



Water Consumption Reduction at the National Sports Center

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UNIVERSITY OF MINNESOTA

Driven to DiscoverSM

National Sports Center

- **Company description**

- 660 acre campus with 140 employees in Blaine, MN
- Sports facility (soccer, hockey, golf)

- **Goals of company and intern project**

- Water conservation during zamboni procedure
- Water conservation during golf course irrigation

- **Incentives**

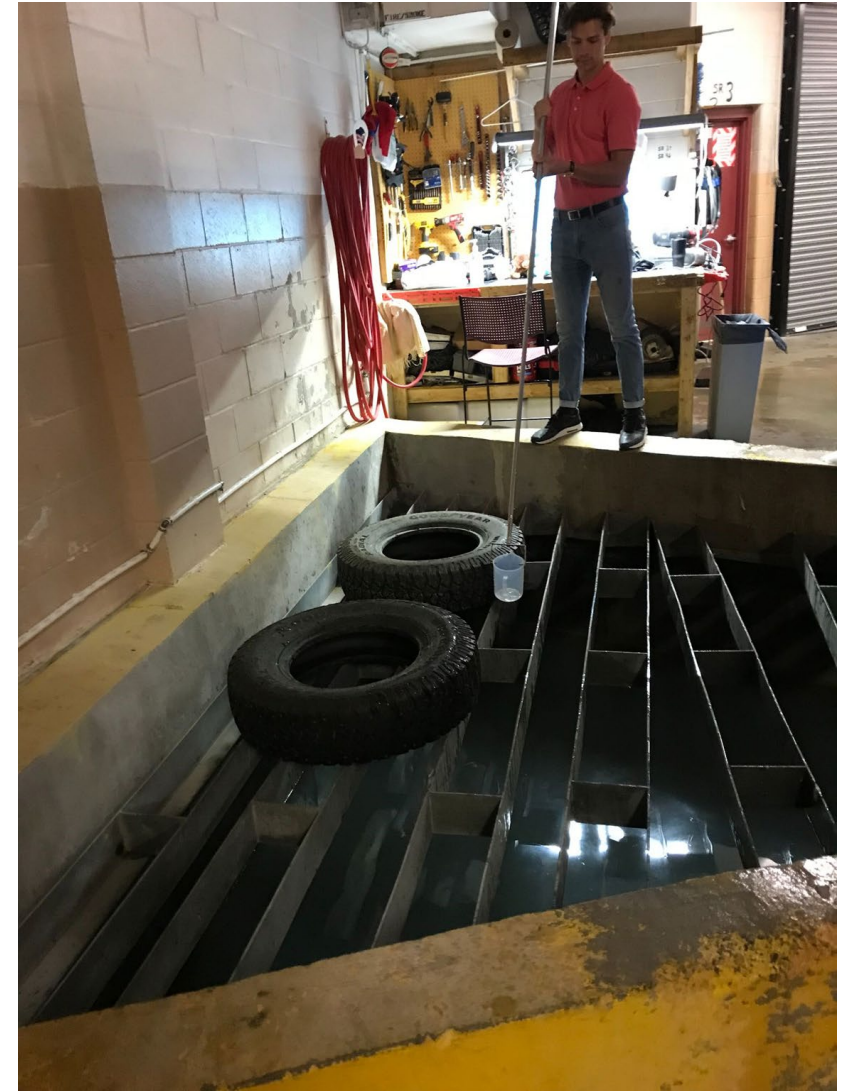
- Wants to be greenest sports facility in Minnesota
- Working to become net zero



National
SPORTS CENTER

Approach

- **Observed ice techs utilizing current process**
 - Refilling procedure
 - Washdown procedure
- **Measured flow rate, water balance, and water quality**
 - Bucket and stopwatch tests
 - Water testing with Pace Analytical
- **Researched solutions**
 - Conversations with engineering contractors
 - Design of plumbing apparatus

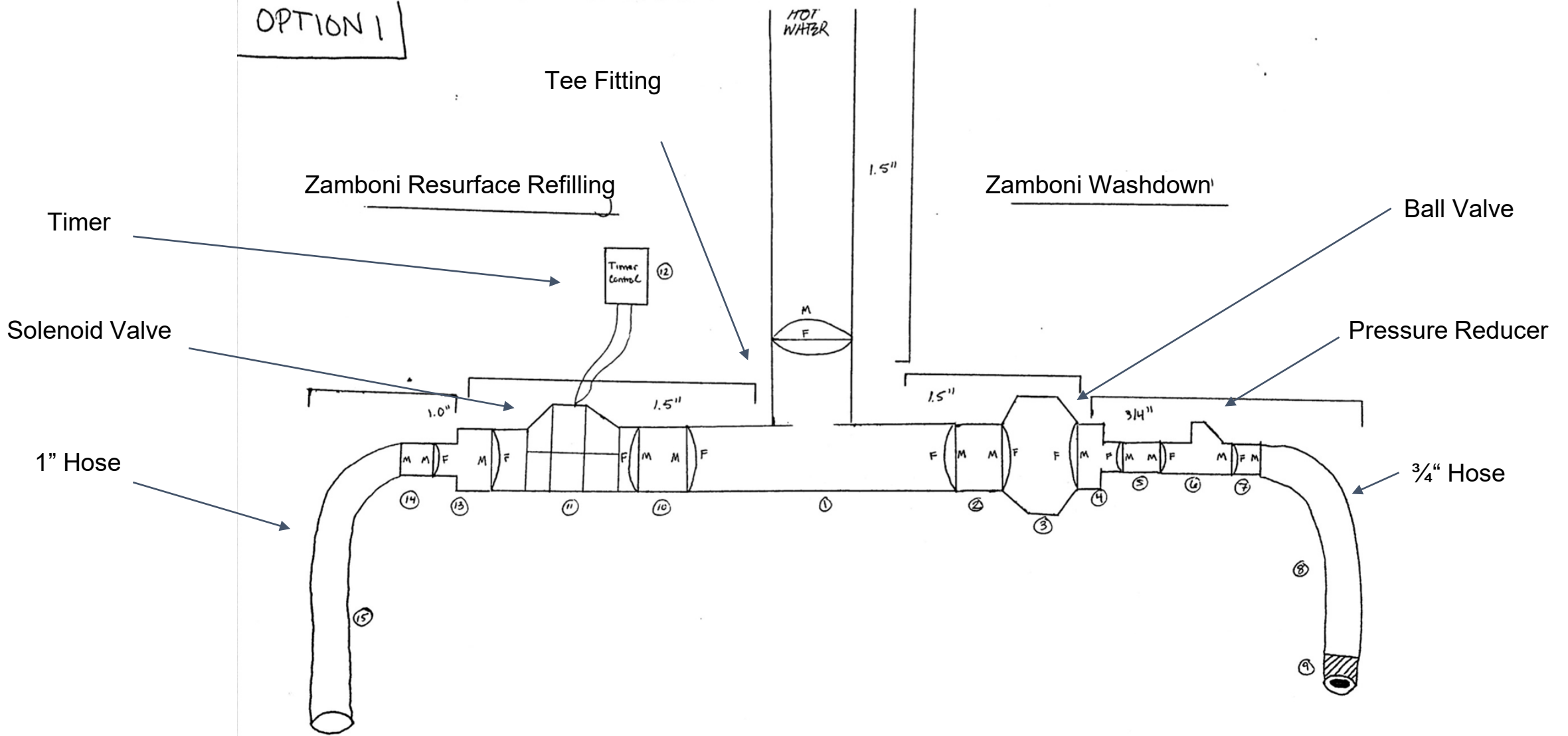


Zamboni Plumbing & Washdown Procedure Change

- **65 gpm hose used for refilling and washdown**
 - Install separate hose for washdown or an integrated auger washout system
 - Install timer and solenoid valve for more accurate filling of zamboni resurface tank
- **Annual Savings**
 - \$9,400
 - 506,000 gallons of water
 - 7 month payback

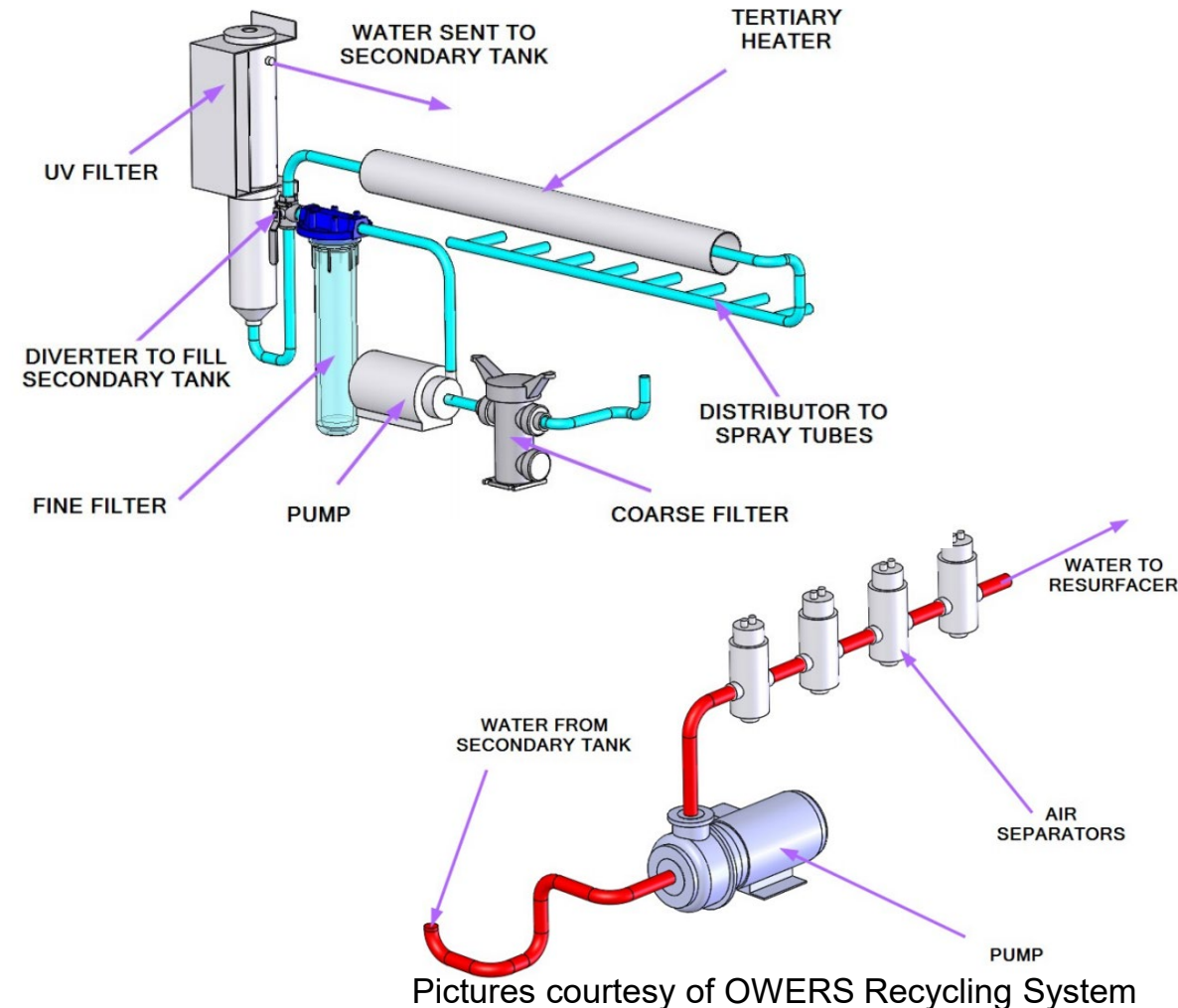


OPTION 1



Resurface Water Recycling System

- **OWERS recycling technology**
 - 13 year payback
 - \$7,300 annual savings
 - 880,000 gal. of water per year per system
- **3M integrated water recycling system**
 - Currently in conversations with engineering team



Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Timer and Solenoid Valve for Refilling Zambonis & Zamboni Wash-down System Installation	506,000 gal of water total 11,000 lbs. of water softener total 7,400 therms of natural gas total	\$4,393 (\$549 per filling station)	\$9,400 (\$1,174 per filling station)	7 months	Recommended
Resurface Recycled Water System	1,090,000 gal of water per melt pit 15,500 lbs. of water softener per melt pit 13,000 therms of natural gas per melt pit	\$136,000 per melt pit & \$3,000 per year (Maintenance) for 10 years	\$13,700 per melt pit	13.5 years	Tentatively recommended
Zamboni Integrated Auger Washout System	823,000 gal of water total 4,000 lbs. of water softener total 6,800 therms of natural gas total	\$19,300 (for all 8 Zambonis)	\$8,000 (for all 8 Zambonis)	2.5 years	Tentatively recommended
Vortex Deaeration System for Cold Water	3,970 therms of natural gas per water line	\$27,500 per water line	\$12,800	2 years	Tentatively recommended
Sprinkler Head Conversion on Victory Links Golf Course	3 to 8 million gal of water Up to 140 hours of irrigation time for running the entire system	\$51,000	\$2,000	25.5 years	Recommended

Personal Benefits

- Gained in-office work experience
- Discovered sports and sustainability work hand-in-hand
- Networked with staff at NSC and others

