CASE STUDY

Camp Creek Golf Club Pesticide Storage and Mix/Load Center

By Larry Livingston, CGCS

PROJECT DESCRIPTION

The project is a Pesticide Rinse Water Reuse System at the Camp Creek Golf Club in Panama City. The pesticide mix/load area is adjacent to a wetland. We wanted to eliminate the possibility of pesticide rinse water contaminating the wetland or the groundwater associated with it. We wanted a mix/load facility that was functional yet easy to maintain and use.

Before this system was constructed, the golf course did not exist. This system was built during construction of the course. After implementing the project, we had a mix/load area that was simple and easy to use, manage and maintain. Best of all, it prevented potential pesticide mix/load rinse water from contaminating the groundwater or adjacent wetland.

Goals

- Create a pesticide mix/load area that would accommodate two sprayers.
- Create safety factors that rinse water contamination would not occur if a part of the system was compromised.
- Be able to dispense an exact amount of make-up and/or rinse water.
- Position spray tank fill hoses so that they were convenient to use but out of the way when not used.
- Prevent sand, dirt, etc., from getting into the rinse water holding tank.
- Be able to easily monitor the sumps so that leakage could be observed.
- Prevent pesticide residual from absorbing into the concrete floor.
- Have safety equipment readily available and accessible.
- Be able to completely contain any pesticide spill that might occur in this system.
- Monitor for fire and theft.

This is the main mix/load area. The concrete floor has a 36-mil chemical-resistant liner underneath and is sealed on top with chemical-resistant epoxy paint. The red grate covers the primary sump. A stainless steel mixing table, sink, eye wash and shower are some of the safety features. The recycled rinsate water is stored in a 500 gallon tank to the left. Photo by Larry Livingston, CGCS.
Inset: Timer and controls on the totalizer unit allows for adding recycled rinsate water and fresh water when mixing chemicals. Photo by Larry Livingston, CGCS.

Implementation & Maintenance

The pesticide rinse water reuse system is designed to contain all the rinse water that is generated during a pesticide mix/load operation so that environmental contamination does not occur. It is designed to be efficient to operate, easy to maintain, and simple to monitor for leakage. I designed a similar system at another golf club a few years ago. I took the best from that design and incorporated improvements into the new design. Quality control during construction is essential to make sure the system is installed exactly as planned. The narrative below, along with the attached pictures, gives a complete description of the system operation.

The Pesticide Rinse Water Reuse Area is in a 30- by 30-foot roofed area consisting of an 8-foot-8-inch by 30-foot pesticide storage room and a 21- by 30-foot mix/load area. Two double chain-link lockable gates are used to secure the area. The floor is made of concrete with a 36-mil chemical-resistant liner underneath. The walls are concrete-filled concrete block. The floors in the mix/load area and the pesticide storage room are coated with a chemical-resistant and waterproof paint. The floor in the mix/load area is sloped so that water drains to a sump located in the middle of the area. The floor in the pesticide storage room is level with an 8-inch solid concrete lip around the floor that is sealed as well. This area will contain 1,158 gallons of liquid. There is no drain in the floor of the pesticide storage room. Safety signs are posted in a number of places in the area.

At the wall opposite the gates in the mix/load area are the controls for adding potable or reuse water to the spray tank, a hook for an apron, a sink, a stainless steel table, a stainless steel shelf above the table, a safety equipment storage cabinet, an emergency shower/eye wash station, and the door to the

pesticide storage room. Between the table and the shelf is a clipboard for the Pesticide Application Sheet. At the wall to the right of the gates are two stainless steel shelves that are used for storage of smaller sprayers. The wall to the left of the gates consists of concrete block and chain-link fence.

The mix/load area can accommodate two sprayers. The sprayers are filled by connecting either a green hose (potable water) or a red hose (recycled rinse water) to the sprayer. An anti-siphon connector valve is mounted to the spray tank to prevent pesticide contamination of the potable water. On the ends of both the green and red hoses is a valve, which is in the off position when the hose is connected to the tank. The valve below the anti-siphon connector is opened. The appropriate totalizer located on the wall is set at zero. The water is turned on (a timer is used for the rinse water) and the valve at the end of the hose where it is connected to the sprayer tank is turned on. The totalizer is monitored as water is dispensed into the spray tank. Once the desired amount of water is dispensed, the valve at the end of the hose connected to the spray tank is turned off, the water is turned off, the valve below the anti-siphon connector is turned off and the hose is removed from the connector and hung up.

Rinse water that falls to the floor during the mix/load operation flows to a plastic grate located in the center of the floor. This is the primary sump. The function of this sump is to allow the heavy contaminates (soil, sand, etc.) to fall out of suspension. Rinse water moves from this sump to the secondary sump that is under an aluminum cover located next to the red grate.

The primary sump consists of a stainless steel liner that has been constructed and installed so that there is an air space between the bottom of the sump and the concrete floor of the sump. This air gap is monitored to check for water leaking past the stainless steel containment. The concrete portion of the sump has been sealed with a chemical-resistant material. Rinse water moves from the primary sump to the secondary sump via gravity through a pipe connecting the two. The fitting at the primary sump has a 90-degree elbow oriented downward so that sand, dirt, etc., will not be able to get into the secondary sump.

Once the rinse water reaches the secondary sump it is stored in a plastic drum. An automatic submersible pump is used to pump the rinse water from the plastic drum to a 500-gallon holding tank. The concrete portion of the sump has been sealed with a chemical-resistant material. A leak from the plastic container can easily be seen by looking at the sealed concrete floor in the secondary sump.

Rinse water from the secondary sump is pumped through a filter and into a 500-gallon holding tank. The holding tank is located in a sealed containment area. The rinse water is held here until needed for future spray operations. When needed, the rinse water is pumped from the holding tank by a centrifugal pump. It is controlled by a timer located on the wall. A totalizer is used to meter the amount of rinse water dispensed. A water hose with potable water is used for washing down the floor, etc.

Pesticides are stored in the pesticide storage room. This room is adjacent to the mix/load area and has a metal door that locks automatically when closed. Inside the room are metal shelves used for pesticide storage. An exhaust fan and explosion-proof lights are located in this room. The pesticide storage room is monitored for fire and theft via a 24-hour security system.

The maintenance for this area consists of routine cleaning, inspecting the sumps for leakage, cleaning the filter at the 500-gallon storage tank, monitoring the level of rinse water in the storage tank, checking the operation of the emergency shower/eye wash, monitoring pesticide inventory.

Results

We are very pleased with the results of this mix/load area. It has allowed us to easily and safely mix and apply the pesticides needed for the maintenance of the course. We know that this systems allows us to protect the groundwater and nearby wetland from pesticide contamination.

Golfer/Employee Response

The golfers and visitors that have toured the facility have been very impressed with the assertive efforts we have taken to protect our environment. We communicate through a display in the golf shop, through one-on-one discussions with members and golfers, tours of the facility, etc. We are also working on a link to our web site that will contain information on this.

Perspective and Recommendations

What, if anything, would you do differently if you were to do the project again? What would you recommend to others implementing this project?

The rinse water hose is on the same side as the spray-rig exhaust pipe. It would be nice to have it on the other side. I would recommend to others to use quality products. Don't try to save money with cheap equipment, pumps, etc. Also, make sure the contractor installs everything the proper way.

Economic Costs & Benefits

How much did it cost to implement this project?

$10,700 for the supplies does not include construction labor and material costs.

What are your anticipated or actual financial savings?

This is hard to measure except to say that without having this facility our chances of having a potential soil, groundwater and wetland contamination problem are very likely and would be costly to correct. Besides being an insurance factor against pollution and contamination, it is just the right thing to do when handling pesticides responsibly.

For more information about this project contact Larry Livingston CGCS, 850-231-7610 or larry_Livingston@arvida.com

STEWARDSHIP NOTES

A Little Effort Goes a Long Way

By Shelly Foy

Hillary Clinton's "It takes a Village" is certainly true about raising children. However, sometimes all it takes is one person becoming motivated to teach children that leads to the "village" concept.

One such person is golf course superintendent Larry Livingston, CGCS, at Camp Creek Golf Club in Panama City Beach. Camp Creek Golf Club recently received full certification in the ACSP for Golf Courses. As part of the course's Outreach and Education segment, Larry and his staff elected to get involved with a local charter school, Seaside Neighborhood School.

Seaside has a mentoring program for grades 6, 7 and 8 that is designed to expose students to many different career choices. Some of the careers that students have explored so far are radio broadcasting, watercolor painting, sewing, babysitting, culinary arts, web page design, video editing, architecture, photography, art, drama, youth leadership, glass painting, interior design, and — of course — golf course, turf and environmental management.

Shelly Foy

According to Seaside ESE and Technology teacher Cathy Brubaker, "Our goals through the community-mentoring program are to give students the opportunity to be exposed to career possibilities and to build relationships with professionals in their community. Too often students are not exposed to career choices until they have to make a decision about a major field of study in college or training in a technical field. Here at Seaside Neighborhood School we want to try to expose students to choices at an earlier age so that when it comes time for them to decide, they will have a broader base of information on which to base their choices".

Larry wanted to participate in the mentoring program and decided to tie in his participation in the ACSP. His description of the proposed mentoring program at Camp Creek:

Students will learn about:

- what is involved in maintaining a championship golf course. From mowing the turf to designing fertilization schedules, to irrigation management… students will find out what it is like on the inside. Learning how to protect the environment is our number-one priority.
- soil nutrition. Take soil samples, review the lab results, and plan a soil nutritional program.
- irrigation management. Get hands-on experience on how we use a computer for irrigation scheduling and management. Learn where the irrigation water comes from and how the pump stations pumps it through the pipes and onto the turf.
- using bats for mosquito control. Build and install bat houses to be used in a study on biological mosquito control.
- water quality. Collect water samples from lakes, review the results and determine what steps need to be taken to address any issues found. Help release plant-eating fish for biological aquatic weed control. Learn about the stormwater management system and how it functions. Learn what part wetlands play in the big picture.

Larry Livingston, CGCS gives students from Seaside Neighborhood School a tour of his golf course as part of a career mentoring program.

In addition to all of that, students also discussed the IPM program and did soap flushes for insects and looked for diseases in the turf. After taking lake samples, they reviewed the results and released bluegill, catfish, gambusia and grass-eating carp into the lakes. They identified native plant material on the golf course and installed identification signs next to them. Other environmental signs were also installed by students. They also designed and planted a butterfly garden near the golf shop.

Larry and his staff hosted 12 students last fall and six students this spring. Students were on-site at Camp Creek once every other week for three months each semester. Larry is very excited about Camp Creek's involvement with the Seaside Neighborhood School. He has also encouraged the school to participate in the ACSP for Schools. He had previously attempted to get involved with a local school in Tampa and found it difficult; the school seemed to want to rely more on Larry and the golf course to do all the work. At Seaside, the enthusiasm for the ACSP is high and Larry is so optimistic that he is considering "adopting" another local school, Butler Elementary School.

It just goes to show you that with enthusiasm and a little determination, one person can set great things in motion. Here's to you, Larry Livingston and Camp Creek Golf Club, I wish there were more people out there like you!

ACSP Update

These Florida courses have earned Certified Audubon Cooperative Sanctuary status:

- **Venice Golf & Country Club**, Venice - Jim Schell, General Manager
- **Camp Creek Golf Club**, Panama City Beach - Larry Livingston, CGCS

There are currently 2,455 properties registered in the Audubon Cooperative Sanctuary Programs for existing facilities; 2,108 are golf courses registered in the Audubon Cooperative Sanctuary Program for Golf Courses; and 481 golf courses, 32 businesses, 4 cemeteries, and 10 schools are designated as Certified Audubon Cooperative Sanctuaries.

WILD SIDE

Working WITH Mother Nature

During the course of any day, the golf course superintendent can face many challenges. Some of these challenges can truly test our skills and our patience. One such challenge that I faced when coming to The Moorings Club was with the irrigation weather station.

Our rain gauge on the weather station never seemed to work properly because it had to be constantly cleaned out. I remember writing a schedule on the calendar to clean the station on a regular basis, like every other week. The problem was that Loggerhead Shrikes (a perching bird slightly smaller than a mockingbird and similar in color) in the area would use the weather station rain bucket for a toilet.

I figured what we had here was a failure to communicate. So I tried my best at communication with my little feathered friends.

Plan A was to just talk with them and let them know what I expected. I told the little birds that I did not mind them sitting on the rain bucket but could they please put their tail feathers to the outside rather then in the bucket. I'm not sure if the birds understood the instructions and just chose to ignore them but the rain bucket continued to be filled.

Plan B called for me to write them a little note complete with a diagram on where to place their tail feathers.

You know, I don't think they even looked at the note or with apathy setting in.... just didn't care.

After some more brainstorming with the crew, we decided to silicone some nail spikes around the rain bucket which we were sure would keep them from landing on it. After all, if they can't land on it they can't use it as a toilet; another good idea gone to crap (literally). The spikes didn't work.

The shrikes would just sit between the spikes and even straddle them. Once I think I saw a shrike using the spikes to preen his feathers with which only added to my frustration. Ok, so telling him didn't do it, writing pictures didn't keep him off, nail spikes around the bucket didn't do it. I got it. Let's tie some fishing line between the nail spikes so he has nothing to land on.

Well you guessed it, I just made the little birds a new swing set. It was quite humorous actually to watch these little birds swing on the fishing line all-the-while still pointing his tail feathers the wrong way filling my rain bucket with, well let's just say bird stuff.

We had had it at this point and thought we had exhausted all of our ideas. Then it dawned on me that if I can't keep him from landing on the rain bucket by placing things on it, what if I provided a better place to sit. Would he go for it?

Yep, that was the ticket. We made a quick bird perch by placing a wooden dowel through a stick and tie-strapped the whole thing to the weather station away from the rain bucket. Since installing this makeshift perch, the shrikes have not landed anywhere else.

The moral of the story here is don't work against Mother Nature because you're going to lose. If you work with nature everyone can be happy!

Craig Weyandt