

Washwater Recycling

Right for your course?

by Austin R. Shepherd

Interest in the treatment and recycle of golf maintenance vehicle washwater is growing, spurred by recent focus on environmental stewardship, water conservation and increased regulatory oversight. The recycle or treatment of washwater prior to discharge, while less practiced at older golf facilities, is being more frequently addressed during new course construction and maintenance facility renovation.

This is in part due to the regulatory review process necessary for projects involving construction activities. While regulation is undoubtedly a growing area of concern, the recycle and reuse of washwater can offer some interesting golf facility opportunities that are often overlooked.

Some of these opportunities and considerations:

- **Efficiency:** A wash facility that is well organized and well designed can speed up the maintenance operation and support a more productive grounds crew.

- **Chemical management:** Advanced recycling systems can safely handle washing of sprayers and any spillage from fueling and chemical mix and load operations.

- **Discharge permits:** Recycling often eliminates the need for a discharge permit and costs associated with ongoing discharge monitoring.

- **Environmental protection:** Treatment of washwater reduces pollutant release liability.

- **Conservation:** Recycling reduces water consumption and saves money.

- **Public relations:** Recycling offers the opportunity for positive public relations and is good public policy.

This article focuses on the golf maintenance facility and the considerations associated with the handling of grass, sand, construction debris, turf chemicals and fuels often contained in water used to wash maintenance vehicles and equipment. Recently, improved treatment technology and new concepts in facility layout and design offer efficient and environmentally comprehensive solutions.

Safeguarding the water supply

Real and perceived risks to local and regional water supply are triggering regulato-



An installed system.

ry action at the local, state and national levels. "Toxic Fairways: Risking Groundwater Contamination From Pesticides on Long Island Golf Courses," a report from New York State Attorney General Eliot Spitzer, initially published more than 10 years ago, is now taking the form of detailed regulations in Suffolk County to specify how facilities manage fuels and chemicals, including maintenance vehicle washwater. Desires to protect the quality of the drinking water system (whether ground water or surface water) are creating similar actions in Illinois, Florida, Massachusetts and other locales. Golf industry resources, such as the USGA Green Section and Audubon International, are encouraging courses to update their maintenance operations to ensure use of best practices.

Defining best practices

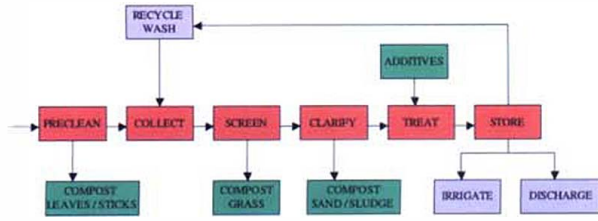
- **Prevention vs. cleanup:** When addressing environmental issues, systems that prevent environmental problems are almost always preferable to and less expensive than the cleanup associated with uncontrolled releases. Historical wash and chemical handling practices at many locations have often failed to consider the potential liability and cost to address contaminated groundwater or

other environmental impacts. Procedures involving "best practices" employ minimization, containment, recycle and treatment as measures to manage potential environmental impacts.

- **System that matches course conditions:** Washwater treatment and recycle systems should be matched to the course conditions and management practices at individual locations. New or renovated courses will demand a system that has the ability to handle large quantities of soil, sand and construction debris, in addition to traditional turf clippings. Courses that have access to a public sewer system may require less treatment than a zero discharge operation located in a sensitive environmental area. Utilizing treated washwater in local or course irrigation systems is also an option at some locations.

- **Operational procedures that take full advantage of the system:** The time management aspects of equipment wash should be considered. Mowing practices that end abruptly with multiple pieces of equipment backed up at a wash station become a detriment to optimum time management and a frustration to crews. Drive-through wash pads, as well as multiple wash stations, can be used for more effective time management. Wash pad designs that require exces-

Figure 1:
TYPICAL STEPS IN A WASHWATER TREATMENT OR RECYCLE SYSTEM



Treatment Process UnitHow It Works

Activated Carbon Adsorption	Removes pollutants from solution by the physical adsorption process and accumulation on the surface of activated carbon
Biological Oxidation	Bacterial decomposition and destruction of pollutants
Chemical Oxidation	Chemical decomposition and destruction of pollutants
Hydrolysis	Reaction with water to break complex pollutants into smaller compounds
Precipitation	Formation of insoluble compounds containing pollutants such that they can be removed by clarification and filtration

The system supplier assembles a set of these treatment process units tailored to the specifics of the site conditions and requirements. Key variables are the type of chemicals to be removed, the completeness of removal, and the variability of conditions.

GRAPHICS COURTESY OF CARBTROL CORP.

sive labor to clean pits, troughs or trenches should be avoided. Similarly, product design should eliminate the accumulation or stagnant contact of solids or grasses in or with the recycled water. Decomposition of organic solid matter generates soluble organic breakdown products that can overload subsequent water treatment operations.

- Designing a system into course renovation and maintenance upgrades: An advanced washwater treatment system can be used as a focal point for integration of key maintenance operations at new or renovated golf maintenance facilities. A system using state-of-the-art treatment technology can be integrated with fueling, chemical mixing and chemical storage operations. Properly designed, such a system can provide total containment for all common fuels and turf products, allowing recycle, reuse and treatment where necessary. Plans that incorporate a proven effective system can speed permitting and facilitate overall project completion. It is helpful to seek out qualified architects/engineers with credentials in this area of design. They can particularly help with overall layout, budgeting and permitting.

Understanding washwater treatment technology

A washwater treatment system is made up of a series of unit processes or steps whereby washwater is collected, treated, stored and reused or discharged. These processes must address the specific flow volume, solids level, contaminant load and treated water use for a particular facility.

Figure 1 is a generic flow diagram that outlines the various steps, which may be assembled to provide a complete treatment system. For each of these steps, alternative technologies can be selected which best address local conditions and together meet the required treatment objective. A good system design will select the best series of unit processes considering performance, cost and operational reliability.

Table 1 lists and describes a series of

unit processes that are commonly employed in the treatment step identified in Figure 1. These processes are used to specifically treat organic contaminants including: hydrocarbons, pesticides, herbicides, etc. Most systems will require a combination of these technologies to address the variation of organic contaminants and changing operating conditions, including pH, temperature, shock loads, etc., that may be encountered at a specific facility.

Considering your needs

In the past, washwater treatment and recycle systems have been installed at golf facilities that have not met operating expectations. Many of these disappointments are the result of improper evaluation of the specific treatment or recycle conditions. Just as one golf club is not optimum for all types of golf shots, one "off-the-shelf" washwater recycle package cannot address all wash and treatment conditions.

The first step in evaluating a washwater application is to consider the type and volume of equipment to be washed. A system with robust solids-and-sludge-handling capacity will be critical to success at new or renovated courses undergoing substantial construction activity. The system will be required to pump and separate significant amounts of grass, sand and construction debris, which may not be present at established courses. Solids removal from flat-bottom tanks, subsurface sumps, collection baskets or vaults can present a significant impediment to efficient operation.

The technology selected to treat the washwater itself is also a major consideration. Locations that wash chemical handling equipment and motorized sprayers that treat wastes from maintenance degreasing operations may require a more advanced treatment technology, as compared to washing only fairway and greens mowers or golf carts. Locations processing fuel-related hydrocarbons, pesticides and other turf chemicals must be matched with the appro-

priate treatment technology. Extraordinary conditions, such as swings in pH, temperature or chemical load, also must be anticipated and incorporated into system requirements.

Lastly, the operational requirements of the washwater recycle system must be considered. A system that requires your mechanic to live at the wash pad will surely not meet your expectations. However, all mechanical systems require some attention to maintain operational efficiency. Your best guide is references from other superintendents with similar course conditions and maintenance intensity. A well designed washwater system should require little time and attention.

Summary

Proper handling of washwater in golf course maintenance operations represents a two-part opportunity: preventing environmental impacts while ensuring the productivity and safety of crews. Advanced technology has overcome many of the limitations of early systems. New, renovated and expanding courses should design an effective washwater system into their plans, with the help of a knowledgeable supplier.

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