

## **Increasing Acceptance of Direct Potable Reuse as a Drinking Water Source in Ventura, CA**

### **Proposers**

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### **Client**

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### **Project Proposal**

#### ***Objectives***

The objectives of the project are to assess the current level of public perception towards Direct Potable Reuse (DPR) and to develop a plan for increasing public awareness and acceptance of DPR as a source of drinking water in Ventura by:

1. Conducting a comparative analysis on the municipal water districts that have successfully implemented DPR to determine best practices for DPR as well as key factors in obtaining public acceptance.
2. Analyzing the water quality data from the City of Ventura's DPR Pilot Project in order to communicate the safety and reliability of the City's DPR process to the public.
3. Developing the content for a comprehensive science-based outreach campaign to increase public acceptance of the future use of DPR in Ventura.

#### ***Background***

City of Ventura's water supply is made up of water from local aquifers, surface water storage in Lake Casitas, and sub-surface water from the Ventura River. The City's five main sources of water supply are the Casitas Municipal Water District, the Ventura River, and the Mound, Oxnard Plain, and Santa Paula Groundwater Basins. The City provides approximately 700 acre-feet per year (AFY) of recycled water for landscape irrigation from the Ventura Water Reclamation Facility (1). In the face of current and future droughts, the City is actively pursuing additional sources for its water supply.

Currently, most of the City's tertiary treated wastewater is released into the Santa Clara River Estuary, as approved in their National Pollution Discharge Elimination System (NPDES) permit from the Los Angeles Regional Water Quality Control Board (1). During the 2008 permit re-issuance process, concerns were raised as to whether the City should continue to release the same levels of treated wastewater into the Estuary (1). The City conducted a number of studies to determine the best use of treated water in order to maintain the health of the Estuary. Direct Potable Reuse was identified among the potential alternatives to the current discharges of treated water into the Estuary (2).

Direct Potable Reuse is the process of converting wastewater into purified drinking water and directly placing that water back into potable water supply systems without the use of an environmental buffer (3). For DPR, wastewater is treated beyond tertiary quality via reverse osmosis and/or other means of water purification. Alternative water supply programs including desalination and indirect potable reuse (IPR) have been also been considered by the City (2). IPR, as opposed to DPR, is the process of recharging groundwater aquifers or filling surface storage facilities (also referred to as environmental buffers) with advanced treated wastewater where it is held before undergoing additional treatment (2). DPR was determined to be the most efficient and cost-effective option with regards to the City's storage capabilities and budget constraints. Unfortunately, the successful implementation of DPR is hampered by three primary concerns that need to be addressed: 1) regulatory considerations, 2) public health concerns, and 3) public acceptance barriers. While the City of Ventura's DPR Pilot Project will address the first two concerns, this group project will focus on improving the low public acceptance rates of DPR by using the water quality results from the Pilot Project to convey to the public the safety and viability of this technology. This project aims to identify and address major concerns that are specific to the City's customers.

### ***Significance***

The current drought in California has increased stress on the water supplies of many cities around the State. The City of Ventura relies solely on local surface and groundwater for its municipal water source and is exploring how DPR can increase the reliability of its drinking water supply (1). The City is evaluating the possibility of implementing DPR within the next 10 years and is hoping to begin public outreach soon in order to increase acceptance of DPR as a drinking water resource.

The Senate Bill 918, signed in 2010, mandates that the California Department of Public Health (DPH) research the feasibility of developing consistent criteria for DPR in the State. The bill requires the DPH to report their final evaluation to the legislature by the end of 2016 (4). Setting a framework for the future utilization of DPR is pertinent for California as it aims to meet its mandated water recycling goal of 1,169,000 AFY by 2030, a 500,000 acre-foot increase from 2009 levels (5). A variety of projects are currently assessing DPR technology to assist with the DPH's decision, including a DPR pilot project at the Ventura Water Reclamation Facility (6). These types of projects are at the forefront of research for implementing DPR in California. Assisting with the Pilot Project will offer a unique opportunity to shape the State's DPR policies.

Developing a comprehensive outreach campaign that targets specific public concerns about DPR in the City of Ventura will help foster public acceptance of utilizing DPR as a source for the City's water supply. Furthermore, DPR will be an important part of the City's water supply portfolio as it faces population growth and the uncertainty of climate change. DPR is also expected to help mitigate the potential negative impacts associated with discharging treated wastewater into the Santa Clara River Estuary by decreasing the total amount of treated water Ventura releases to the Estuary.

The target audience for this project is the City of Ventura, but key features of the resulting outreach campaign could be applied to other cities in California as they begin to implement DPR. A successful DPR customer outreach campaign would benefit the citizens of Ventura by increasing their confidence in the quality and reliability of their local water supply.

### ***Available Data***

Data for the comparative analysis of DPR best practices are readily available via peer reviewed articles, online resources, and interviews with U.S. water providers currently using DPR. Data relating to the City of Ventura's DPR Pilot Program will be available as it is collected (starting in April 2015) and ready in full by the end of September 2015. Students could collect customer acceptance data in the form of an online customer survey. This survey would be distributed through the City's social networking presence (Facebook, Twitter, Blog, and Newsletter), given to customers at all events in which the City participates, and emailed to customers to obtain the largest target audience possible. In addition, existing DPR acceptance case studies will be used as a baseline to compare to the City of Ventura's customer survey results (7, 8, 9).

### ***Possible Approaches***

Objective 1:

- Conduct a literature review to synthesize information about DPR, identify common obstacles to implementing DPR in municipalities, and quantify potential economic and/or environmental benefits.
- Conduct interviews with U.S. water providers that are currently using DPR; focus on U.S. cities with similar concerns to Ventura, which include drought, cost of water supply, and saltwater intrusion.

Objective 2:

- Perform a statistical analysis comparing California water quality standards to the quality of the City's DPR processed water. Develop an effective plan for communicating complex data to Ventura's water users.

Objective 3:

- Design an online customer survey to determine public perceptions of DPR in Ventura.
- Quantify the economic and environmental benefits of DPR as compared to other water recycling options identified in the City's Water Recycling Studies (2).

### ***Deliverables***

The main deliverable of this project is the final report, the content of which will be the basis for a community outreach campaign framework aimed at fostering public acceptance of DPR technology within the City of Ventura. The outreach campaign will then target concerns discovered during research and data analysis. The goal of the campaign is to convey the safety and reliability of DPR as a water resource, while highlighting the benefits to water supply security and the health of the Santa Clara River Estuary. In addition, the plan will include recommendations for the most effective methods of framing DPR; for example messaging on the safety of DPR water quality, the environmental co-benefits, and/or the economic benefits.

### ***Internships***

Internships will be available. Paid internships will depend on budgets not yet determined by the City of Ventura. See the Client Letter of Support for more details.

## **Supporting Materials**

### ***Citations***

1. *2013 Comprehensive Water Resources Report*, Ventura Water. Prepared by RBF Consulting. June 2013. [http://www.cityofventura.net/files/file/public-works/water/WaterSupplyReport\\_Combined\\_06\\_10\\_13.pdf](http://www.cityofventura.net/files/file/public-works/water/WaterSupplyReport_Combined_06_10_13.pdf).
2. *Estuary Special Studies Phase 2: Facilities Planning Study for Expanding Recycled Water Delivery*, Ventura Water. Prepared by Carollo Engineers. January 2013. <http://www.cityofventura.net/files/file/public-works/water/130214%20FacilitiesPlanningStudies.pdf>.
3. *Carollo Engineers Supports California Direct Potable Reuse Initiative*. Carollo Engineers. <http://www.carollo.com/sites/default/files/news/DrinkinWaterSupport.pdf>.
4. *California to Develop Regulations for Potable Reuse*. WaterReuse. <https://www.watereuse.org/node/954>
5. *California Water Plan, Chapter 12: Municipal Recycled Water*. California Department of Water Resources. 2013. [http://www.waterplan.water.ca.gov/docs/cwpu2013/Final/Vol3\\_Ch12\\_Municipal-Recycled-Water.pdf](http://www.waterplan.water.ca.gov/docs/cwpu2013/Final/Vol3_Ch12_Municipal-Recycled-Water.pdf)
6. *Direct Potable Reuse: Providing Leadership to the Industry for Research, Permitting, and Implementation*. Carollo Engineers. April 2, 2014. <http://www.carollo.com/sites/default/files/tech-bulletins/DirectPotableReuse.pdf>.
7. *The Future of Direct Potable Reuse in California: Overcoming Public Acceptance Barriers*. Allison Chan, USF Scholarship Repository. December 12, 2014. <http://repository.usfca.edu/cgi/viewcontent.cgi?article=1101&context=capstone>.
8. *Turning the tide of public perception*. Barry Dugan. World Water: Water Reuse & Desalination. 2014. <http://www.datainstincts.com/direct-potable-reuse/pdf/Water-Reuse-Desalination-06-05-14.pdf>.
9. *An Analysis of Direct Potable Water Reuse Acceptance in the United States: Obstacles and Opportunities*. Charla R. Cain, Johns Hopkins Bloomberg School of Public Health. April 29, 2011. [http://ocw.jhsph.edu/courses/capstone2011/PDFs/Cain\\_Charla\\_2011.pdf](http://ocw.jhsph.edu/courses/capstone2011/PDFs/Cain_Charla_2011.pdf).

### ***Budget and Justification***

No additional funding is needed.

### ***Client Letter of Support***

See attached.

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**To:** Bren School of Environmental Science & Management, Group Project Committee

**From:** Ryan Kintz, Environmental Services Specialist, Ventura Water, City of Ventura

**Date:** January 22, 2015

**Subject:** Group Project Proposal: Increasing Acceptance of Direct Potable Reuse as a Drinking Water Source in Ventura, CA

This letter is to confirm the client, Ventura Water (City of Ventura) is committed to providing support to the degree necessary and possible to assist in the completion of the Group Project, *Increasing Acceptance of Direct Potable Reuse as a Drinking Water Source in Ventura, CA*. Ventura Water has a long term goal of developing a strategic plan and methodology to implement an educational outreach campaign plan relating to public acceptance of Direct Potable Reuse, and this Group Project will be a valuable resource to the completion of that goal. Ventura Water's commitment to completing this project is apparent in the upcoming start of the Direct Potable Reuse Pilot Study; therefore it is necessary this group project be completed in a timely manner that is sufficient with the deadlines set forth by the Bren School of Environmental Science & Management. Ventura Water also agrees to the following:

**Data:** The City of Ventura agrees to provide any public information or data that is available to the public relevant to the Group Project, *Increasing Acceptance of Direct Potable Reuse as a Drinking Water Source in Ventura, CA*. In addition, the Direct Potable Reuse Pilot Study is scheduled for installation late February. Data from this pilot study will be available to all organizations involved in the study. Data will begin to arrive and will be available for review in late April as each analysis is completed, and the project conclusion will be in September of 2015, at which time all data will be analyzed and available in full. In addition, surveys for gathering data on public acceptance of Direct Potable Reuse can be distributed as early as this spring.

**Funding:** Proposed group project should not require any additional funding beyond what will be provided by the Bren School.

**Internships:** The City of Ventura agrees to provide 2 unpaid internships during the summer of 2015. These internships will provide valuable experiences working in a water utility and provide hands on experiences of dealing with real world water resource management, and educational outreach/communication related issues. In addition, these internships will be provided with daily access to working professionals that can provide mentoring, networking opportunities and professional guidance.

As a fellow Bren Alum, I am excited at this opportunity to be working with Bren Students, Staff and Faculty once again. I believe this project exemplifies the Bren School mission of "... playing a leading role in researching environmental issues, identifying and solving environmental problems, and training research scientists and environmental management professionals." Water related environmental problems have always been and will continue to be a major issue to solve. This project gives Bren Students the opportunity to be on the leading edge of encouraging the public to accept a technology that has the potential to solve many water related issues. Given the current state of affairs in water resources across California and the world, this project has the potential to make a lasting impact on the acceptance of a technology that can be the future of water quality, and water supply reliability for years to come.

In sincere appreciation,

Ryan Kintz