

Title: U of I Potable Water Reduction Project
APPLICATION INFORMATION

Project Lead Contact Information

Name: Emad W. Jassim
E-mail: jassim@illinois.edu
Title: Senior Design Project Coordinator and
Lecturer
Organization/Department: MechSE

Phone: 217-244-3634
Address: 1206 W. Green St.
Urbana, IL 61801

Secondary Contact Information

Name: Guy Grant
E-mail: grgrant@illinois.edu
Title: Management Engineer
Organization/Department: Facilities & Services

Phone: 217-265-0530
Address: 1501 S. Oak St, Champaign, IL 61820

I. Detailed Project Description:

Please include:

- Project goals:
Reduce campus potable water usage by designing sump pump water collection, storage and dispensing system for portable water tanks used for watering campus vegetation, cleaning sewers, and making road/sidewalk salt solution. This project will involve both a feasibility study and system design by a team of U of I Department of Mechanical Science and Engineering (MechSE) Senior Design Students (ME 470).
- Definition of sustainability and the relationship of the project to this definition:
Sustainability can be defined as curtailing present usage of resources while fulfilling current needs so that they will be available for future generations without degradation. Potable water that we currently use on campus comes from the Mahomet aquifer. We are currently using water from the Mahomet aquifer at an unsustainable rate, so that future generations may not be able to benefit from it. There are many uses of potable water on campus that come from this aquifer, which are unnecessary and should be curtailed such as watering plants/vegetation, cleaning sanitary and storm sewers to name a few. Instead sump pump water could be used for these purposes.
- Longevity and/or permanence of project results on campus.
Information and designs developed in this study could be used for generations to come. This design could serve as a model to be duplicated across campus.
- Location, including any concerns that may arise from the chosen site; applicants are encouraged to consult with Facilities & Services prior to submitting their proposal to ensure selection of appropriate sites.
The study and design will focus on the use of sump pump water from the Oak St. Chiller plant roof. This system continuously delivers between 40-50 gpm of subsoil drainage water. This would be a convenient location to fill portable water tanks which are currently used to dispense water throughout campus. In addition, this water can be used to make road/sidewalk salt solution for snow/ice melting in the winter. Facilities and Services were consulted in determining this project and location.
- If applicable, comparisons to similar projects at other campuses.
Colorado State University is currently testing the use of greywater from sinks, showers, and laundry to water vegetation in residences. In this case the sum pump water will not contain soap/detergents eliminating the concerns about the health of the plants.

II. Budget & Fundraising:

1. Detailed budget

- The MechSE Department requires a \$4,000 donation for a team of 3 or 4 seniors for a semester (see additional information about the MechSE senior design course at [https://www-s.mechse.uiuc.edu/courses/me470/](https://www.s.mechse.uiuc.edu/courses/me470/)) The MechSE program, established 17 years ago, has accommodated several successful energy/sustainability related projects in the last couple of years:
 - Advanced computations building cold isle containment
 - Design of a water side economizer for NCSA's new Blue Waters petascale supercomputing building (outlined savings of over \$2Million/year)
<http://engineering.illinois.edu/news/index.php?xId=074108960700>
 - Design of systems to reduce energy consumption MEL (Outlined savings of nearly \$170K/year)
 - Design of systems to reduce energy consumption CSL (currently under way)
 - Design of systems to reduce energy consumption Loomis (currently under way)
 - Design of systems to reduce energy consumption MRL (currently under way)

2: Fundraising:

Upon completion of this project funds will be requested from the student sustainability committee and Facilities and Services to implement the solutions.

III. Timeline

Provide a detailed project timeline.

- This project would start at the beginning of the Fall 2009 semester (August 24, 2009) and will be completed at the end of the semester (Week of December 10, 2009).

IV. Energy, Environmental, Social and Economic Impact

B. Energy Efficiency Projects

The students will determine the electricity savings associated with using the subsoil drainage water instead of the treated potable water.

C. All Projects

Environmental Impact:

This project will reduce the amount of potable water used which comes from the Mahomet aquifer to help preserve this valuable resource. Electricity and consequently CO₂ emissions will be reduced because the water treatment process requires electricity for filtration and distribution pumping. The total annual potable water reduction and associated electricity reduction is to be predicted in the study portion of this project. Furthermore, the water collection system will reduce the load on the storm sewer system which will potentially help reduce flooding in Boneyard creek and connecting rivers.

Social Impact

This project will increase awareness of our unsustainable use of the water from the Mahomet aquifer.

Economic Impact:

Water that is collected and used will also save the campus \$1.87 per 1000 gal. It should be noted that the cost of potable water is rapidly increasing, so the savings may be much greater in the future. The total savings has yet to be determined from the study portion of this project. The cost of implementation and payback is also to be determined in the design portion of this project.

V. Outreach and Education

- visibility of the project to students:
The project design will include signs to be placed on the highly visible portable water tanks indicating that the water is from a green subsoil sump water distribution system supported by the Illinois Student Sustainability Committee. The students will be making a publicly accessible website to advertise the project, which is a requirement of the course. Furthermore, they will prepare a poster for display at the annual Environmental Horizons conference. In addition, students will be giving project presentations to their classmates, faculty, and industry present.
- role that students will play in the project:
Students will perform the feasibility study and design the water collection, storage, and dispensing system.
- opportunities for involvement in classroom curriculum:
This would be one of the senior design class (ME 470) projects.
- media opportunities:
The students will be required to make a press release advertising their findings and acknowledging the support of the Illinois Student Sustainability Committee