Rose Park Golf Course GIS Database & Mobile App

Erik Neemann

15 Nov 2017

Overview

- Background
- Justification
- Knowledge Areas
  - Scope
  - Time
  - Cost
  - Quality
  - Risk
  - Procurement

Background

- Salt Lake City golf courses plagued by financial struggles in recent years
  - 2 golf courses closed since 2015 (Wingpointe, Jordan River)
  - Rose Park moved from Golf Enterprise Fund to General Fund (2017)
    - Net operating loss of $1.4M from 2005-2014
- Opportunity to improve processes and return to financial viability with innovative solutions
- Propose building detailed golf course GIS database and exploiting the data with a multi-faceted mobile application
  - Course Maintenance: Improve use of resources with better estimation and prediction of needs (water, seed, fertilizer, etc.)
  - Course Management: Tee time reservation, in-app advertising, snack bar menu/purchasing
  - Golf GPS: Improve golf experience by exposing GIS data, increase number of rounds played, pace of play

Justification

- Project fits organization goals:
  - Provide affordable recreation to citizens
  - Maintain profitable or financially solvent Golf Enterprise Fund
- How to meet these goals through GIS/Mobile App project
  - Make course maintenance more efficient: cut costs
  - Improve golfer experience & increase number of rounds played
  - Add new revenue stream: in-app advertising

Discount rate	8.00%								
Assume the project is completed in Year 0			Year						
	0	1	2	3	4	5	6	Total	
Costs	134,897	1,400	1,400	1,400	1,400	1,400	1,400		
Discount factor	1.00	0.93	0.86	0.79	0.74	0.68	0.63		
Discounted costs	**134,897**	**1,302**	**1,204**	**1,106**	**1,036**	**952**	**882**	**141,379**	
Benefits	0	30,847	42,019	53,526	53,526	53,526	53,526		
Discount factor	1.00	0.93	0.86	0.79	0.74	0.68	0.63		
Discounted benefits	**0**	**28,687**	**36,136**	**42,286**	**39,609**	**36,398**	**33,722**	**216,838**	
Discounted benefits - costs	(134,897)	27,385	34,932	41,180	38,573	35,446	32,840	**75,459**	← **NPV**
Cumulative benefits - costs	(134,897)	(107,512)	(72,579)	(31,400)	7,174	42,620	75,459		
ROI →	**53%**								
			Payback in Year 4						

Scope

- Scope Statement
  - Justification
  - Product Characteristics and Requirements
  - Summary of Deliverables
  - Project Success Criteria
- Work Breakdown Structure
  - Top-down approach
  - 6 summary tasks
  - 87 low-level tasks
  - Agile development cycle
    - Preparation sprint
    - 3 development sprints

Scope Statement

Project Title: Rose Park GIS Database & Mobile Application
Date: 12 Nov 2017 **Prepared by:** Erik Neemann

Project Justification:
Over the last several years, Rose Park Golf Course has failed to earn profits, but it is believed that resource and maintenance costs can be streamlined with the implementation of detailed, GIS-based golf course database. Second-order improvements to the golf experience and increased advertising revenue are also anticipated as the result of the project by developing a mobile app to exploit the GIS data. The long-term goal of Salt Lake City's golf course system is to provide affordable recreation to citizens in a financially solvent or profitable business. The Rose Park GIS database project will support this goal by both cutting operating costs and increasing revenue. By using data to its advantage, the Rose Park staff can improve the efficiency of their course maintenance practices to promote profitability. The mobile app will also provide an additional revenue stream (in-app advertising and food purchases) and increase the number of rounds per year by speeding up the pace of play, improving the golf experience, and increasing the number of repeat customers. Over six years, this project is expected to yield an NPV of $75,459 and ROI of 53% on an initial investment of $134,897.

Product Characteristics and Requirements:
1. Comprehensive Rose Park Golf Course GIS Database
2. Mobile Application capable of exploiting GIS Database for the functions below:

A. *Golf Course Management*
- Snack bar functions (view menu, online ordering, payment, etc.)
- Tee time reservation system
- Advertising functions

B. *Golf Course Maintenance*
- Resource estimation module (water, seed, fertilizer, pesticide, etc.)
- Water and irrigation scheduling/recommendations function
- Integration with local weather data (recent rainfall, forecast, soil moisture, etc.)
- Best practice scheduling suggestions (seeding, aeration, clear water lines, etc.)

C. *Golf GPS*
- GPS distance to fairways, greens, bunkers, hazards, other GIS database objects
- Golf round scoring for 1-4 players
- Completed round logs and statistics
- User score handicapping

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  - Agile development cycle
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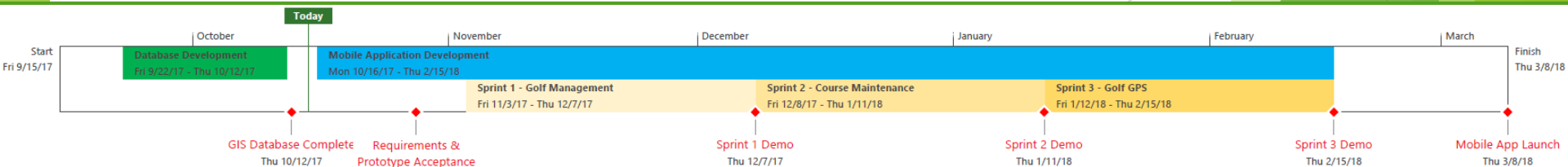
    - 3 development sprints

Scope Statement

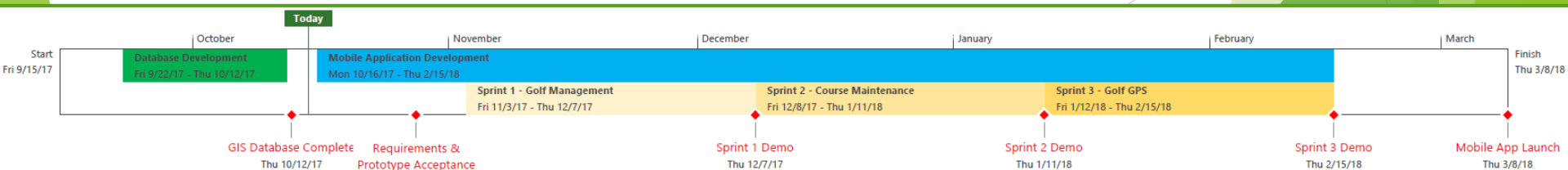
42		**3 Mobile Application Development**	**89 days**	**Mon 10/16/17**	**Thu 2/15/18**	
43		**3.1 Mobile App Concept**	**4 days**	**Mon 10/16/17**	**Thu 10/19/17**	
44		3.1.1 Define Requirements	**3 days**	**Mon 10/16/17**	**Wed 10/18/17**	
45		3.1.1.1 Course Maintenance Rqmts	3 days	Mon 10/16/17	Wed 10/18/17	
46		3.1.1.2 Golf Mgmt Rqmts	3 days	Mon 10/16/17	Wed 10/18/17	
47		3.1.1.3 Golfer Rqmts	3 days	Mon 10/16/17	Wed 10/18/17	
48		3.1.2 System Requirements	1 day	Thu 10/19/17	Thu 10/19/17	44
49		**3.2 Mobile App Prototyping**	**6 days**	**Fri 10/20/17**	**Fri 10/27/17**	**43**
50		3.2.1 Prototype Design	4 days	Fri 10/20/17	Wed 10/25/17	
51		3.2.2 Prototype Stakeholder Review	1 day	Thu 10/26/17	Thu 10/26/17	50
52		3.2.3 Prototype Lessons Learned	4 hrs	Fri 10/27/17	Fri 10/27/17	51
53		3.2.4 Requirements Updates	4 hrs	Fri 10/27/17	Fri 10/27/17	52
54		**3.3 Requirements & Prototype Acceptance**	**0 days**	**Fri 10/27/17**	**Fri 10/27/17**	**49**
55		**3.4 Mobile App Development Sprints**	**79 days**	**Mon 10/30/17**	**Thu 2/15/18**	**54**
56		**3.4.1 Sprint 0 - Preparation**	**4 days**	**Mon 10/30/17**	**Thu 11/2/17**	
57		3.4.1.1 Team Planning Session	4 hrs	Mon 10/30/17	Mon 10/30/17	
58		3.4.1.2 Team Task Breakdown	1.5 days	Mon 10/30/17	Tue 10/31/17	57
59		3.4.1.3 Build Backlog & Assign Points	1 day	Wed 11/1/17	Wed 11/1/17	58
60		3.4.1.4 Organize Sprint Backlogs	1 day	Thu 11/2/17	Thu 11/2/17	59
61		**3.4.2 Sprint 1 - Golf Management**	**25 days**	**Fri 11/3/17**	**Thu 12/7/17**	**56**
62		3.4.2.1 Snack Bar Functionality Dev	15 days	Fri 11/3/17	Thu 11/23/17	
63		3.4.2.1.1 Menu & Ordering	10 days	Fri 11/3/17	Thu 11/16/17	
64		3.4.2.1.2 Payment/Checkout	5 days	Fri 11/17/17	Thu 11/23/17	63
65		3.4.2.2 Advertising Functionality Dev	10 days	Fri 11/3/17	Thu 11/16/17	
66		3.4.2.3 Golf Mgmt Integration Testing	5 days	Fri 11/24/17	Thu 11/30/17	65,62
67		3.4.2.4 Mgmt Bug Fixes/Buffer	5 days	Fri 12/1/17	Thu 12/7/17	66
68		**3.4.3 Sprint 1 Demo**	0 days	Thu 12/7/17	Thu 12/7/17	61
69		**3.4.4 Sprint 2 - Course Maintenance**	**25 days**	**Fri 12/8/17**	**Thu 1/11/18**	**61**
70		3.4.4.1 Course Maint Functionality Dev	**15 days**	**Fri 12/8/17**	**Thu 12/28/17**	
71		3.4.4.1.1 Water Resource Estimation Tools	7 days	Fri 12/8/17	Mon 12/18/17	
72		3.4.4.1.2 Turf Resource Estimation Tools	8 days	Tue 12/19/17	Thu 12/28/17	71
73		3.4.4.2 Course Maint Integration Testing	5 days	Fri 12/29/17	Thu 1/4/18	72
74		3.4.4.3 Maint Bug Fixes/Buffer	5 days	Fri 1/5/18	Thu 1/11/18	73
75		**3.4.5 Sprint 2 Demo**	0 days	Thu 1/11/18	Thu 1/11/18	69
76		**3.4.6 Sprint 3 - Golf GPS**	**25 days**	**Fri 1/12/18**	**Thu 2/15/18**	**69**
77		3.4.6.1 Golf GPS Functionality Dev	15 days	Fri 1/12/18	Thu 2/1/18	
78		3.4.6.2 Golf GPS Integration Testing	5 days	Fri 2/2/18	Thu 2/8/18	77
79		3.4.6.3 Golf GPS Bug Fixes/Buffer	5 days	Fri 2/9/18	Thu 2/15/18	78
80		**3.4.7 Sprint 3 Demo**	**0 days**	**Thu 2/15/18**	**Thu 2/15/18**	**76**
81		**4 System & User Acceptance Testing**	**10 days**	**Fri 2/16/18**	**Thu 3/1/18**	**42**
82		4.1 Course Maintenance Tests	10 days	Fri 2/16/18	Thu 3/1/18	
83		4.2 Golfer GPS Tests	10 days	Fri 2/16/18	Thu 3/1/18	
84		4.3 Snack Bar Tests	10 days	Fri 2/16/18	Thu 3/1/18	
85		4.4 Advertising Tests	10 days	Fri 2/16/18	Thu 3/1/18	
86		**5 System Fielding**	5 days	Fri 3/2/18	Thu 3/8/18	81
87		**6 Mobile App Launch**	0 days	Thu 3/8/18	Thu 3/8/18	86

Time

- Estimated completion in 25 weeks
- PERT-based estimates used for individual tasks
- Leveraged MS Project features:
  - Organized tasks with duration and/or work definitions
  - De-conflicted personnel tasks by assigning resources
  - Applied dependencies and auto-scheduled
- Major milestones include:
  - GIS Database Completion
  - Requirements & Prototype Acceptance
  - Sprint Demos
  - Mobile App Launch



ID	Task Name	Duration	Start	Finish	Predece	Resource Names	Work
1	**1 GIS Database Development**	**20 days**	**Fri 9/15/17**	**Thu 10/12/17**			**286 hrs**
2	**1.1 Database Concept**	**2.5 days**	**Fri 9/15/17**	**Tue 9/19/17**			**40 hrs**
3	**1.1.1 Database Planning**	4 hrs	Fri 9/15/17	Fri 9/15/17		Adam,Brian	8 hrs
4	**1.1.2 Database Requirements**	**2 days**	**Fri 9/15/17**	**Tue 9/19/17**	3	**Adam,Brian**	**32 hrs**
5	1.1.2.1 DB Hardware Requirements	2 days	Fri 9/15/17	Tue 9/19/17			0 hrs
6	1.1.2.2 DB Software Requirements	2 days	Fri 9/15/17	Tue 9/19/17			0 hrs
7	1.1.2.3 DB Data Requirements	2 days	Fri 9/15/17	Tue 9/19/17			0 hrs
8	**1.2 Database Design**	**3 days**	**Tue 9/19/17**	**Fri 9/22/17**	4	**Adam,Brian**	**48 hrs**
9	1.2.1 Conceptual Design	1 day	Tue 9/19/17	Wed 9/20/17			0 hrs
10	1.2.2 Logical Design	1 day	Wed 9/20/17	Thu 9/21/17	9		0 hrs
11	1.2.3 Physical Design	1 day	Thu 9/21/17	Fri 9/22/17	10		0 hrs
12	**1.3 Database Development**	**13.75 days**	**Fri 9/22/17**	**Thu 10/12/17**	8		**198 hrs**
13	**1.3.1 Build GDB Structure**	1 day	Fri 9/22/17	Mon 9/25/17		Adam	8 hrs
14	**1.3.2 Develop Features/Attributes**	**4 days**	**Mon 9/25/17**	**Fri 9/29/17**	13		**72 hrs**
15	1.3.2.1 Tees	1 day	Thu 9/28/17	Thu 9/28/17		Adam	8 hrs
16	1.3.2.2 Fairways	1 day	Wed 9/27/17	Wed 9/27/17		Brian	8 hrs
17	1.3.2.3 Greens	4 hrs	Fri 9/29/17	Fri 9/29/17		Adam	4 hrs
18	1.3.2.4 Hole Centerlines	4 hrs	Thu 9/28/17	Thu 9/28/17		Brian	4 hrs
19	1.3.2.5 Bunkers	1.5 days	Tue 9/26/17	Wed 9/27/17		Adam	12 hrs
20	1.3.2.6 Rough	1.5 days	Tue 9/26/17	Fri 9/29/17		Brian	12 hrs
21	1.3.2.7 Native Areas	4 hrs	Mon 9/25/17	Mon 9/25/17		Brian	4 hrs
22	1.3.2.8 Landscaped Areas	4 hrs	Mon 9/25/17	Mon 9/25/17		Brian	4 hrs
23	1.3.2.9 Water Hazards	**1 day**	**Mon 9/25/17**	**Tue 9/26/17**			**8 hrs**
24	1.3.2.9.1 Creeks	4 hrs	Mon 9/25/17	Mon 9/25/17		Adam	4 hrs
25	1.3.2.9.2 Lakes/Ponds	4 hrs	Tue 9/26/17	Tue 9/26/17	24	Adam	4 hrs
26	1.3.2.10 Cart Paths	4 hrs	Thu 9/28/17	Thu 9/28/17		Brian	4 hrs
27	1.3.2.11 Hole Info Table	4 hrs	Fri 9/29/17	Fri 9/29/17		Brian	4 hrs
28	**1.3.3 GPS Field Collection**	**5.75 days**	**Fri 9/29/17**	**Mon 10/9/17**	14		**70 hrs**
29	1.3.3.1 Irrigation	**4.75 days**	**Mon 10/2/17**	**Fri 10/6/17**			**34 hrs**
30	1.3.3.1.1 Pumps	2 hrs	Tue 10/3/17	Tue 10/3/17		Adam	2 hrs
31	1.3.3.1.2 Valves	4 hrs	Tue 10/3/17	Wed 10/4/17		Adam	4 hrs
32	1.3.3.1.3 Lines	1 day	Thu 10/5/17	Fri 10/6/17		Adam	8 hrs
33	1.3.3.1.4 Sprinkler Heads	2.5 days	Mon 10/2/17	Wed 10/4/17		Brian	20 hrs
34	1.3.3.2 Verify Irrigation System	4 hrs	Fri 10/6/17	Mon 10/9/17	29	Adam	4 hrs
35	1.3.3.3 Drainage System	**4 days**	**Fri 9/29/17**	**Thu 10/5/17**			**16 hrs**
36	1.3.3.3.1 Drains	1 day	Fri 9/29/17	Mon 10/2/17		Adam	8 hrs
37	1.3.3.3.2 Drainage Lines	1 day	Wed 10/4/17	Thu 10/5/17	36	Brian	8 hrs
38	1.3.3.4 Electrical	1 day	Mon 10/2/17	Tue 10/3/17		Adam	8 hrs
39	1.3.3.5 Signs	1 day	Thu 10/5/17	Fri 10/6/17	38	Brian	8 hrs
40	**1.3.4 Field Data Integration**	3 days	Mon 10/9/17	Thu 10/12/17	28	Adam,Brian	48 hrs
41	**2 GIS Database Complete**	0 days	Thu 10/12/17	Thu 10/12/17	1		0 hrs



Cost

- $135K total cost
  - $102K software development and testing
  - $33K internal personnel costs (GIS, Proj Mgmt, IT)

Rose Park Project Cost Estimate

Prepared by: **Date:** **5-Nov-17**

Note: Change the WBS items and other entries to meet your project needs. This data is from Figure 7-1 of Schwalbe's text Information Technology Project Management, Fourth Edition. Also make sure the formulas work properly based on the data you enter.

	# Units/Hrs.	Cost/Unit/Hr.	Subtotals	WBS Level 1 Totals	% of Total
WBS Items					
1. GIS Database Development				**$10,010**	**7%**
1.1 Database Concept	40	$35	$1,400		
1.2 Database Design	48	$35	$1,680		
1.2 Database Development	198	$35	$6,930		
2. GIS Database Complete (Milestone)			$0	**$0**	
3. Mobile Application Development				**$96,120**	**71%**
3.1 Mobile App Concept	96	$45	$4,320		
3.2 Mobile App Prototyping	144	$45	$6,480		
3.3 Requirements & Prototype Acceptance (Milestone)	-	$0	$0		
3.4 Mobile App Development Sprints	1,896	$45	$85,320		
4. Acceptance Testing (6% of software costs)			$5,767.20	**$5,767**	**4%**
5. System Fielding				**$1,400**	**1%**
5.1 Deployment	40	$35	$1,400		
6. Mobile App Launch (Milestone)			$0	**$0**	**0%**
Additional Cost Items					
7. Project Manager Costs	480	$45	$21,600	**$21,600**	**16%**
Total project cost estimate				**$134,897**	

Cost

- $135K total cost
  - $102K software development and testing
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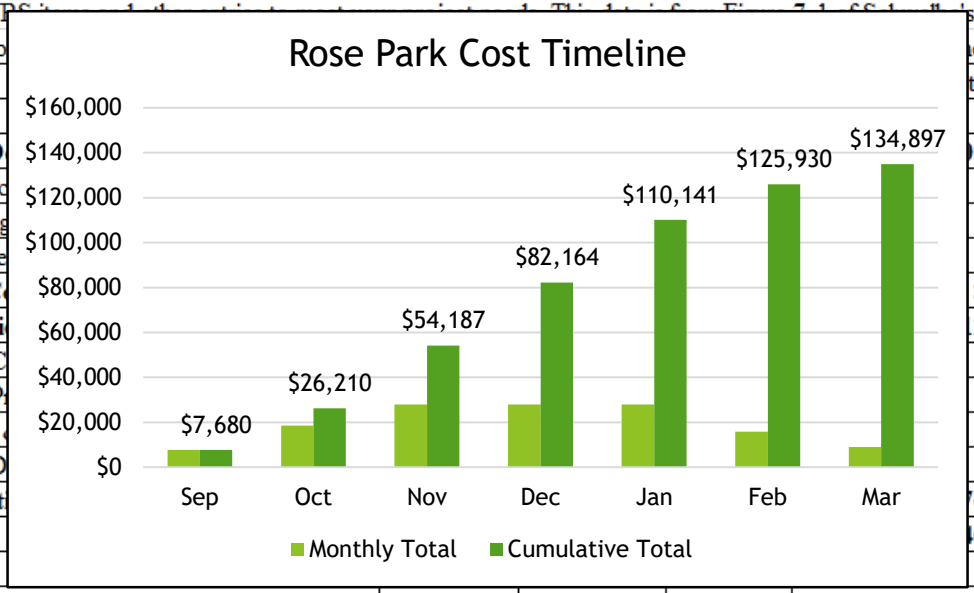
Rose Park Project Cost Estimate

Prepared by: **Date:** 5-Nov-17

Note: Change the WB[illegible] text

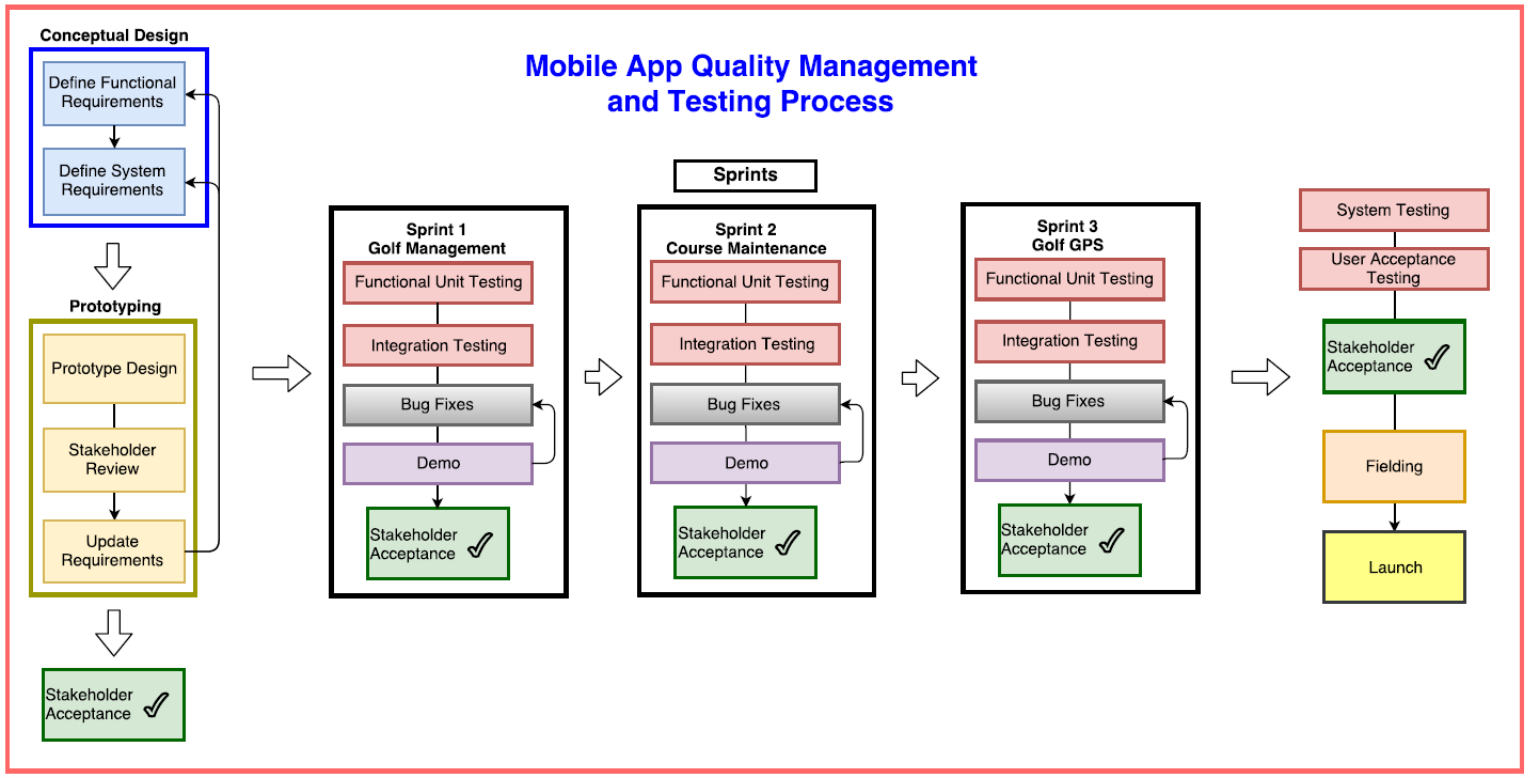
Information Technolo[illegible] e data you enter.

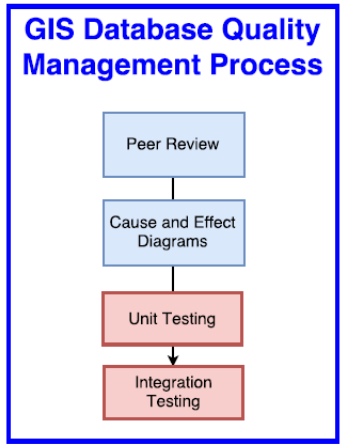


WBS Items				tals	% of Total
1. GIS Database D[illegible]				**10**	**7%**
1.1 Database Conc[illegible]					
1.2 Database Desig[illegible]					
1.2 Database Deve[illegible]					
2. GIS Database C[illegible]				**$0**	
3. Mobile Applicati[illegible]				**20**	**71%**
3.1 Mobile App C[illegible]					
3.2 Mobile App P[illegible]					
3.3 Requirements [illegible]					
3.4 Mobile App D[illegible]					
4. Acceptance Test[illegible]				**67**	**4%**
5. System Fielding				**00**	**1%**
5.1 Deployment					
6. Mobile App Launch (Milestone)			$0	**$0**	**0%**
Additional Cost Items					
7. Project Manager Costs	480	$45	$21,600	**$21,600**	**16%**
Total project cost estimate				**$134,897**	

Quality

- Apply Agile processes for multi-tiered quality assurance
  - Stakeholder involvement from start to finish
  - Requirements definition and Prototyping
  - Iterative testing, bug fixes, demos during sprint cycle
  - System and User Acceptance Testing





Risk

- Identify & mitigate with Risk Register and Probability/Impact Matrix

Number	Rank	Risk	Description	Category	Root Cause	Triggers	Potential Responses	Owner	Probability	Impact	Status
R2	1	Golfer App Adoption Slow	With the introduction of a new app for golfers to use, initial adoption may be slow. Many golfer GPS apps currently exist on the market and have several years of maturity behind them. This could result in hesistance to try a new app and lead to slow adoption by Rose Park golfers.	Market Risk	Strong competition from other golfer apps	Low download numbers in first weeks/months after release	Implement a strategic marketing campaign to highlight the features and added data compared to other apps. Highlight the app on SLC golf website, posters at clubhouse, encourage pro shop workers to mention it to golfers.	Derek Schmehl	medium	high	Open
R9	2	Mobile App Scope Creep	During app development, there could be scope creep where there is a desire to keep adding more features. This needs to be managed by sticking firm to the requirements and only enhancing the app if time/resources allow after the primary requirements are completed.	Structure Risk	Scope control not being properly managed, poor initial requirements or scope definition, stakeholders too involved	Adding tasks that don't meet agreed upon requirements, timeline lagging behind, too many visits from the "good idea fairy"	Freeze the addition of any new software development tasks, stop work on tasks not in requirements, increase oversight of mobile app development team by project manager	Erik Neemann	high	medium	Open
R7	3	Cost Overruns	Cost overruns are most likely to be encountered due to timeline delays and additional labor costs. Unidentified hardware requirements could also lead to additional, unforeseen costs that put us over the project budget.	Financial Risk	Poor estimates of cost or timelines to complete tasks, additional resources needed	Falling behind on budget/cost baseline early or at any point during the project	Reduce scope on project, decrease human resources working on project, reach back to sponsor and stakeholders to increase budget	Erik Neemann	medium	high	Open
R11	4	Golfer App Quality Behind Market	Due to the maturity of golfer GPS apps on the market, there is risk that our app will not provide the level of quality of other available apps.	Market Risk	Unable to meet quality of private company apps, not enough scope/time/resources to make app competitive	App not capable of providing features of other apps, interface not user friendly, bugs or issues discovered in testing, low download numbers in first weeks/months after release	Increase time dedicated testing/QC, host stakeholder meeting to brainstorm improvements, explore options to extend timeline/increase budget to improve mobile app	Software Contractor	medium	medium	Open
R8	5	Slow App Development Timeline	As with any software development task, we could encounter delays in mobile app development to utilize the GIS database. This would result in additional time/resources/cost needed to complete the project.	Technology Risk	Poor initial timeline estimates, unforeseen task complexity, software/hardware issues delaying progress	Falling behind on tasks during software development, sprints not fully complete or on-time	Investigate reducing mobile app scope, increase human resources to assist development (with expected cost increase), identify roadblocks that could be removed	Erik Neemann & Software Contractor	medium	medium	Open
R10	6	Benefits Don't Exceed Costs	In the long run, there is risk that the overall benefits (ad revenue, increased golfers, maintenance efficiency improvements) don't outweigh the cost invested in the project.	Financial Risk	Poor cost and/or benefit estimates, slow app adoption by golfers, poor ad sales	Golfer app downloads slow, no increase in golfer numbers, ad sales slow, maintenance efficiency gains not found or lower than expected, weather not cooperating	Increase marketing push for golfer app, reinvigorate sales push with local businesses, ensure maintenance best practices are being implemented	Erik Neemann	low	high	Open
R1	7	Poor Advertising Sales	Advertising sales represent a good percentage of the expected benefits from the project (~22% over 6 yrs). If advertising sales are slow or behind what was estimated, the benefits of the project won't be realized. This risk is potentially tied to R2, Golfer App Adoption.	Financial Risk	Low quality golf app, poor golfer adoption, inefficient marketing campaigns	Low sales numbers and income from advertising compared to projections in first weeks/months after release.	Pursue marketing campaign noted in R2, work with potential advertisers early on and generate interest up front. Target business near the course that could benefit and perform market analysis.	Dan Dent	low	medium	Open

Risk

- Identify & mitigate with Risk Register and Probability/Impact Matrix

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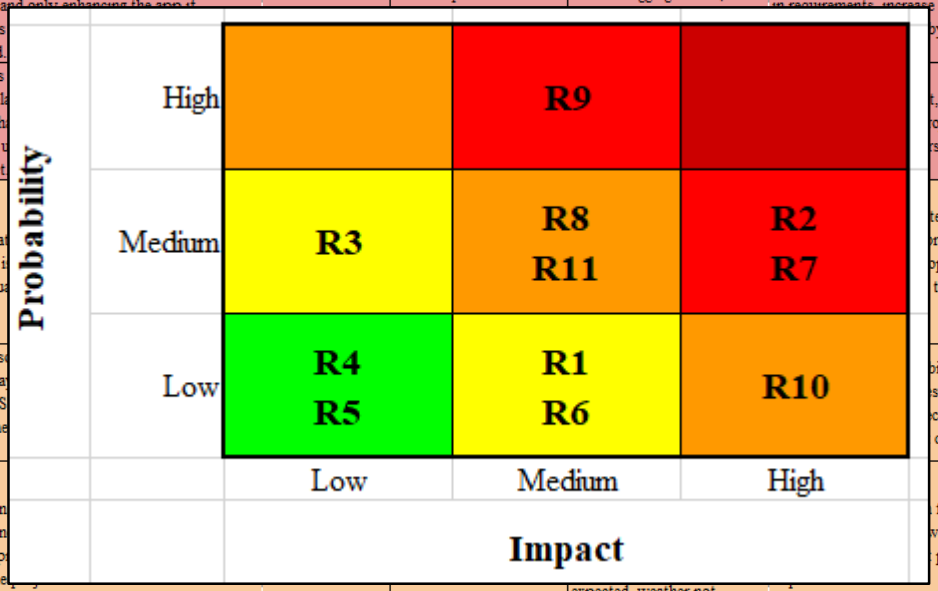
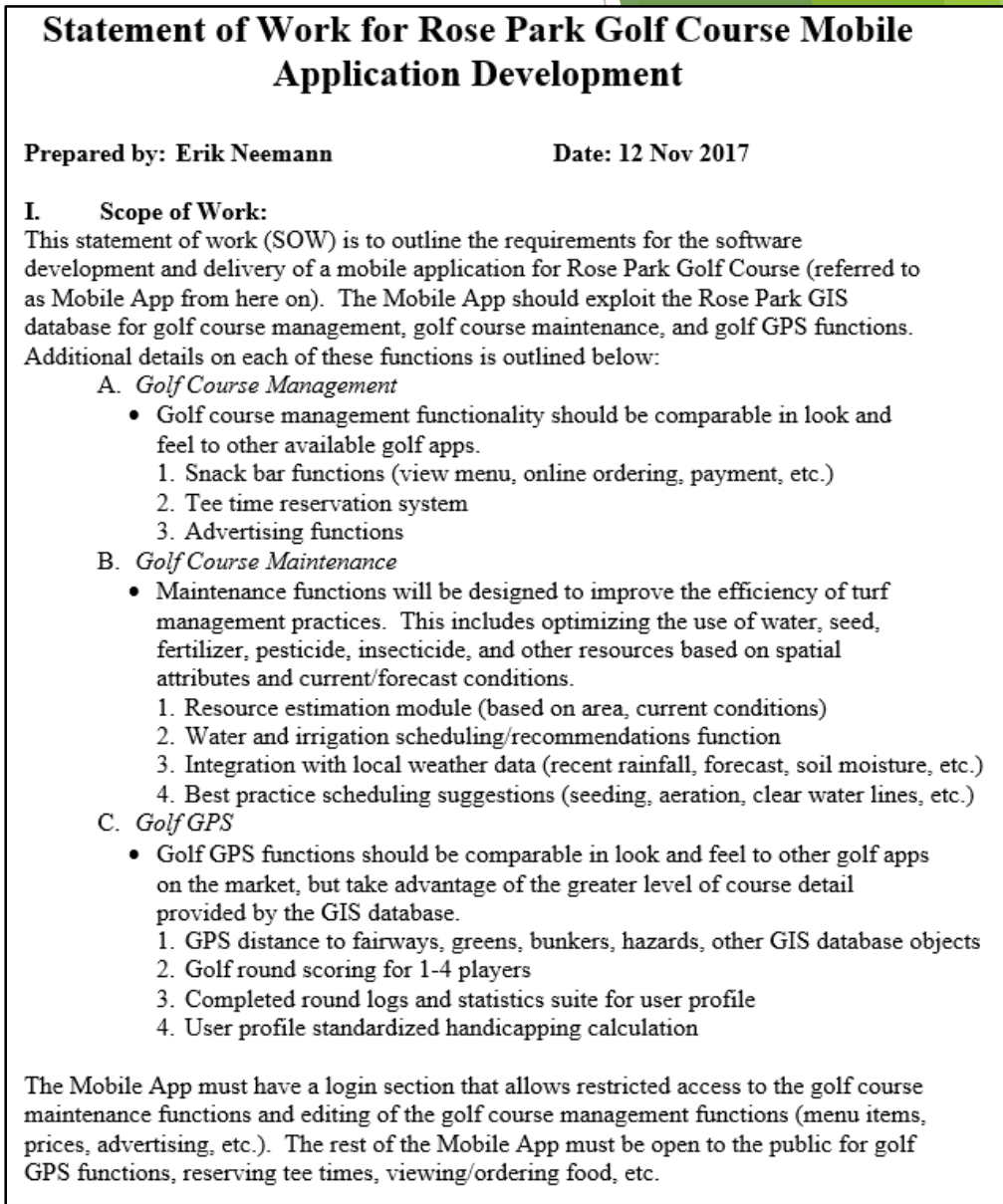
R2	1	Golfer App Adoption Slow	With the introduction of a new app for golfers to use, initial adoption may be slow. Many golfer GPS apps currently exist on the market and have several years of maturity behind them. This could result in hesistance to try a new app and lead to slow adoption by Rose Park golfers.	Market Risk	Strong competition from other golfer apps	Low download numbers in first weeks/months after release	Implement a strategic marketing campaign to highlight the features and added data compared to other apps. Highlight the app on SLC golf website, posters at clubhouse, encourage pro shop workers to mention it to golfers.	Derek Schmehl	medium	high	Open
R9	2	Mobile App Scope Creep	During app development, there could be scope creep where there is a desire to keep adding more features. This needs to be managed by sticking firm to the requirements and only enhancing the app if time/resources are completed.	Structure Risk	Scope control not being properly managed, poor initial requirements or	Adding tasks that don't meet agreed upon requirements, timeline lagging behind, too	Freeze the addition of any new software development tasks, stop work on tasks not in requirements, increase oversight of mobile by project manager	Erik Neemann	high	medium	Open
R7	3	Cost Overruns	Cost overruns to timeline dela Unidentified h to additional, u project budget				t, decrease human oject, reach back to rs to increase budget	Erik Neemann	medium	high	Open
R11	4	Golfer App Quality Behind Market	Due to the mat market, there i the level of qua				testing/QC, host brainstorm options to extend to improve mobile	Software Contractor	medium	medium	Open
R8	5	Slow App Development Timeline	As with any s encounter dela utilize the GIS additional time the project.				bile app scope, s to assist cted cost increase), could be removed	Erik Neemann & Software Contractor	medium	medium	Open
R10	6	Benefits Don't Exceed Costs	In the long run (ad revenue, in efficiency impr invested in the			expected, weather not cooperating	for golfer app, with local businesses, practices are being	Erik Neemann	low	high	Open
R1	7	Poor Advertising Sales	Advertising sales represent a good percentage of the expected benefits from the project (~22% over 6 yrs). If advertising sales are slow or behind what was estimated, the benefits of the project won't be realized. This risk is potentially tied to R2, Golfer App Adoption.	Financial Risk	Low quality golf app, poor golfer adoption, inefficient marketing campaigns	Low sales numbers and income from advertising compared to projections in first weeks/months after release.	Pursue marketing campaign noted in R2, work with potential advertisers early on and generate interest up front. Target business near the course that could benefit and perform market analysis.	Dan Dent	low	medium	Open



Procurement

- Procure support for Mobile App software development
- Target companies with experience in GPS Golf apps
- Statement of Work used to define critical aspects of contract
  - Scope of Work
  - Location of Work
  - Period of Performance
  - Deliverable Schedule
  - Applicable Standards
  - Acceptance Criteria
  - Special Requirements



Statement of Work for Rose Park Golf Course Mobile Application Development

Prepared by: Erik Neemann **Date: 12 Nov 2017**

I. Scope of Work:

This statement of work (SOW) is to outline the requirements for the software development and delivery of a mobile application for Rose Park Golf Course (referred to as Mobile App from here on). The Mobile App should exploit the Rose Park GIS database for golf course management, golf course maintenance, and golf GPS functions. Additional details on each of these functions is outlined below:

A. *Golf Course Management*
- Golf course management functionality should be comparable in look and feel to other available golf apps.
  1. Snack bar functions (view menu, online ordering, payment, etc.)
  2. Tee time reservation system
  3. Advertising functions

B. *Golf Course Maintenance*
- Maintenance functions will be designed to improve the efficiency of turf management practices. This includes optimizing the use of water, seed, fertilizer, pesticide, insecticide, and other resources based on spatial attributes and current/forecast conditions.
  1. Resource estimation module (based on area, current conditions)
  2. Water and irrigation scheduling/recommendations function
  3. Integration with local weather data (recent rainfall, forecast, soil moisture, etc.)
  4. Best practice scheduling suggestions (seeding, aeration, clear water lines, etc.)

C. *Golf GPS*
- Golf GPS functions should be comparable in look and feel to other golf apps on the market, but take advantage of the greater level of course detail provided by the GIS database.
  1. GPS distance to fairways, greens, bunkers, hazards, other GIS database objects
  2. Golf round scoring for 1-4 players
  3. Completed round logs and statistics suite for user profile
  4. User profile standardized handicapping calculation

The Mobile App must have a login section that allows restricted access to the golf course maintenance functions and editing of the golf course management functions (menu items, prices, advertising, etc.). The rest of the Mobile App must be open to the public for golf GPS functions, reserving tee times, viewing/ordering food, etc.

Questions?

Sources:

- Piper, M. (2017a, February 8). Salt Lake City's golf woes face tough crowd in council. *The Salt Lake Tribune*. Retrieved October 15, 2017, from http://archive.sltrib.com/article.php?id=4915676&itype=CMSID.
- Piper, M. (2017b, May 3). Biskupski's budget seeks to bolster homeless services, rethink golf funding. *The Salt Lake Tribune*. Retrieved October 15, 2017, from http://archive.sltrib.com/article.php?id=5245041&itype=CMSID&fullpage=1.
- McKellar, Katie. (2015, July 16). Wingpointe Golf Course scheduled to shut down Nov. 1. *Deseret News*. Retrieved October 15, 2017, from https://www.deseretnews.com/article/865632784/Wingpointe-Golf-Course-scheduled-to-shut-down-Nov-1.html.
- Mayor's Recommended Budget, Fiscal Year 2017-18. (2017). 2017 annual budget from Salt Lake City government. Retrieved October 15, 2017 from http://www.slcdocs.com/budget/mayor18.pdf.

Full Gantt Chart