

# Creative Solutions to Water U

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In the land of 10,000 lakes, water availability shouldn't be much of an issue. Unfortunately it is, as can be witnessed in depleting aquifers, shrinking lakes and sometimes dry rivers and streams. The biggest problem in Minnesota is that most water tends to run off our vast property; north to Hudson Bay, east to the Atlantic Ocean or south to the Gulf of Mexico. Fresh water resources are

being watched closer than ever and golf courses, considered recreational destinations rather than businesses, are easy targets for the newly water-conscious public.

In an effort to promote themselves as "Stewards of the Environment" and responsible water users, golf courses must begin telling their "good story" of economic stimulus, conservation

# Undersupply

of each segment



programs and habitat enhancement. Golf courses also need to look beyond easy fresh water resources and pursue other irrigation opportunities. The following case studies are examples of such possibilities.

## *The Road to Success at Eagle Valley and Prestwick Golf Clubs*

In the spring of 2011, Washington

County looked to HR Green to complete the final design on the reconstruction and expansion of a 1.73 mile long stretch of County State Aid Highway (CSAH) 19 (Woodbury Drive) in the City of Woodbury. The project called for roadway widening from a two-lane rural road to a four-lane street with curb & gutter.

In order to complete roadway construction, the County needed to obtain a stormwater permit from the South Washington Watershed District (SWWD). The SWWD permit application stated rate control, volume reduction, and water quality improvements were required to achieve the SWWD's goals. Rate control requirements included matching or decreasing existing 2-, 10-, and 100-year runoff rates. Washington County needed to infiltrate the first ½ inch of runoff over the entire site to complete the volume reduction requirements. Since approximately half of the roadway drains to Colby Lake, an impaired water downstream, water quality improvements included meeting a target standard maximum allowable unit load of 0.34 lbs. /ac/yr. of total phosphorous (TP).





*Not only will roadway drainage supplement the irrigation water at Eagle Valley Golf Course, a babbling brook was also added to the tenth hole.*

The County, City of Woodbury, SWWD, and HR Green met to discuss the stormwater management options for the project. Initial considerations included infiltration trenches and an iron-enhanced sand filter berm. However there were still some concerns about the performance and maintenance requirements of these best management practices. The SWWD's primary concern was Colby Lake's nutrient problem. Also in the back of the City's mind were concerns about the amount of water being pumped from their local aquifer. Other cities to the north were seeing significant decreases in lake water elevations

within the last few years, so the City of Woodbury wanted to be proactive in their water management strategies. Since the City owned Eagle Valley Golf Course, where David Erickson is Superintendent, adjacent to the roadway, the City suggested reusing stormwater for irrigation on the course. This provided a viable use for the project's stormwater and it reduced the 30 million gallons of aquifer pumping for the golf course. A similar system was considered at Prestwick, located just south of Eagle Valley. HR Green looked into the option to see if it was a possibility, examining drawdown volumes and pond recharge of the large

stormwater pond adjacent to Woodbury Drive. The calculations provided positive results and the reuse system was a go for the Colby Lake watershed.

Since the Eagle Valley Golf Course and Prestwick Golf Club already contained a large stormwater pond adjacent to the roadway, all road drainage was directed to these ponds for pretreatment. A pump station was installed on the eastern side of the pond, routing stormwater to the irrigation pond east of the driving range by an 8-inch transfer pipe. The existing irrigation system distributes water from the irrigation pond, normally filled by aquifer water, throughout the golf course. The golf course plans to use as much stormwater as possible without drawing down the stormwater pond so much it causes aesthetic ef-

fects. When the irrigation system is not in use, typically during the day, stormwater is routed to the north to a newly installed “babbling brook” surface water feature on the 10th hole. Since the small golf course ponds are already connected, stormwater will flow from the irrigation pond north to the brook, and then is redirected back to the large stormwater pond via gravity. This alternative routing system allows for additional infiltration water treatment. The Prestwick system is similar, only without the “babbling brook” transfer.

After all calculations and analyses are complete, the Eagle Valley Golf Course expects to utilize 22.5 million gallons (69 ac-ft.) of stormwater per year. These expected volumes will likely vary by year depending on precipitation amounts.



***Enhanced water features and Environmental Stewardship  
reign at Eagle Valley Golf Club***



Assuming all irrigated stormwater is infiltrated, the Eagle Valley system is expected to achieve a TP unit loading of 0.12 lbs. /ac/yr., exceeding the goal for Colby Lake. One concern the golf courses have is the effect of road salt on the stormwater. Water with high salinity values are detrimental to golf course fairways. To avoid any negative effects on the landscape, the City will be monitoring the system for salinity and other pollutants. Sampling efforts are targeted to begin in the summer of 2014.

The total cost of this system was almost \$700,000, which was primarily paid for by a Legacy Grant funded by the Clean Water Fund. Overall, these

systems were a win-win-win for everyone involved. The golf courses obtained new pumping equipment, now able to reduce the amount of water they pump from the aquifer. The City will be able to extend the life of their aquifer, and the County will achieve their permit requirements. The SWWD will reduce the amount of untreated stormwater entering Colby Lake, provide infiltration to recharge groundwater, and exceed the required water quality treatment goals within the Colby Lake watersheds.

If you want to learn more about this project, please contact Bridget Osborn at 651.644.4389 or at bosborn@hrgreen.com.

***Unique Golf Course/Home Owner***



***Dave  
Kazmierczak  
CGCS,  
Superintendent  
at Prestwick Golf  
Club, will utilize  
stormwater runoff  
as part of his  
irrigation water  
resource***

## ***Association Relationship***

Oakdale Golf Club, where Mike Knodel is owner and superintendent, began utilizing effluent as an irrigation source in the fall of 2001. The recycling of wastewater at Oakdale started as a collaborative effort between the residents around Lake Allie and Oakdale Golf Club. In 1997, the Lake Allie Environmental Subordinate Service District (ESSD) (a subsidiary of Renville County) was created to upgrade non-compliant wastewater systems around the lake. A centralized wastewater system servicing the homes and Oakdale within the ESSD was completed in 2001.

The engineering design focused on pretreating wastewater at a central site and recycling the water through spray irrigation onto the grounds of Oakdale Golf Club.

The Minnesota Pollution Control Agency (MPCA) permit required that the wastewater operator and Oakdale develop a plan for both wastewater facility operation and a turf management plan including the daily operations of the golf course.

The treatment process begins with a series of two septic tanks sized according to Minnesota Rules Chapter 7080. The flow from the septic tanks

***Oakdale Golf Club draws down their effluent irrigation pond each fall to accommodate lake shore property owners.***



enters a metering manhole and is then discharged into a filter tank and then sent through a vertical flow wetland that includes Forced Bed Aeration™ for enhanced treatment. Following treatment the water is disinfected by sodium hypochlorite to remove fecal coliform bacteria. After disinfection, the water gravity flows to the reclaimed irrigation pond for disposal.

During the irrigation season, the golf course consumes far more water on an average daily basis (53,000 GPD based on 183 day season) than the Lake Allie ESSD can generate at design flow (18,300 GPD). Water withdrawn from Lake Allie under Oakdale's water appropriation permit is mixed with the effluent in the reclaimed irrigation pond, maintaining a constant water level in the pond during the majority of the golf season and provides a "more desirable" irrigation source.

A new irrigation pump station was built at the head of the reclaimed irrigation pond that withdraws the water from the pond and pumps it through the existing golf course irrigation system. The interconnection between the old and the new pump station was designed so that either pump station

can be used for irrigation, depending on the needs of the golf course. Valves were also installed that isolate the reclaimed irrigation pond from irrigation water drawn from Lake Allie. If irrigation water is needed during the day, or at a time when it is not advisable to withdraw water from the reclaimed irrigation pond, the valves can be utilized in a manner that water can be drawn directly from Lake Allie.

During the last 60 days of the irrigation season, the reclaimed irrigation pond is drawn down. This allows treated effluent generated by the Lake Allie ESSD to be stored over the winter. The reclaimed irrigation pond will continue to fill during the winter months until the start of the irrigation, when it will be "topped off" or mixed with lake water and managed as previously described.

For more information about this project contact Mike Knodel, owner and superintendent at Oakdale Golf Course, [mike@oakdalegolfclub.com](mailto:mike@oakdalegolfclub.com)

### ***Oneka Ridge Cleans and Uses Agricultural and Urban Run-Off***

The Rice Creek Watershed District worked closely with the City of Hugo



*The irrigation pond at Oakdale Golf Club serves as a holding pond for treated effluent water as well as a lateral water hazard.*



and the Oneka Ridge Golf Course, where Jamie Bezanson is superintendent, to finalize a large water re-use irrigation project.

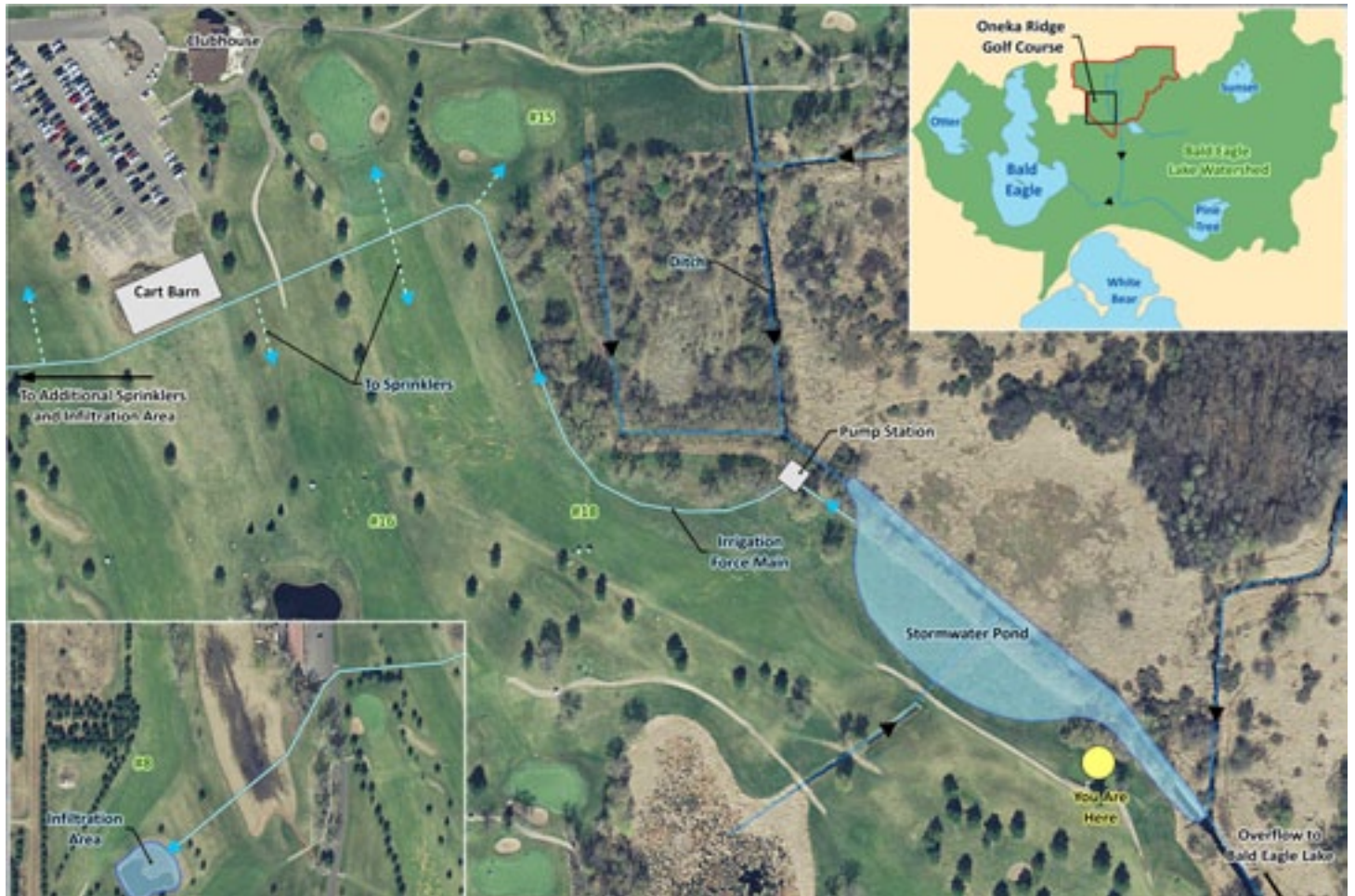
The Oneka Ridge Golf Course project collects and stores stormwater runoff from nearly 1,000 acres of land upstream of Bald Eagle Lake and use it, instead of pumped groundwater, to irrigate 116 acres within the Oneka Ridge Golf Course. To accomplish this, a large pond was constructed along the 18th fairway to capture runoff from a nearby agricultural ditch. Excess water beyond that needed for irrigation is sent through perforated pipes to recharge the groundwater system.

The RCWD's initial estimates show

that 32.5 million gallons of stormwater runoff (or more) can be intercepted and treated through the re-use irrigation system and the underground infiltration system annually. By reusing and treating stormwater, excess nutrients such as phosphorous are being kept out of Bald Eagle Lake. Conservative estimates suggest that 75 pounds of phosphorous will be kept out of the lake each year, depending upon rainfall, as a result of this project. 75 pounds of phosphorus can grow between 12 and 18 tons of algae.

Bald Eagle Lake may not be the only local water resource benefiting from this project. According to a recent





*The project at Oneka Ridge will reduce ground water pumping for irrigation from shallow aquifers as well as return water to shallow aquifers from seepage fields.*

U.S. Geological Survey study, declining lake levels are the result of less than average rainfall combined with increased groundwater pumping for drinking water and irrigation. The Oneka Ridge project represents one significant step towards reducing water consumption and ultimately the pumping of groundwater while improving water quality and clarity. It is anticipated that Oneka Ridge Golf Course's dependence on groundwater for irrigation will be reduced by as much as 50% as a result

of this project.

This project was funded by a \$497,100 Clean Water Fund grant from the Clean Water, Land and Legacy Amendment. Matching funds and in-kind project support were supported by the RCWD and the City of Hugo. The Oneka Ridge Golf Course is also providing valuable in-kind support to the project. Construction began in November of 2013 and wrapped up in early 2014. For more information about this

project contact Kyle Axtell at the Rice Creek Watershed District, at [kaxtell@ricecreek.org](mailto:kaxtell@ricecreek.org).

## **Making It Happen**

As water becomes more and more scrutinized by the MPCA, DNR, MDH, MDA and public at large, it is in the Minnesota golf industries,, and individual courses, best interest to look at alternative sources to keep viable. All golf courses, and in particular surface water users, should begin reaching out to local businesses, communities and water districts to see if partnerships can be created to reuse industrial and municipal water as well as stormwater runoff.

The four example courses cited have reduced or eliminated their dependence upon freshwater resources as well as strengthened their position in the community as Stewards of the Environment. The advent of the Clean Water, Land and Legacy Amendment and Clean Water Grant funding, combined with these precedents, make the time perfect for courses to initiate water allocation and management changes.

Do you have a local source of reusable water for use on your course?



*The newly created containment pond on Oneka Ridge Golf Course captures phosphorous laden water from urban and agricultural runoff.*