.2.1 Project Management

Role	Organization: Name
Project Manager	Abdulaziz ALzhrani
Technical Project Mgr.	Abdulrahman Hareth

4.2.2 Project-internal Functions

Role	Organization: Name	Comment
Quality Assurance	Fahd Alhassan	Responsible for delivering the project with highest standers
System Test Lead	Abdullah Alhazmi	Responsible for testing team and maintenance of the project
Validation Lead	Abulahman Hareth	Insures Correctness to specifications and the acceptance testing with the client
Configuration Management	Mohammed Alsayed	Controls and monitors the changes to the project
Change Management	Abdullah Alyami	Responsible for the changes need in the project after updating or maintain cooperating with the testing team

4.2.3 Project Team

Organization: Name	Availability	Comment
Abdulaziz Alzhrani	Tue - Sat (10:00 - 16:00)	
Abdulrahman Hareth	Sun - Thur (10:00 – 16:00)	
Mohammed Alsayed	Sun - Tue - Wed - Thur (09:00 – 17:00)	

Organization: Name	Availability	Comment
Abdullah Alyami	Mon - Fri (10:00 – 15:00)	
Abdullah Alhazmi	Sun – Thur (09:00 – 14:00)	
Fahd Alhassan	Sun - Tue - Thur (10:00 -16:00)	

4.2.4 Steering Committee

The Steering Committee (SteCo) of the project is responsible for monitoring the project progress and making sure is under budget and time.
The SteCo consists of the following members:

Organization	Name	Comment
KFUPM	Dr.Ahmed	Responsible for leading the development and execution of the project
Traffic police	Dean. Fahd Albashr	list what's included and what is not in the report
Elsamexksa	Eng. Khalid Mohammed	
HighwayMaintaince	Dr. Faisal Mansour	

5- Schedule and Budget

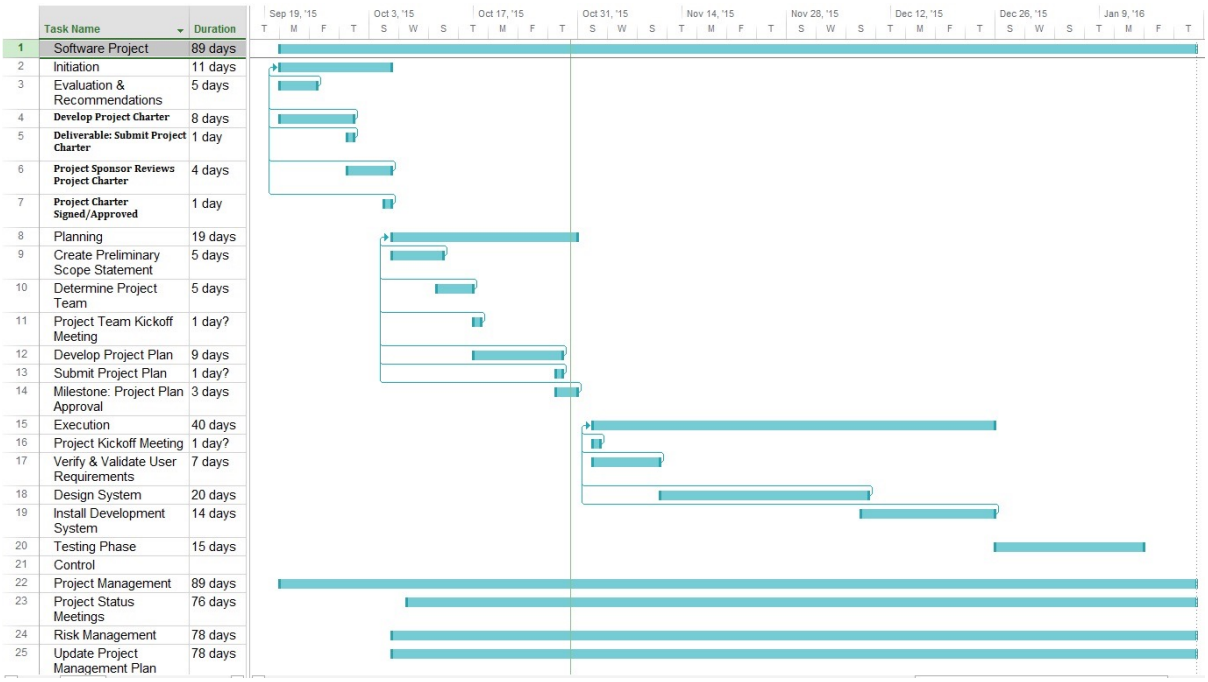
5.1 Work Breakdown Structure

The Pothole Tracking System "PTS" project is a Web & Mobile-Based service that connects the citizens of Saudi Arabia with the responsible governmental organizations of roads and streets maintenance work. It helps mainly to report the portholes in streets by citizens and send notification to the right organization to keep track of the problem. While the PTS application main focus is to have a database as a server, which will support live synchronizing. The system will show a statistics of the most defected streets and analyze the priorities of the maintenance work so that the responsible organizations can have more data driven work flow. For further details refer to section 2 in the document.
If there was an occurrence of a change in the scope of the project then we will handle the change in a similar way of handling the Change Management Plan that is be mentioned later in the document. That is by first, Generate SCR (Scope Change Request), when the team identifies a change, they complete the Change Request form and submit it to the Scope Manager. Then by his role he will Log the SCR Status and then the SCR's status is updated throughout the SCR process as needed. After that, an evaluation of the Scope Change Request is conducted to determine the feasibility of the SCR.
Finally that, authorizing the change, The sponsor will review and determine whether to: authorize, reject or defer the change request then implement if approved, and make the necessary adjustments to carry out the requested change and communicate SCR status to the submitter and other stakeholders
After the project is finished, the final deliverables and the final product, Abdullah Al-yami is the one responsible for accepting it with the association of Abdulrahman Al-hareth as he acts as a Validation Lead in this project and then they approve the acceptance of the project scope.

Level	WBS Code	WBS	Definition	Start	End
1	1	**Software Project**	All work to implement a new widget management system.	21/Sep/ 2015	21/Jan/ 2016
2	1.1	**Initiation**	The work to initiate the project.	21/Sep/ 2015	5/Oct/2015
3	1.1.1	**Evaluation & Recommendations**	Working group to evaluate solution sets and make recommendations.	21/Sep/ 2015	25/Sep/ 2015
3	1.1.2	**Develop Project Charter**	Project Manager to develop the Project Charter.	21/Sep/ 2015	30/Sep/ 2015
3	1.1.3	**Deliverable: Submit Project Charter**	Project Charter is delivered to the Project Sponsor.	30/Sep/ 2015	30/Sep/ 2015
3	1.1.4	**Project Sponsor Reviews Project Charter**	Project sponsor reviews the Project Charter.	30/Sep/ 2015	5/Oct/2015
3	1.1.5	**Project Charter Signed/Approved**	The Project Sponsor signs the Project Charter which authorizes the Project Manager to move to the Planning Process.	5/Oct/2015	5/Oct/2015

Level	WBS Code	WBS	Definition	Start	End
2	1.2	**Planning**	The work for the planning process for the project.	6/Oct/2015	30/Oct/2015
3	1.2.1	**Create Preliminary Scope Statement**	Project Manager creates a Preliminary Scope Statement.	6/Oct/2015	12/Oct/2015
3	1.2.2	**Determine Project Team**	The Project Manager determines the project team and requests the resources.	12/Oct/2015	16/Oct/2015
3	1.2.3	**Project Team Kickoff Meeting**	The planning process is officially started with a project kickoff meeting which includes the Project Manager, Project Team and Project Sponsor (optional).	17/Oct/2015	17/Oct/2015
3	1.2.4	**Develop Project Plan**	Under the direction of the Project Manager the team develops the project plan.	17/Oct/2015	28/Oct/2015
3	1.2.5	**Submit Project Plan**	Project Manager submits the project plan for approval.	28/Oct/2015	28/Oct/2015
3	1.2.6	**Milestone: Project Plan Approval**	The project plan is approved and the Project Manager has permission to proceed to execute the project according to the project plan.	28/Oct/2015	30/Oct/2015
2	1.3	**Execution**	Work involved to execute the project.	2/Nov/2015	25/Dec/2015
3	1.3.1	**Project Kickoff Meeting**	Project Manager conducts a formal kick off meeting with the project team, project stakeholders and project sponsor.	2/Nov/2015	2/Nov/2015
3	1.3.2	**Verify & Validate User Requirements**	The original user requirements is reviewed by the project manager and team, then validated with the users/stakeholders. This is where additional clarification may be needed.	2/Nov/2015	10/Nov/2015
3	1.3.3	**Design System**	The technical resources design the new widget management system.	11/Nov/2015	8/Dec/2015
3	1.3.5	**Install Development System**	Team installs a development system for testing and customizations of user interfaces.	8/Dec/2015	25/Dec/2015
3	1.3.6	**Testing Phase**	The system is tested with a select set of users.	26/Dec/2015	14/Jan/2016
2	1.4	**Control**	The work involved for the control process of the project.	6/Oct/2015	21/Jan/2016
3	1.4.1	**Project Management**	Overall project management for the project.	21/Sep/2015	21/Jan/2016
3	1.4.2	**Project Status Meetings**	Weekly team status meetings.	8/Oct/2015	21/Jan/2016

Level	WBS Code	WBS	Definition	Start	End
3	1.4.3	**Risk Management**	Risk management efforts as defined in the Risk Management Plan.	6/Oct/2015	21/Jan/ 2016
3	1.4.4	**Update Project Management Plan**	Project Manager updates the Project Management Plan as the project progresses.	6/Oct/2015	21/Jan/ 2016
2	1.5	**Closeout**	The work to close-out the project.	15/Jan/ 2016	21/Jan/ 2016
3	1.5.2	**Document Lessons Learned**	Project Manager along with the project team performs a lessons learned meeting and documents the lessons learned for the project.	15/Jan/ 2016	15/Jan/ 2016
3	1.5.3	**Update Files/ Records**	All files and records are updated to reflect the Software Project	15/Jan/ 2016	19/Jan/ 2016
3	1.5.4	**Gain Formal Acceptance**	The Project Sponsor formally accepts the project by signing the acceptance document included in the project plan.	19/Jan/ 2016	19/Jan/ 2016
3	1.5.5	**Archive Files/ Documents**	All project related files and documents are formally archived.	19/Jan/ 2016	21/Jan/ 2016



Gantt Chart From The .project File

5.2 Schedule and Milestones

Milestones	Description	Millstone Criteria	Planned Date
M0	Start Project	Budget Release	<2015-09-21>
	Project Charter, goals and scope document	Contract is signed by stockholders, SRS document is revised and the Implementation Proposal is reviewed	<2015-10-05>
M1	Start Planning		<2015-10-06>
	Deliver the WBS, Scope statement and Development process	Project Management Plan document	<2015-10-30>
M2	Start Execution		<2015-11-02>
	Deliver architecture document Follow-up meeting schedule	Developed Framework. SDD verified. Revised Resources.	<2015-12-25>
M3	Finalizing Execution		<2015-12-25>
	Prototype Demo	Architecture reviewed and stable	<2015-12-25>
M4	Testing		<2015-12-26>
	Strain test, extreme cases test and network and security testing and handling	Submitted test results and getting the feedback from stakeholders.	<2016-01-14>
M5	Product Release		<2016-01-21>
		Tested Product and Product description document revisited.	
M6	Close Project		<2016-01-21>

5.3 Cost Estimation

5.3.1.1 Rough order of Magnitude (ROM)

WBS Code	Description	Subtotal	WBS Level 2 Totals	% of Total	Resources
1	Software Project	-			
1.1	Initiation	-	35,000 SAR	1.75%	
1.1.1	Evaluation & Recommendations	10,000 SAR			
1.1.2	Develop Project Charter	15,000 SAR			
1.1.3	Deliverable: Submit Project Charter	-			
1.1.4	Project Sponsor Reviews Project Charter	10,000 SAR			
1.1.5	Project Charter Signed/ Approved	-			
1.2	Planning	-	425,000 SAR	21.25%	
1.2.1	Create Preliminary Scope Statement	100,000 SAR			
1.2.2	Determine Project Team	75,000 SAR			
1.2.3	Project Team Kickoff Meeting	90,000 SAR			
1.2.4	Develop Project Plan	160,000 SAR			
1.2.5	Submit Project Plan	-			
1.2.6	Milestone: Project Plan Approval	-			
1.3	Execution		1,100,000 SAR	55%	
1.3.1	Project Kickoff Meeting	170,000 SAR			
1.3.2	Verify & Validate User Requirements	165,000 SAR			
1.3.3	Design System	530,000 SAR			

1.3.5	Install Development System	235,000 SAR			
1.4	Testing Phase		150,000 SAR	7.5%	
1.5	Control		250,000 SAR	12.5%	
1.5.1	Project Management	175,000 SAR			
1.5.2	Project Status Meetings	-			
1.5.3	Risk Management	-			
1.5.4	Update Project Management Plan	75,000 SAR			
1.6	Closeout	-	40,000 SAR	2%	
1.6.1	Document Lessons Learned	-			
1.6.2	Update Files/Records	15,000 SAR			
1.6.3	Gain Formal Acceptance	10,000 SAR			
1.6.4	Archive Files/Documents	15,000 SAR			
TOTAL			2,000,000 SAR		

5.3.1.2 Function Point Estimate:

Function Point Estimate	Quantity	Conversion Factor	Function Factor	Calculation
External input	18	4	72	
External interface files	14	7	98	
External outputs	9	5	45	
External queries	16	4	64	
Logical internal Tables	20	10	200	
Total function points			=479	
Java language		53	46	
SLOC(JAVA#)			22034	=46*479
Productivity x KSLOC^Penelty (in month)			66.1	=3*(22.034)^1

Total labor hours (160hour/month)			10,576	160*66.1
Cost Labor hours(40SAR/hour)			40	
TOTAL			423,040 SAR	

5.3.2 Budget

Category	**Budget for Period in kUS$**					
	Weeks					
	1-3	**4-6**	**7-9**	**10-12**	**13-15**	**16-18**
Human Resources (internal)	33,600	78,275	117,000	117,000	117,000	109,200
Human Resources (external)	-	-	86,400	162,000	156,000	86,400
Purchases (COTS)	15,000	35,000	-	15,000	-	-
Equipment	3,000	15,000	48,000	30,000	12,000	-
Premises	-	15,000	15,000	15,000	-	-
Tools	-	20,000	45,000	60,000	-	-
Travel costs	2,500	5,000	-	11,000	-	-
Training	100,000	132,500	-	-	-	-
Review activities	-	-	9,850	10,000	10,000	30,000
Other	4,650	94,225	170,000	5,000	5,000	4,400
Total	158,750	395,000	491,250	425,000	300,000	230,000
Total cumulated	**2000,000 S.R.**					

5.4 Schedule and Milestones

This project management approach will follow the Scrum methodology. Where our project time and cost is defined but the requirements is not that clear and might change over time. The activities of the scrum methodology includes:

1. Creating prioritized wish list.
2. During sprint planning phase a small chunk (sprint) of the wish list is chosen. And the team makes a decision how to implement it.
3. The sprint has limited time to be accomplished (usually between 2 – 4 weeks).
4. The Scrum Master is responsible to make sure the team is focused on the goals.
5. After each sprint the chunk of work should be deliverable.
6. The sprint is finalized with a sprint review1 and retrospective2.

5.5 Development Environment

Item	Applied for	Availability by Milestone
Methods		
Use Case	Requirements capturing	M1
Backlog	Ordering requirements	M1
COCOMO	Cost Estimation	M2
Black box	Testing	M5
White box	Testing	M5
Tools		
Rational Rose	Design	M2
Wrike	Scheduling and Planning	M2

[1] A meeting in which the team demonstrates the product owner what is has completed during the sprint. (Information technology project management, Schwalbe)

[2] A meeting in which the team looks for ways to improve the product and the process based on a review of the actual performance of the development team. (Information technology project management, Schwalbe)

Item	Applied for	Availability by Milestone
Slack	Communication	M0
Dropbox	File sharing	M0
Microsoft Word	Documentation	M0
Sketch 3	UI & UX prototyping	M2
Languages		
UML	Design	M2
Java	Android app implementation	M3
XML	Android UI design	M3
Swift	iOS app implementation	M3
Cocoa	iOS UI design	M3
SQL	Database	M3

5.6 Development Environment

Type of data	Purpose	Responsible
Coupling value exceeds 0.69	To make sure that the coupling is low and the maintainability is high.	Abdallah alhazmi
Budget exceeded 12% of the planned.	Cost control	Abdallah al yami
More 6 use cases is changed	Revise the SRS document	Abdulaziz Al zhrani
More than 10 bugs found before testing	Ensure the competence of the code.	Fahad al Hassan
Number of root classes exceeded 3 roots	Refactor the code	Abdallah alhazmi

6- Management Plans

6.1 Integration Management

6.1.1 Configuration Management Plan

6.1.1.1 Configuration Identification Method

Configuration identification will be performed in three stages, as follows:

1. Identifying the items to be placed under configuration control will be identified
2. Naming an identification system will be specified for assigning unique identifiers to each Item under configuration control
3. Acquiring a procedure for placing items identified for configuration control into the appropriate library

6.1.1.2 Configuration Identification Method

Configuration control will consist of the following mechanisms, as follows:

- Change requests
  - Changes to a configuration item will be requested through the university's change management software.
- Change evaluation
  - The impact of a chance to the configuration item will be evaluated, usually based on perceived risk vs. benefit with respect to budget, schedule and the impact on other configuration items.
- Change approval/rejection
  - Based on an evaluation of the change to the configuration item, permission to change the item will be approved or rejected by the sponsor.
- Change implementation
  - If the change is approved, change to the configuration item will be allowed to take place.

6.1.1.3 Status Accounting Method

The following data about each configuration item will be tracked and available for inspection within the configuration management software:

- Latest approved version of the configuration item.
- Configuration control status of the configuration item.
- Implementation status of the configuration item.

6.1.1.4 Evaluation Method

Evaluation of changes will be performed by Subject Matter Expert (SME), consisting of the resources appropriate for evaluating a particular change; due to the company size, the SME will be a dynamically formed group of team members who are required to participate in the evaluation of a change. The decision will be dependent on the configuration item affected and the impacts on other configuration items that the change will have.

6.1.1.5 Release Management Method

Releases will be defined in the configuration management system by the Configuration Manager when all configuration items that make up a release are suitable for delivery to our client. By defining releases, it will be possible to recreate that release at a future point in time.

6.1.1.6 Procedure for Baselining a Work Product

In order for a work product to become a configuration item, it must be baselined. The procedure for doing so is as follows:

Step	Description	Responsible
1	Label baselined version • label configuration item according to organizational standard naming conventions	Abdullah Al-Hazmi
2	Announce baseline to project team • e-mail notification • include specification of whether baseline is a new baseline of an existing configuration item, or the creation of a baseline for a new configuration item • include reminder that the work product is now a configuration item and may not be changed without submitting a change request	Abdullah Al-Hazmi

6.1.1.7 Procedure for Change Logging

In order for a change request to be considered, it must be logged with the configuration management system. The procedure for doing so is as follows:

Step	Description	Responsible
1	Enter change request • enter change details into the configuration management system • submit change request	Change requestor

Step	Description	Responsible
2	Determine nature of change request • determine whether change is trivial or nontrivial 1. if trivial, approve request 2. if non-trivial, schedule Change Control Board meeting to review the change.	Configuration Manager

6.1.1.8 Procedure for Change Control Board Review of Changes

In order for a change to be implemented, it must be reviewed by the Change Control Board and updated in the configuration management system by the Configuration Manager. The procedure for doing so is as follows:

Step	Description	Responsible
1	Review change request • analyze change's importance • analyze change's impact on the project	SME
2	Approve or Reject Change Request • determine whether change importance is worth the change impact • communicate decision to Configuration Manager	SME
3	Update change request status • change the status of the change request to "Approved" or "Rejected"	Configuration Manager

6.2 Change Management Plan

6.2.1.1 Introduction

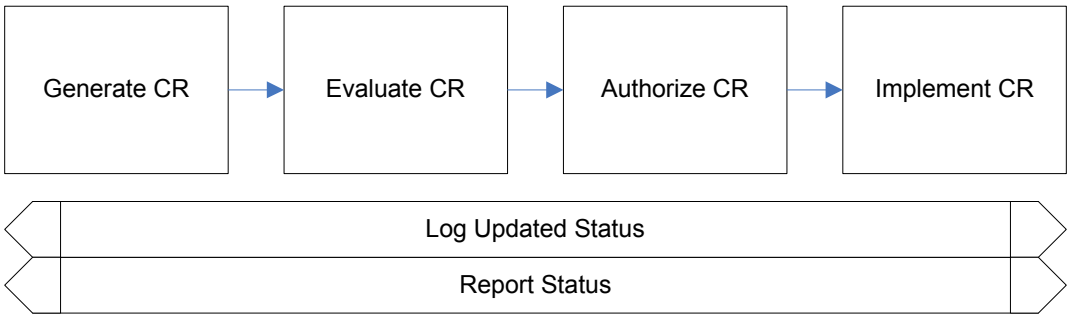
The Change Management Plan documents and tacks the necessary information required to effectively manage project change from project inception to delivery. The Change Management Plan is created during the Planning Phase of the project. Its intended audience is the project manager, project team, project sponsor and any senior leaders whose support is needed to carry out the plan.

6.2.1.2 Change management Process

The Change Management process establishes an orderly and effective procedure for tracking the submission, coordination, review, evaluation, categorization, and approval for release of all changes to the project's baselines.

6.2.2.1 Change Request Process Flow Requirements

Step	Description
Generate CR	A submitter completes a CR Form and sends the completed form to the Change Manager
Log CR Status	The Change Manager enters the CR into the CR Log. The CR's status is updated throughout the CR process as needed.
Evaluate CR	Project personnel review the CR and provide an estimated level of effort to process, and develop a proposed solution for the suggested change
Authorize	Approval to move forward with incorporating the suggested change into the project/product
Implement	If approved, make the necessary adjustments to carry out the requested change and communicate CR status to the submitter and other stakeholders



6.1.2.2 Change Request Form and Change Management Log

Element	Description
Date	The date the CR was created
CR#	Assigned by the Change Manager
Title	A brief description of the change request
Description	Description of the desired change, the impact, or benefits of a change should also be described
Submitter	Name of the person completing the CR Form and who can answer questions regarding the suggested change
Phone	Phone number of the submitter
E-Mail	Email of the submitter
Product	The product that the suggested change is for

Element	Description
Version	The product version that the suggested change is for
Priority	A code that provides a recommended categorization of the urgency of the requested change (High, Medium, Low)

6.1.2.3 Evaluating and Authorizing Change Requests

Change requests are evaluated using the following priority criteria:

Priority	Description
High	The change must be evaluated as soon as possible because the change will affect the progress of the whole project
Medium	The change should be evaluated because it will improve the quality of the project
Low	The change may be evaluated to add a feature to the project

Change requests are evaluated and assigned one or more of the following change types:

Priority	Description
Scope	Change affecting scope
Time	Change affecting time
Duration	Change affecting duration
Cost	Change affecting cost
Resources	Change affecting resources
Deliverables	Change affecting deliverables
Product	Change affecting product
Processes	Change affecting process
Quality	Change affecting quality

Change requests are evaluated and assigned one of the following status types:

Priority	Description
Open	Entered/Open but not yet approved or assigned
Work in Progress	CR approved, assigned, and work is progressing
In Review	CR work is completed and in final review prior to testing
Testing	CR work has been reviewed and is being tested
Closed	CR work is complete, has passed all tests, and updates have been released.

6.1.2.4 Responsibilities

Role	Name	Description
Project Manager	Abdulaziz Alzahrani	The PM submits the Change Request form.
Change Manager	Abdullah Alyami	Track and monitor the changes
Sponsor	Dr. Mohammed Alshayeb	Approve or deny the CR
Testing	Abdulaziz Alzahrani	The PM submits the Change Request form.
Closed	Abdullah Alyami	Track and monitor the changes

6.1.3 Delivery Plan

Ident.	Deliverable	Planned Date	Receiver
D1	Project Plan	28/10/2015	Abdalaziz AL-Zahrani
D2	Project Kick-off Meeting Report	2/11/2015	The sponsor
D3	Business Requirements Specifications	10/11/2015	Abdulrahman Al-Hareth, The sponsor
D4	Software Requirements Specifications	10/11/2015	The Team
D5	Prototype	7/11/2015	Abdalaziz AL-Zahrani, The Sponsor

Ident.	Deliverable	Planned Date	Receiver
D6	System Design Document	8/12/2015	The Team
D7	WBS Document	20/10/2015	Abdalaziz AL-Zahrani, Fahd Alhassan
D8	Progress Report	After each phase	Abdalaziz AL-Zahrani, The Sponsor
D9	Test Outcome Report	14/1/2016	Abdullah Alhazmi
D9	Demo Presentation	15/1/2016	The Team, the Sponsor
D10	The final Product	21/1/2016	Abdalaziz AL-Zahrani

6.3 Integration Management

6.3.1 Introduction

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

6.3.2 Schedule Management Approach

Project schedules will be created using MS Project 2013 starting with the deliverables identified in the project's Work Breakdown Structure (WBS). 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. Activity duration estimating will be used to calculate the number of work periods required to complete work packages. Resource estimating will be used to assign resources to work packages in order to complete schedule development. Once a preliminary schedule has been developed, it will be reviewed by the project team and any resources tentatively assigned to project tasks. The project team and resources must agree to the proposed work package assignments, durations, and schedule. Once this is achieved the project sponsor will review and approve the schedule and it will then be base lined.

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

- Completion of scope statement and WBS/WBS Dictionary

- Base lined project schedule
- Approval of final project budget
- Project kick-off
- Approval of roles and responsibilities
- Requirements definition approval
- Completion of data mapping/inventory
- Project implementation
- Acceptance of final deliverables

Refer to 5.2 for additional information.
Roles and responsibilities for schedule development are as follows:
The project manager will be responsible for facilitating work package definition, sequencing, and estimating duration and resources with the project team. The project manager will also create the project schedule using MS Project 2013 and validate the schedule with the project team, stakeholders, and the project sponsor. The project manager will obtain schedule approval from the project sponsor and baseline the schedule.
The project team is responsible for participating in work package definition, sequencing, and duration and resource estimating. The project team will also review and validate the proposed schedule and perform assigned activities once the schedule is approved.
The project sponsor will participate in reviews of the proposed schedule and approve the final schedule before it is baselined.
The project stakeholders will participate in reviews of the proposed schedule and assist in its validation.

6.3.3 Schedule Management Approach

The project schedule will be reviewed and updated as necessary on a bi-weekly basis with actual start, actual finish, and completion percentages which will be provided by task owners.
The project manager is responsible for holding bi-weekly schedule updates/reviews; determining impacts of schedule variances; submitting schedule change requests; and reporting schedule status in accordance with the project's communications plan.
The project team is responsible for participating in bi-weekly schedule updates/reviews; communicating any changes to actual start/finish dates to the project manager; and participating in schedule variance resolution activities as needed.
The project sponsor will maintain awareness of the project schedule status and review/ approve any schedule change requests submitted by the project manager.
Refer to Change Management Plan.

6.3.3.1 Schedule Changes and Thresholds

If any member of the project team determines that a change to the schedule is necessary, the project manager and team will meet to review and evaluate the change. The project manager and project team must determine which tasks will be impacted, variance as a result of the potential change, and any alternatives or variance resolution activities they may employ to see how they would affect the scope, schedule, and resources. If, after this

evaluation is complete, the project manager determines that any change will exceed the established boundary conditions, then a schedule change request must be submitted. Submittal of a schedule change request to the project sponsor for approval is required if either of the two following conditions is true:

- The proposed change is estimated to reduce the duration of an individual work package by 10% or more, or increase the duration of an individual work package by 10% or more.
- The change is estimated to reduce the duration of the overall baseline schedule by 10% or more, or increase the duration of the overall baseline schedule by 10% or more.

Any change requests that do not meet these thresholds may be submitted to the project manager for approval.

Once the change request has been reviewed and approved the project manager is responsible for adjusting the schedule and communicating all changes and impacts to the project team, project sponsor, and stakeholders. The project manager must also ensure that all change requests are archived in the project records repository.

6.5 Quality Management Plan

6.5.1 Quality Management Approach

The quality management approach for the PTS project will ensure quality is planned for both the product and processes. In order to be successful, this project will meet its quality objectives by utilizing an integrated quality approach to define quality standards, measure quality and continuously improve quality.

Product quality for the PTS project will be defined by the university's current standards. The focus is on the project's deliverable and the standards and criteria being used will ensure the product meets established quality standards and customer satisfaction.

Process quality for the PTS project will focus on the processes by which the project deliverable will be manufactured. Establishing process quality standards will ensure that all activities conform to an organizational standard which results in the successful delivery of the product.

The project team will work with the Quality Group to define and document all organizational and project specific quality standards for both product and processes. All quality documentation will become part of the PTS Project Plan and will be transitioned to operations upon the successful completion of the project.

Metrics will be established and used to measure quality throughout the project life cycle for the product and processes. The Quality Group Manager will be responsible for working with the project team to define these metrics, conduct measurements, and analyze results. These product and process measurements will be used as one criterion in determining the success of the project and must be reviewed by the project sponsor. Metrics will include:

- Schedule
- Resources
- Cost
- Process performance
    - Manufacturing line utilization
    - Material waste
- Product performance
    - Attenuation
    - Tensile strength
- Customer Satisfaction (as a result of field trials)

Quality improvements will be identified by any member of the project team or quality group. Each recommendation will be reviewed to determine the cost versus benefit of implementing the improvement and how the improvement will impact the product or processes. If an improvement is implemented the project manager will update all project documentation to include the improvement and the quality manager will update the organizational documentation the improvement affects.

6.5.2 Roles and responsibilities

6.5.2.1 Project Manager

Project manager is surely responsible for the overall quality of the project . Although there is a specialized quality manager , project manager will be supporting project quality management by:

1. Develop a quality culture among team members.
2. Encourage the belief that the right level of quality is more important than getting things fast.
3. Monitor the overall quality of the project and follow up with quality processes .
4. Help in developing Quality Management Plan .

6.5.2.2 Technical Lead

Team leader is supposed to enforce good practices in: requirements , design , implementation and testing phases.

6.5.2.3 Quality Manager

1. Ensure that the organization's Quality Management System conforms to customer, internal, CMMI –Level 5, and regulatory/legal requirements.
2. Ensure evaluation of, and reporting on, vendor quality systems.
3. Oversee inspection (examination) of incoming software artifacts , ensuring that they meet requirements.
4. Manage the monitoring, measurement, and review of internal processes, especially those that affect the quality of the organization's products.
5. Lead a team of Quality engineers, inspectors, analysts, and software engineers.

6. Report to top management on the performance of the QMS (e.g., results of quality audits, corrective actions), including the need for improvement.
7. Conduct periodic management review meetings.
8. Oversee product recalls.
9. Responsible for accuracy and timely inspection/calibration of monitoring and measuring devices.
10. Keep up on standards, regulations/laws, issues, and news with respect to product (service) quality.
11. Develop quality management plan .

6.5.3 Quality Control

Quality control insures that the deliverables are accepted. However, testing is going to be conducted thru the project after every phase. These types of testing will be used:

1. Unit testing
2. System testing
3. User acceptance testing

However, if any objections are raised form the user during any phase of the project, the rework and process adjustments are going to be conducted based on the criteria shown in this section.

6.5.3.1 Acceptance Decisions

- Product should satisfy user requirements.
- Product should be satisfy user interface usability requirements.
- Product should undergo lab tests and make sure acceptance criteria is satisfied.
- Product should be sent to professionals giving there feedback.
- Product should be firstly tested by the user before publishing the product.
- Product code should satisfy company’s code standards.

6.5.3.2 Rework

- To find the source problem of defects Ishikawa diagram will be used.
- Different complaints of the system will be recorded on a check sheet.
- We are going to use pareto chart to identify and prioritize problem areas.

6.5.3.3 Process adjustments

After finding the defects and analyzing the Ishikawa and checksheet and pareto chart, the team will select the defects to be changed. After that, the planning schedule will be adjusted to add the changes. Next, the tasks are going to be distributed thru the team and are going to be supervised by the project manager.

6.5.4 Quality Assurance

Periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards, includes all the activities related to that. Another goal of quality assurance is continuous quality improvement. The project manager is the responsible for the quality of the project, which can be assigned to a "Quality Manager". Clear success criteria's (Project Management, Technical, and Business Quality) which are documented in the contract will be followed by the team members.
Quality assurance will be implemented through all the software life cycles of the tool's development process, until the release of the software product. The following are the quality assurance tasks for each phase of the software development:

- Requirements phase: When the SRS is being developed, the developers have to ensure that it elucidates the proposed functionality of the product and to keep refining the SRS until the requirements are clearly stated and understood.
- Specification and Design phase: Due to the great importance for accuracy and completeness in these documents, weekly reviews shall be conducted between the developer and the professor to identify any defects and rectify them.
- Implementation phase: The developers shall do code reviews when the construction phase of the Tool begins.
- Software testing phase: The testers shall test each case. The final product shall be verified with the functionality of the software as specified in the Software Requirements Specification (SRS) for the Tool.

Through all these phases of the software development, the following shall also be conducted to improve the software quality:

- Develop and generate QAP: Generate a finalized QAP plan
- Communication and Feedback: The developers are encouraged to freely express disagreements, suggestions and opinions about all aspects of the weekly process of software development.
- Internal audits and evaluations: The Project Manager and the Project Director are expected to do auditions and evaluations at the end of each phase in the project.

6.5.4.1 Documentation

In addition to this document, the essential documentation will include:
The Software Requirements Specification (SRS), which

- Prescribes each of the essential requirements (functions, performances, design constraints and attributes) of the software and external interfaces
- Objectively verifies achievement of each requirement by a prescribed method (e.g. Inspection, analysis, demonstration or test)
- Facilitates traceability of requirements specification to product delivery.
- Gives estimates of the cost/effort for developing the product including a project plan.

The Formal Specification Document, which gives the formal description of the product design specified in Object Constraint Language (OCL).

The Software Design Description (SDD)

- Depicts how the software will be structured
- Describes the components and sub-components of the software design, including various packages and frameworks, if any.
- Gives an object model that is developed using Rational Rose highlighting the essential classes that would make up the product.
- Gives a sample interaction diagram, showing the key interactions in the application. This should also be a part of the object model.

6.5.4.2 Software User Manual (SUM)

- Identify the required data and control inputs, input sequences, options, program limitations or other actions.
- Identify all error messages and describe the associated corrective actions.
- Describe a method for reporting user-identified errors.
- Documented Source Code.

6.6 Staffing Management Plan

6.6.1 Introduction

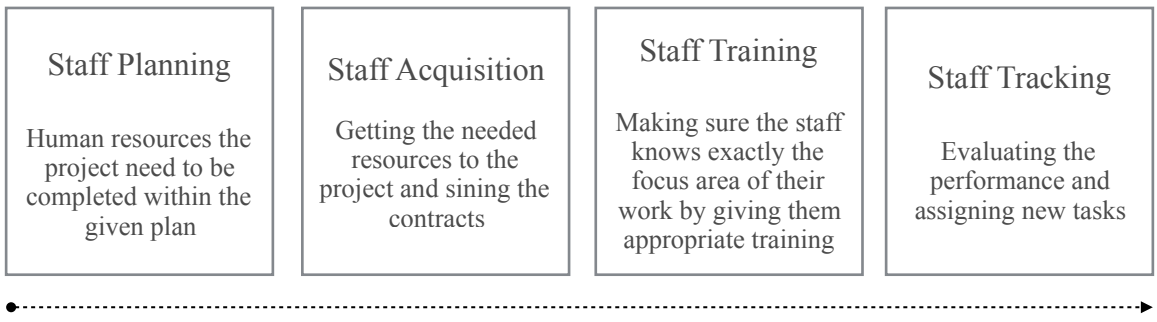
This section describes the Staff Management Plan for the Pothole Tracking System Project. The purpose of the Staff Management Plan is to capture how the project manager will manage the project staff resources throughout the life of the project. The Staff Management Plan will make certain the project has sufficient staff possessing the correct skill sets and experience to ensure a successful project completion.

6.6.2 Scope

This Staff Management Plan identifies the process and procedures used to manage staff throughout the project's life sycle. This section describes the planning and acquisition of both state staff and consulting staff, describes the responsibilities assigned to each staff, and discusses transition of staff to other assignments.

6.6.3 Staff Management Approach

The staff management process for the project consists of the following four elements: Staff Planning, Staff Acquisition, Staff Training, Staff Tracking.



6.6.4 Staffing Plan

for this project the needed team will consist of :

Role	Assigned to
Project Manager	Abdulaziz ALzhrani
Technical Project Mgr.	Abdulrahman Hareth
Quality Assurance	Fahd Alhassan
System Test Lead	Abdullah Alhazmi
Validation Lead	Abulahman Hareth
Configuration Management	Mohammed Alsayed
Change Management	Abdullah Alyami
Software Architect	Ahmed Aqarni
Database Engineer	Adam Salah
User-Interface designer	Mahmud Elsie
iOS Programmer	Mohammed Alsaha'lan
Android Programmer	Anas Bassam
ASP.NET Programmer	Ali Bu-Saleh

6.6.5 Resource Calendar

The resource calendar identifies key resources needed for the project and the times/ durations they'll be needed

Role	From	To	Phase	Price
Project Manager	21/Sep/2015	21/Jan/2016	All phases	55$/h
Technical Project Mgr.	21/Sep/2015	21/Jan/2016	All phases	55$/h
Quality Assurance	2/Nov/2015	21/Jan/2016	Election & monitoring and control	43$/h
System Test Lead	8/Oct/2015	21/Jan/2016	Implmention and testing	43$/h
Validation Lead	8/Oct/2016	21/Jan/2017	testing	30$/h

Role	From	To	Phase	Price
Configuration Management	8/Oct/2017	21/Jan/2018	implementation	35$/h
Change Management	8/Oct/2018	21/Jan/2019	control	34$/h
Software Architect	21/Sep/2015	21/Jan/2020	implementation and planning	33$/h
Database Engineer	8/Oct/2018	21/Jan/2019	implementation	33$/h
User-Interface designer	8/Oct/2018	21/Jan/2019	implementation	33$/h
iOS Programmer	8/Oct/2018	21/Jan/2019	implementation	38$/h
Android Programmer	8/Oct/2018	21/Jan/2019	implementation	38$/h
ASP.NET Programmer	8/Oct/2018	21/Jan/2019	implementation	38$/h

6.7 Communication Management Plan

6.7.1 Introduction

This Communications Management Plan sets the communications framework for this project. It will serve as a guide for communications throughout the life of the project and will be updated as communication needs change. This plan identifies and defines the roles of persons involved in this project. It also includes a communications matrix which maps the communication requirements of this project.

6.7.2 Communications Management Approach

The Project Manager will take a proactive role in ensuring effective communications on this project. The communications requirements are documented in the Communications Matrix presented in this document. The Communications Matrix will be used as the guide for what information to communicate, who is to do the communicating, when to communicate it and to whom to communicate.

As with most project plans, updates or changes may be required as the project progresses or changes are approved. Changes or updates may be required due to changes in personnel, scope, budget, or other reasons. Additionally, updates may be required as the project matures and additional requirements are needed. The project manager is responsible for managing all proposed and approved changes to the communications management plan. Once the change is approved, the project manager will update the plan and supporting documentation and will distribute the updates to the project team and all stakeholders. This methodology is consistent with the project's Change Management Plan and ensures that all project stakeholders remain aware and informed of any changes to communications management.

6.7.3 Communications Management Plan

Communication Type	Objective of Communication	Medium	Frequency	Audience	Lead	Deliverables	Format
Internal Communication:							
Kickoff Meetings	-Overview of the project -Distributing the roles -Defining the risks, opportunities and outcomes of the project.	Face to Face or Teleconference	Twice at the beginning of the project.	-Project Team -Project Sponsor -Project Stakeholders	Project Manager	-Agenda -Reports and Outcome documents -Project plan and Management plan	Soft Copy and Hard Copy
Team Meetings	Review and discuss the progress with the team	Face to Face	Every 3 days	Project Team	Team Lead	Task progress report	Soft Copy
Technical Design Meetings	Discuss and develop technical design solutions for the project	Face to Face	As needed	Design Team	Team Lead	-Software Design Document -Progress Report	Soft Copy and Hard Copy
Monthly Project Status Meetings	Report on the status of the project	Face to Face or Teleconference	Monthly	-Project Team -Project Sponsor	Project Manager	-Project Progress Report -Configuration Document Adjustment	Soft Copy and Hard Copy
Status Reports	Status reports that include Activities, progress, issues of the project	Email, Phone Face to Face, Shared Repository Server	Weekly	Teams and Divisions	-Project Manager	Current status report	Soft Copy
Project Shared Library	Share necessary documents	Shared Repository Server	Along with the project duration	Teams and Divisions	Team and Division Lead	Necessary documents and libraries	Soft Copy and Hard Copy

Milestone Meetings	-Adjustment for the current milestone -Planning for the next milestone	Face to Face or Teleconference	As needed	Teams and Divisions	Project Manager	-Milestone Progress report -Configuration document	Soft Copy and Hard Copy
Final Meeting	-Audit -Closing -Archiving Project Documents	Face to Face or Teleconference	Once (at the end of the project)	-Project Team -Project Sponsor -Project Stakeholders	Project Manager	-Final Project Report -Archived Project Documents	Soft Copy and Hard Copy
External Communication:							
Delivery Reports	A report that includes information about -delivery timing -equipment	Email Face to Face	Monthly	Project Stakeholders	-Project Manager -Team	Report that have delivery information and issues	Soft Copy and Hard Copy
Project Reports	-A report that includes progress, forecast and risks	Email Face to Face	Biweekly	Project Stakeholders	-Project Manager -Team Lead	Report that summarizes the current situation of the project	Soft Copy and Hard Copy
Project Meetings	-Discussing the development of the project and the requirements if there will be any changes	Face to Face or Teleconference	Every 45days	Project Stakeholders	-Project Manager - Team and Division Lead	-Change Request (if needed)	Soft Copy and Hard Copy

6.8 Risk Management

6.8.1 Risk Management Plan

This part will introduce the followed procedures in risks identification and analysis. It also address how will we manage those risks.

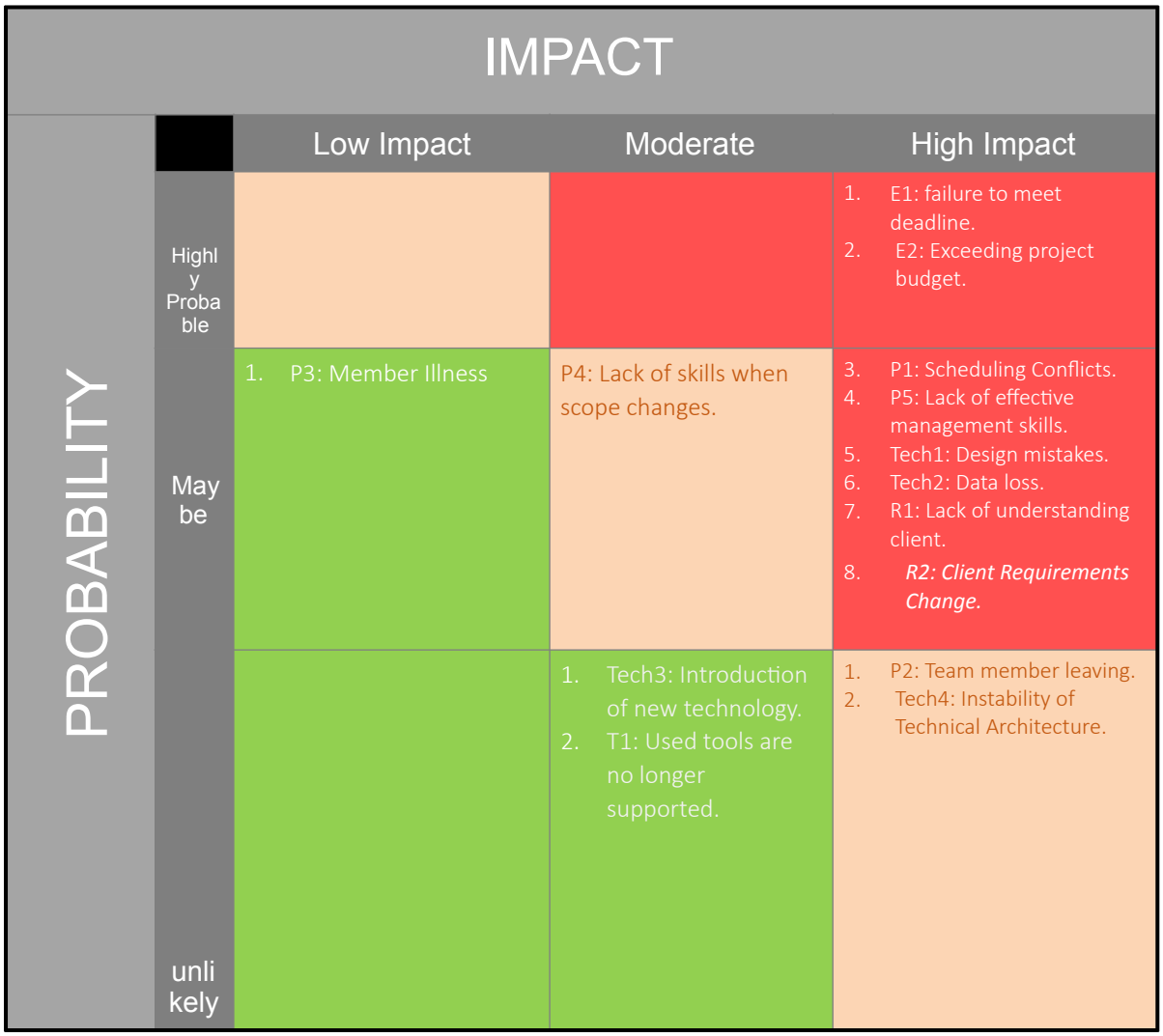
6.8.2 Risk Analysis

6.8.2.1 Quantitive Risk Analysis

Risk Area	Potential Risks
People	1. Scheduling Conflicts. 2. Team members may leave (drop the semester). 3. Team members might not be able to work due to illness. 4. Lack of skilled team member if any scope changes occurred. 5. Lack of effective management skills
Technology	1. Design mistakes 2. Loss of data due to (hacking, human mistake. 3. Introduction of new technology. 4. Instability of technical architecture.
Requirements	1. Lack of understanding of client requirements 2. Client requirements change.
Estimation	1. Failure to meet deadlines. 2. Exceeding project budget.
Tools	1. Used tools are no longer supported.

6.8.2.2 Qualitative Risk Analysis

We will use Probability/Impact matrix to sort the risk importance.



6.8.3 Risk Monitoring

All the risks will be maintained by the project team and will be reported to Fahd Alhassan the leader of Quality Assurance team. Weekly reports will be presented to the project manager Abdulaziz alzahrani indicating the risks. The Project Manager has overall responsibility for managing project risk. Project team members may be assigned specific areas of responsibility for reporting to the project manager. New risks may be added to the Risk table by the project manager or quality assurance team at any time.

6.8.4 Risk Register

#Risk	Risk Name	Probability(1 to 5)	Risk Score (1 to 5)	Mitigation	Contingency	Risk Score after Mitigation	Action By
1	Scheduling Conflicts.	4	5	Set a plan considering all details of all team members, and use Google calendar to monitor changes	Use teleconference or conduct meetings through phone	2	Team Members
2	Team members may leave (drop the semester).	1	5	Notify Project Manager	Hire a new team member	3	Project Manager
3	Team members might not be able to work due to illness.	2	2	Coordinate between team members to distribute the work of the unavailable member between them	Hire a new team member	1	Project Manager
4	Lack of skilled team member if any scope changes occurred.	3	3	Train team members to get the needed skills	Getting help from Software Engineering Department	2	Project Manager
5	Lack of effective management skills	3	5	Read best practices of project management	Take training for Project Management	3	Project Manager
6	Design mistakes	2	5	Following the process and monitor it	Go back and fix bugs	3	Technical Lead

7	Loss of data due to (hacking, human mistake).	2	5	All projects documents and work should be backed up t in each of team members device and in the SWE Department	Trying to communicate with web cloud provider to retrieve lost information	1	Project Manager
8	Introduction of new technology.	1	3	Pick the latest supported and reliable technology	Get help from SWE Department or a consultant	1	Project Manager
9	Instability of technical architecture.	2	5	Do the architecture that covers all requirements perfectly	Get help from an architecture consultant ASAP	2	Technical Lead
10	Lack of understanding of client requirements	3	5	Explore similar projects	Verify & validate of the requirement with the user	2	Technical Lead
11	Client requirements change.	3	4	Anticipate the change and prepare a contingency plan for it	Plan the change and ask for more time and resources (if needed)	2	Project Manager
12	Failure to meet deadlines.	5	5	Add a buffer for each task to reduce the number of late tasks, if the task is done on time that buffer could be used in any other tasks	Take over time and add resources for the task to finish it ASAP	3	Project Manager

13	Exceeding project budget.	4	5	Have a detailed project cost estimation and look for the case in previous projects	Updating the cost plan and try to cut costs in the remaining of the project	2	Project Manager
14	Used tools are no longer supported.	1	3	Pick the latest supported and popular Tools	Get the new version and get help to know how to use it	1	Project Manager

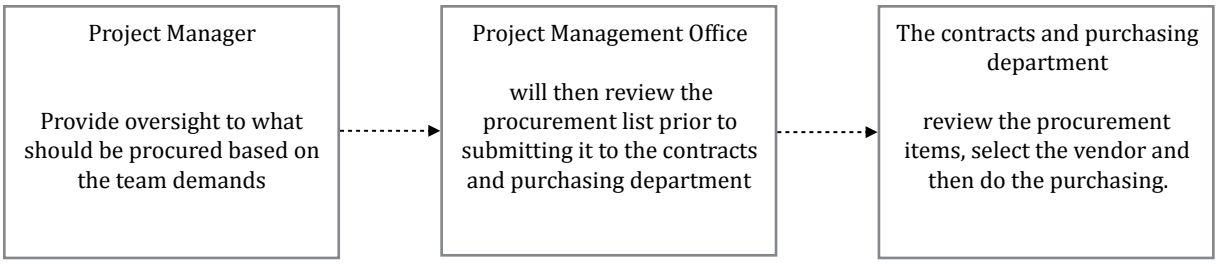
6.9 Procurement Management

6.9.1.1 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. 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 metrics in measuring procurement activities is included. Other items included in the procurement management plan include: procurement risks and procurement risk management considerations; how costs will be determined; how standard procurement documentation will be used; and procurement constraints.

6.9.1.2 Procurement Management Approach

The Project Manager Abdulaziz Alzahrani will provide oversight and management for all procurement activities under this project. The Project Manager will work with the project team to identify all items to be procured for the successful completion of the project. The Project Management Office (PMO) will then review the procurement list prior to submitting it to the contracts and purchasing department. The contracts and purchasing department will review the procurement items, determine whether it is advantageous to make or buy the items, and begin the vendor selection, purchasing and the contracting process.



Procurement Management Approach Flow Graph

6.9.1.3 Procurement Definition

The following procurement items and/or services have been determined to be essential for project completion and success. The following list of items/services, justification, and timeline are pending PMO review for submission to the contracts and purchasing department

Item/Service	Justification	Needed by
Photo Uplaod Service	This service will provide all the necessary backend to upload and view photos for all various users of the system apps.	05 October 2015
Tablet devices	Mainly for the maintenance team to check requests, update their status and close them.	07 Jan 2015
Cellular internet provider	To go along with tablets for the responsible teams to accomplish their missions.	05 Jan 2015
Servers	We will use outside services for backup pourpeses to avoid any failure to the internal ones.	1 October 2015
Laptops	They are going to be disrupted among the team members to accomplish the needed tasks	05 October 2015
Training	Training sessions will be given to the maintenance team to get used to the system.	05 Jan 2016
Travel tickets	For travel purposes fro the team purposes.	Open tickets for will be decided later
Purchases “COTS”	To enhance the reusability of the the application via using COTS components	2 November 2016

refer to the included excel sheet for more costs details.

6.9.1.3.1 Procurement Team

Name	Role
Abdulaziz Alzahrani	Project Manager
Abdullah Al-yami	Procurement Manager
Mohammed Al-Sayed	Communication Maneger
Abdullah Al-Hazmi	Legal Officer

6.9.1.4 Contracts' Types

All items and services to be procured for this project will be solicited under firm-fixed price contracts so we are in more secure situation. The project team will work with the contracts and purchasing department to define the item types, quantities, services and required delivery dates. The contracts and purchasing department will then solicit bids from various vendors in order to procure the items within the required time frame and at a reasonable cost under the firm fixed price contract once the vendor is selected. This contract will be awarded with one base year and three option years.

6.9.1.5 Cost Determination

For this project we will issue a Request for Proposal (RFP) in order to solicit proposals from various vendors which describe how they will meet our requirements and the cost of doing so. All proposals will include vendor support for items in section 6.9.3 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 resumes of employees performing the work, and a line-item breakdown of all costs involved. Additionally, the vendors will be required to submit work breakdown structures (WBSs) and work schedules to show their understanding of the work to be performed and their ability to meet the project schedule.
All information must be included in each proposal as the proposals will be used as the foundation of our selection criteria. Proposals which omit solicited information or contain incomplete information will be discarded from consideration.

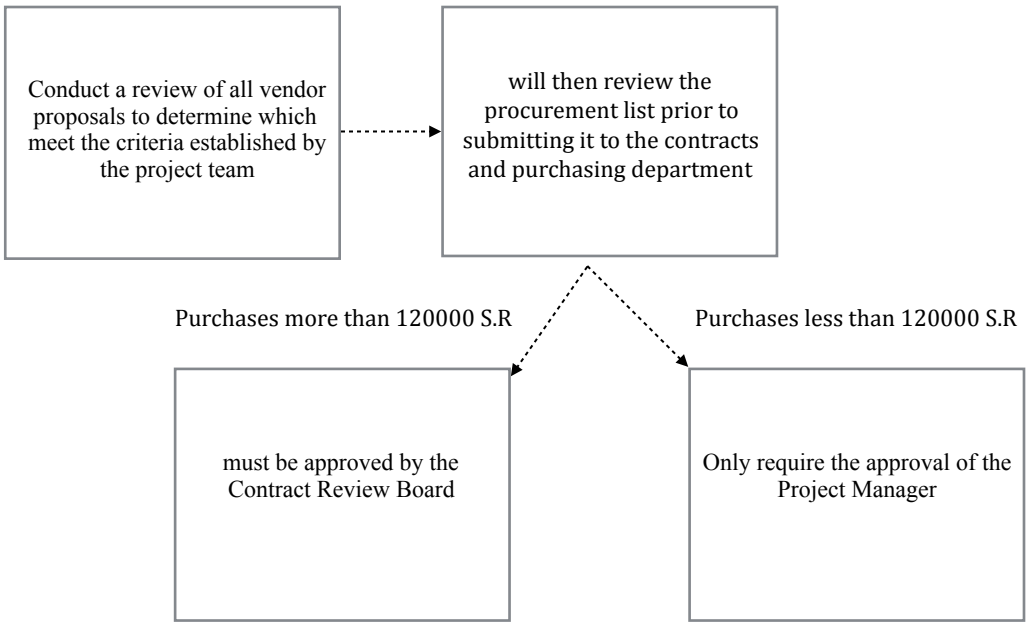
6.9.1.6 Standardized Procurement Documentation

The procurement management process consists of many steps as well as ongoing management of all procurement activities and contracts. In this dynamic and sensitive environment, our goal must be to simplify procurement management by all necessary means in order to facilitate successful completion of our contracts and project. To aid in simplifying these tasks, we will use standard documentation for all steps of the procurement management process. These standard documents have been developed and revised over a period of many years in an effort to continually improve procurement efforts. They provide adequate levels of detail which allows for easier comparison of proposals, more accurate pricing, more detailed responses, and more effective management of contracts and vendors.
The PMO maintains a repository on the company's shared drive which contains standard project management and procurement documentation that will be used for this project. The following standard documents will be used for project procurement activities:

- Standard Request for Proposal Template to include
  - Background
  - Proposal process and timelines
  - Proposal guidelines
  - Proposal formats and media
  - Source selection criteria
  - Pricing forms

  - Statement of work
  - Terms and Conditions
- Internal source selection evaluation forms
- Non-disclosure agreement
- Letter of intent
- Firm fixed price contract
- Procurement audit form
- Procurement performance evaluation form
- Lessons learned form

6.9.7 Contract Approval Process



Contract Approval Flow Graph

6.9.1.8 Decision Criteria

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

- Ability of the vendor to provide all items by the required delivery date
- CV's of major employee who will be working on the order.
- Quality of previous outcomes
- Cost
- Expected delivery date
- Comparison of outsourced cost versus in-sourcing

These criteria will be measured by the contracts review board and/or the Project Manager. The ultimate decision will be made based on these criteria as well as available resources.

6.9.2 Sub-contract Management

Sub-contractor		Sub-contracted Work
Company	**Contact**	
Sub-contractor 1	Paid $225 Hourly	Database analyisis
Sub-contractor 2	Paid $225 Hourly	Networking
Sub-contractor 3	Paid $225 Hourly	System Architecture
Sub-contractor 4	Paid $225 Hourly	Component research
Sub-contractor 5	Paid $225 Hourly	Code optimization
Sub-contractor 6	Paid $225 Hourly	Security
Sub-contractor 7	Paid $300 Hourly	Testing team for API's
Sub-contractor 8	Paid $300 Hourly	Testing team for component integration
Sub-contractor 9	Paid $300 Hourly	Functionality testing team
Sub-contractor 10	Paid $300 Hourly	DB testing team

7- Abbreviations and Detention

Abbreviation	Definition
PTS	Pothole Tracking System - The project name.
SME	Subject Matter Expert
CCB	Change Control Board
CI	Configuration Item
CM	Configuration Management
COTS	Commercial Off The Shelf
CR	Change Request
CRM	Change Request Management