Assessment of Water Resources Sustainability in Otter Point, Shirley, and Jordan River:

Project Agreement

Prepared by:

Pacific Priority Solutions

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Prepared for:

Otter Point and Shirley Residents and Ratepayers Association

Introduction

The Otter Point and Shirley Residents and Ratepayers Association (OPSRRA) have commissioned an Assessment of Water Resources Sustainability for the communities of Otter Point, Shirley, and Jordan River as a result of diminishing water security and rising concerns. Pacific Priority Solutions is a group comprised of four students from the Environmental Sciences program at Royal Roads University, Victoria. The final product of the assessment will include an ArcGIS database and map identifying known water resources in the area, identification of information gaps that may impede protection of existing resources, and completion of an assessment of the 2016 Water Sustainability Act pertaining specifically to the three communities. An assessment of this nature will assist in ensuring the protection and maintenance of water supplies, and act as a resource for making decisions regarding sustainable community growth and protection.

Project Team

The Water Resources Sustainability Assessment for Otter Point, Shirley, and Jordan River is being conducted by Pacific Priority Solutions. Pacific Priority Solutions is a student-formed group undertaking the Bachelor of Science in Environmental Science program at Royal Roads University, Victoria. The team comprises four members: Kodi Bowman, Gayle Hatchard, Victoria Ntomola, and Emily Rudderham. The project is being overseen by Royal Roads Faculty Advisor, Jonathan Moran Ph. D, and the Environmental Science Major Project financial advisor, Heather Wanke. The sponsor and client of the Water Resources Sustainability Assessment is the Otter Point and Shirley Residents Ratepayers Association (OPSRRA).

Research Questions

1. What geographical information (wells, water licenses, watersheds, groundwater, aquifers, etc.) is available to compile an easily accessible, maintainable and archivable water resource GIS map and database?
2. What information gaps and critical issues may impede the completion of a database and GIS map of the region's water resources, and the sustainability of water resources in the study region? What further investigations maybe needed to address identified gaps and critical issues?
3. Does the upcoming 2016 Water Sustainability Act reflect the communities' needs in terms of protection, regulation and development? Will the Act help support a sustainable community within the OPSRRA area in the future?

Objectives

- Create a central ArcGIS map using Capital Regional District (CRD) protocols and guidelines to provide a GIS-based map with wells, water licenses, watersheds, groundwater and aquifers. The map will be compatible with existing CRD databases, and delivered as an archivable and easily accessible product to the community

- Define information gaps in existing water source data, and identify potential barriers to groundwater sustainability

- Review, evaluate and summarize the Water Sustainability Act, and determine whether the Act will ensure the sustainability of water resources for current and future communities

- Gather information to show the necessity of aquifer studies

- Produce a formal report on findings of project

General Approaches

- Create a plan for obtaining water resource data

- Obtain data from municipal, regional, provincial, federal and international websites and archives

- Obtain data from water delivery and/or drilling companies

- Compile a geographical database and map of water resources

- Attempt to obtain information from up to two local water supply companies relating to the amount of water delivered to the residents in the OPSRRA communities

Ethical Review

An ethical review will be completed and submitted for review by the Research Ethics Board, in the event that acquisition of sensitive information from secondary non-public sources is required for this study. These data sources have the potential to identify residents.

Proposed Methodology

The methodology for this project is based upon both academic and applied principles. The acquisition, accumulation and compilation of data will comprise the largest component of this project. The compilation aspect will encompass the formation of a water resources database, and the generation of an ArcGIS map using CRD protocols and guidelines and CRD GIS Data Standards depicting various layers of data. The 2016 Water Sustainability Act will be assessed and summarized for the local regions of Shirley, Otter Point, and Jordan River. The data, data gaps and Water Sustainability Act assessment will be compiled into a final report for the client. The following steps will be undertaken:

- Familiarization

- o Evaluate and understand the data provided by OPSSRA
- o Utilize existing information and sponsor communication to determine direction and potential data gaps
- Data acquisition
  - o Identify and obtain required information for each water resource
  - o Identify and obtain data resources by investigating municipal, regional, provincial, and international databases, as well as processing the existing data possessed by OPSSRA
  - o Contact local government (CRD) staff in order to comply with CRD GIS Data Standards
  - o Collect and organize data to be used in the formation of the water resources database and ArcGIS map
  - o Obtain site information through site visits
  - o Assimilate data in a format compatible with the GIS platform
- Data compilation
  - o Create a user-friendly, archivable database which can be built upon in the future
  - o Enter data into a ArcGIS platform and create layers based on wells, aquifers, and other water sources of focus
  - o Assess and summarize findings of the 2016 Water Sustainability Act
  - o Produce a formal report on findings of project for the sponsor

Data Analysis Methods

Analysis of data will be performed using ArcGIS, a global information system designed for mapping spatial components. ArcGIS will be used to generate the map of water resources and accompanying database. This software was chosen for its broad capabilities and compatibility with the CRD and provincial government's existing groundwater databases.

Communication Plan

Communication between the team, sponsor and faculty advisor will be primarily conducted over e-mail, Google Documents, Dropbox, and phone. The team will meet every Tuesday, on the designated Major Project days, to carry out Major Project agendas. Due to the nature and time constraints of the project, tasks will change weekly.

The team will contact or meet with the faculty advisor every Tuesday, to clarify any questions surrounding the functionality and practicality of the project that have arisen during the week. This meeting will also be used to brief the advisor in order to ensure team progress in on track. Regular contact will be maintained with the sponsor over email and phone. Face-to-face meetings will be arranged with

the sponsor when needed. A briefing by email will be sent on a monthly basis to inform sponsor of project progress.

Deliverables to RRU

The following academic products and documents are to be submitted to the Project advisor (Jonathan Moran) as per the attached timeline (see Appendix A):

- Terms of Reference
- Draft project Agreement: approved terms, budget, signed by all and project sponsor
- Final Report
- Database and geographic map information

Deliverables to OPSRRA

- A centralized easily accessible, maintainable, and archivable water resources database
- An ArcGIS map of known water resources
- Identification of information gaps that may have significant impact on the water sustainability assessment
- A review, analysis and summary of the 2016 Water Sustainability Act relating to water resource sustainability in the three communities
- Project updates according to client timeline (See Appendix A)

Sponsor's Expectations of Pacific Priority Solutions

- Professional behaviour
- Meeting deadlines in a timely manner
- Maintaining adequate communication
- Producing a quality product pertinent to OPSRRA's requirements

Pacific Priority Solutions' Expectations of Sponsor

- Timely communication
- Relaying of data and aid in information access if possible (e.g. CRD database access)
- Maintaining the original state of documents presented to the client
- Crediting Pacific Priority Solutions for work carried out on the project
- Informing Pacific Priority Solutions on any changes to the project in a timely manner
- Project objectives and scope to remain static once the project agreement is signed

Appendix A: Client Timeline

January	
5	
12	First Meeting
22	Terms of Reference to Client and Budget
February	
16	Signed Draft Project Agreement
March	
15	Annotated Table of Contents
29	Site Visit
May	
31	Interim Report including Progress Report
	2 page Financial Statement
August	
26	Printed reports distributed to sponsors and team members @ Major Project presentations
26	Major Project Presentations

Appendix B: Client Budget

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Major Project Budget Proposal

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Date	Description	Total	Unit	Projected Quantity	Expenses	Funding
01-Dec-15	Admin Fee (Not Applicable)					$0.00
07-Mar-16	Total Project Funding			OPSRRA		$747.00
Expenses:		**Total**	**Unit**	**Projected Quantity**		
	Project Expenses					**$747.00**
	Printing of Final Project	2	50.00	2 copies at 50$ each (+HST)	$112.00	$635.00
	Maps and Photos	x	250.00	Various maps and photos	$250.00	$385.00
	Miscellaneous Printing Colour	150	0.40	150 colour pages of various prints	$60.00	$325.00
	Miscellaneous Printing Colour	371	0.07	370 B& W pages of various prints	$40.00	$285.00
	Mileage	300km	0.45	Site Visit to each community	$135.00	$150.00
	Software Rental			1 arcGIS platform anual subscription	$150.00	$0.00
						$0.00
				Total Expenses:	$747.00	

Estimated Billable Hours

Date	Description	Hours	Qty	Notes	Amount
21-Mar-16	2nd Quarter Billable Hours	264	66		17424.00
13-Jun-16	3rd Quarter Billable Hours	240	66		15840.00
28-Aug-16	4th Quarter Billable Hours	240	66		15840.00
				Total Estimated Billable Hours:	**49104.00**

PPS Team Member Signatures

Kodi Bow man	Date

Gayle Hatchard	Date

Emily Rudderham	Date

Victoria Ntomola	Date

RRU Major Project Advisor:

Jonathan Moran	Date

Major Project Sponsor:

Brenda Mark	Date
OPSRRA	