

# Hole in One

## A modified conventional septic system with drainfield chambers makes the most of restrictive conditions on a golf course

By **Scottie Dayton**

**S**unserra at Crescent Bar is a new, 207-home resort community on the Columbia River in Washington. A lagoon system treats wastewater from more than 400 existing houses.

The four most recent resort developments have community septic systems. John Glassco of Eco-nomic in Ephrata, Wash., designed the last three. State Department of Ecology restrictions prevented enlarging the lagoon system, and Sunserra was too far away for a gravity sewer to reach.

Sunserra's septic system and the irrigation and drainage lines for a new, nine-hole golf course and clubhouse would be installed simultaneously on the fairways. "The course sits on a sand deposit that couldn't be better for sep-

tic," says Glassco. "Resorts, however, are the third most difficult system to design, mostly due to unpredictable and erratic flows. After a long resting period, it's not uncommon to get more than a month's worth of sewage in a week."

The owners didn't want the pump chambers accessed during the golf season because that interrupted play. The only other location for them was on Crescent Bar Road at the foot of the development.

"My next challenge was designing the system to follow natural drainage over rugged terrain to the pump chambers," says Glassco. "In some cases, the chambers were 2,000 feet away from the septic tank, and freezing in the chambers was a problem. After that, the design had to pump the effluent 400

or more feet back up the gorge to the drainfields."

The final hurdle was integrating five miles of distribution lines with the golf course's irrigation and drainage lines. Glassco's conventional but modified system with drainfield chambers moves sewage from 17 independent systems,

each with a replacement drainfield to handle overflows.

### Site conditions

Sunserra sits on a dogleg portion of Crescent Bar surrounded by steep basalt cliffs. The golf course separates the single-family homes – grouped in 97 build-

## System Profile

|                            |   |
|----------------------------|---|
| <b>Location:</b>           | Quincy, Wash.   |
| <b>Facility served:</b>    | Sunserra 207-home resort community  |
| <b>Installer:</b>          | Freese and Sons Excavation, Quincy, Wash.   |
| <b>Site conditions:</b>    | Sand with moderate percolation  |
| <b>Type of system:</b>     | Conventional septic tank and pump chambers with 7,122 drainfield chambers from Infiltrator Systems Inc., Old Saybrook, Conn. stems of Florida Inc., |
| <b>Hydraulic capacity:</b> | 3,120 to 3,480 gpd per group of homesprings, Fla.   |



Installers of the Sunserra at Crescent Bar system lower a concrete vault over the valve assembly.

ings on 80 acres – from the road. This area of the Columbia River Gorge has 100-foot-deep medium and fine sand deposits. The percolation rate is 0.8 gallons per square foot per day.

### Group system components

Glassco designed each system to handle 3,120 to 3,480 gpd. The major group components are:

- Seventeen 6,000-gallon concrete septic tanks.
- Sixteen 2,500-gallon pump chambers.
- Two 1,500-gallon additional tanks.
- Custom-cast concrete vaults (tanks and vaults from Wilbert Precast Inc., Spokane, Wash.)
- 7,122 Quick4 Standard Infiltrator chambers from Infiltrator Systems Inc., Old Saybrook, Conn.
- 34 P5007 3/4 hp turbine pumps from Orenco Systems Inc., Sutherlin, Ore.
- Control panels, VeriComm monitoring system, and 16 automatic distributing valves from Orenco.

### Group system operation

The lowest house in a group has the septic tank near it. Sewage from the homes flows through bundled and glued 4-inch PVC pipe to the pump chambers ganged into two pods of eight and nine.

Each drainfield – the average footprint is 40 by 240 feet – has six, time-dosed zones. “Orenco prefers the distribution valve installed at the pump chamber to prevent air from entering the system, but that leaves the line to the drainfield full and susceptible to freezing,” says Glassco. “The drainfields are 36 inches deep, but in places the transport lines are much shallower, with the golf course’s 16-inch deep irrigation system below and above them.”

Glassco mounted the distribution and check valves at the drainfield and supplied them with two transport lines, one for each pump in the chamber. When a pump shuts off, the check valve opens, and air enters the line. “A line longer than 500 feet drains back into the chamber

through the pump within three and a half minutes,” says Glassco. The manifold drains effluent back into the drainfield from the distribution valve.

Draining back through the pump instead of through the usual weep hole required the Grant County Health District’s (GCHD) approval. Orenco’s letter stating that the condition was acceptable satisfied the agency.

Every drainfield has different characteristics because of the compound transport lines. “They might enter the pump chamber as 1.5 inches and step up to a 2-inch or down to a 1-inch pipe,” says Glassco.

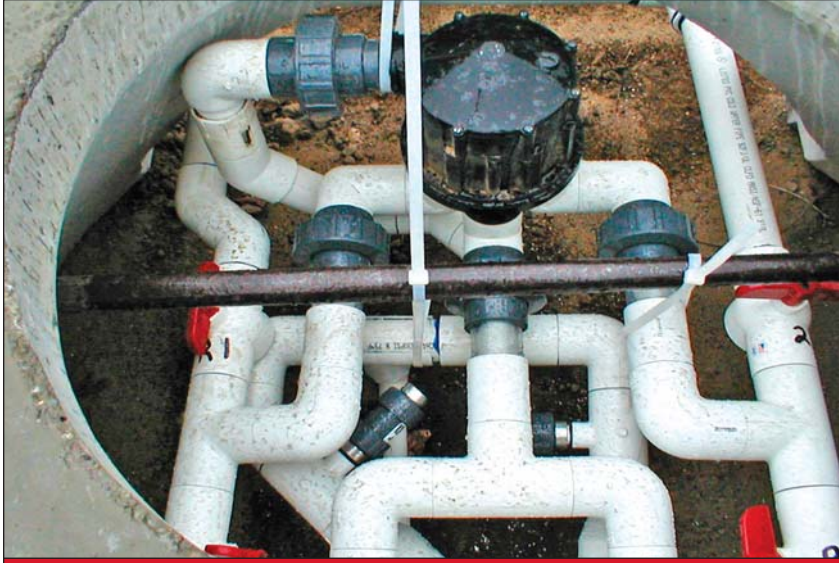
Design, not a valve in the line, achieved the proper squirt height and enabled Glassco to use the same pump throughout the system. After entering the chambers, the liquid drains down through the sand to the environment.

Since the golf course can’t afford a system failure, the replacement drainfield handles the weekend overload and the main drainfield processes the normal

**Stunning views of the Columbia River and sheer basalt cliffs form the backdrop to Crescent Bar.**



**Technicians excavate Upper Zone 3 of Drainfield B and place soil over Zone 2 of the same drainfield as backfill.**



**A view inside the vault shows the distributing valve (black) at the top.**

flow. The replacement has ample resting time between episodes and a biomat never develops. "I wanted to combine the flows for only a nominal cost, but that required a state permit, waiving certain regulations, and went beyond the county's jurisdiction for size," says Glassco.

## Installation

The tanks arrived in pieces. They were assembled in the hole, filled with water and checked by the county health department for leaks. The critical item was getting the correct slope on the pipes so that effluent drained from anywhere into the pump chambers. Some cases required installer Dennis Freese of Freese and Sons Excavation in Quincy, Wash., to make difficult 20-foot-deep cuts through rugged terrain to maintain the slope.

"Our distribution lines zoomed around the golf course's irrigation lines and crossed the main irrigation pipe," says Freese. "This required extraordinary coordination between my crew and the golf course builder's due to space constraints. We had excavated dirt, loam cover, equipment, materials and irrigation mains all clustered on 80 acres."

The switching gear and distribution vaults were installed on the golf course. Because lids on the fairways are a sensitive issue, Glassco took a valve assembly

to Scott Erickson at Wilbert to see if he had a vault with a small lid that would enclose it. He did.

Wilbert constructed a mold of the conical vault that was open at the bottom so Freese could build the distribution piping, then lower the vault over the top of the valve assembly. "Should a valve fail, we can excavate around the vault, lift it off and repair the valve," he says.

## Maintenance

Glassco originally had 17 control panels running the system, but Luke Bozwell at Orenco recommended putting them in one panel to save space in the clubhouse. "His idea saved enough money to buy the telemetric monitoring system," says Glassco.

The manager of the first nine-hole golf course maintains the lagoon system and will do the same for this one. Glassco wrote an operations and maintenance manual for each system and supplied the golf course owners and health department with copies. When 90 percent of the homes are sold, the homeowners association will take ownership and hire a septic system management company to perform maintenance. Glassco will check its books once a year.

The health department insisted that care of the system be apportioned into the homeowners' other management costs. ■

© 2005, COLE Publishing Inc.

Reprinted with permission from

**ONSITE  
installer**

July 2005

COLE Publishing  
1720 Maple Lake Dam Rd.  
P.O. Box 220  
Three Lakes, WI 54562  
800-257-7222  
[www.onsiteinstaller.com](http://www.onsiteinstaller.com)