



Science Museum of Minnesota



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Company Background

The Science Museum of Minnesota, located in downtown Saint Paul exists to “turn on the science” by inspiring learning, informing policy, and improving lives. The museum provides hands-on learning experience to guests through its exhibits, programs, and the facility itself. The museum envisions a world in which all people have the power to use science to make lives better. It values science as essential literacy, fun accessible learning, authenticity and relevance, inclusion inside and out, remaining vital to its community, and leadership through collaboration.



**Science
Museum
of Minnesota®**

“I really enjoyed the additional educational outreach incentives that came with working at the Science Museum. Not only did I have to use my engineering skills when developing my recommendations, but I also had to use my creativity to incorporate educational components and incentives.” ~ DU

Project Background

The goal of the MnTAP project was to discover solutions that would lead to real savings for the Science Museum, with the added benefit of educating the public on the importance of water conservation. The intern project involved investigating water conservation opportunities that ranged from green space irrigation to rooftop rainwater capture.

Incentives To Change

Over the past 10 years, the Science Museum of Minnesota has not only advocated for, but also implemented within its facility sustainable, environmentally conscious practices in energy and waste management. With the 2017 launch of its “Water Planet Initiative,” the Science Museum has turned its attention to water conservation and reuse, making it an optimal time to bring in a MnTAP intern to investigate potential solutions.

“Having a MnTAP water efficiency intern at the Science Museum of Minnesota in summer 2018 made possible the investigation of how much water the museum uses, where and when to a degree and sophistication that museum staff would never have had the time to accomplish on their own. The museum now has the data and recommendations on which to base both its immediate and long-term water efficiency actions.”

~ Patrick Hamilton, Science Museum of Minnesota

SOLUTIONS

Switch to 1 GPM Aerators on Non-automated Faucets

Science Museum staff restrooms employ manually operated faucets that were previously outfitted with 2 gallons per minute (GPM) aerators. Based on the function of these various sinks, it was deemed appropriate to replace the aerators with 1 GPM versions, resulting in an estimate annual savings of 58,000 gallons of water.

Install Flow-reducing Flushometers and Dual-flush Toilet

Flushometers provide a cost-effective way to update toilets without replacing entire fixtures. Along with flow reduction, it is also recommended that the Science Museum install dual-flush options for some of its toilets. The dual-flush toilets give the option of 1.6 or 1.1 gallons per flush. This provides an option for a larger volume of water to be used if necessary. This will help prevent pipe clogs and associated maintenance costs. Most of all, this is a great way to involve the public in actively practicing water conservation while they visit the museum.

Modify the Lawn Irrigation Schedule

It was recommended that the Science Museum re-program the system controllers to a new irrigation

Solutions

schedule. The new schedule will reduce total number of days per week the system operates, reduce the number of cycles per day, reduce the amount of time per station, change the start times, and eliminate unnecessary stations. With guidance from the irrigation contractor and University of Minnesota irrigation specialists this is a start to reducing water used for irrigating the various green spaces at the museum.

Install Irrigation Smart Controllers

Irrigation smart controllers will allow the museum maintenance staff to monitor the system more closely and make changes to the schedule from their smart phones at any location. This upgrade would give staff the ability to make immediate schedule changes dependent on daily weather conditions, which will further impact water conservation.

Install Rainwater Capture System with Roof Renovation

Implementing a roof rainwater catchment system is a unique way for the museum to practice water reuse and reduce its use of purchased water for irrigation. The system could also serve as an educational opportunity for



the public, fitting in with Science Museum's goals to lead by example in terms of water conservation.

Implement Faucet Greywater Reuse

Another option to conserve water and create a new exhibit is to implement faucet greywater reuse in selected restrooms. The system would utilize handwashing sink water, that would be filtered and piped to reserve for flushing toilets. A system like this could save approximately 375,000 gallons of water per year from flushing toilets.

Install Snow Melt and Water Capture on Kellogg Plaza

The Science Museum's Kellogg Plaza requires snow removal and salt application to keep the walkway safe in winter months. It is recommended that the museum explore the option to install a low-temperature snow-melt system when it is time to replace the surface of the plaza. Savings from reduced salt chemical usage and staff time in snow removal are to be determined. The system may provide an opportunity to collect additional rainwater and melted snow to store for reuse.

Recommendation	Annual Reduction	Annual Savings	Status
Switch to 1 GPM aerators on faucets	58,000 gallons 220 therms	\$650	Implemented
Install flow-reducing and dual-flush toilet flushometers	1,360,000 gallons	\$13,000	Recommended
Modify irrigation schedule	860,000 gallons	\$8,000	Recommended
Install irrigation smart controllers	300,000 gallons	\$3,000	Recommended
Roof rainwater capture	970,000 gallons	\$9,000	Further investigation needed
Reuse of greywater from faucets	375,000 gallons	\$3,600	Further investigation needed
Implement snowmelt system and water reuse on Kellogg Plaza	1,900,000 gallons	\$18,000	Further investigation needed

MnTAP Advisor: Matt Domski, Waste Reduction Specialist