

Guidelines for Managing Winery Wastewater



Pollution prevention or source reduction options are considered the best strategies to reduce environmental impacts, avoid excess resource utilization, and save money. The Best Management Practices (BMPs) developed for wineries are examples of pollution prevention methods that can minimize or even eliminate waste. From a practical perspective, one-hundred-percent of all waste cannot be eliminated, which includes wastewater from winery operations. Once all feasible source reduction measures have been implemented, which reduces the amount of wastewater generated, wineries need to properly manage wastewater. Treating wastewater is also considered a unit operation where pollution prevention principles can be applied to ensure that environmental impacts are minimized (chemical, media, water, and energy use).

The purpose of this document is to outline wastewater management options for wineries in New York State. The information provided is not an official representation of regulations or compliance requirements but rather is a guidance document for wineries to use. Any questions should be directed to local or state authorities.

Wineries typically generate two major categories of wastewater:

- **Industrial or “process” wastewater:** The residual wastewater from winemaking operations is considered an industrial wastewater by New York State Department of Environmental Conservation (NYSDEC). Typically, this wastewater is generated from washing operations during harvesting, pressing, fermentation, washing, and sanitizing equipment and bottles, as well as from larger scale restaurant operations or tasting-room waste. Process wastewater may also include, at different times of the year, pomace after crushing, lees after fermentation, and sediments after stabilization.
- **Sanitary Wastewater:** The definition of sanitary wastewater is wastewater generated from bathrooms, kitchen waste (in small quantities), and other general plumbing in a winery. Since a winery has more people contributing to sanitary wastewater than a typical household, it is considered a source of commercial wastewater as opposed to a domestic/residential or an institutional wastewater source.

Ideally, sanitary and industrial wastewater streams should be separated since different management, treatment, and disposal methods apply to each. For example, regulatory agencies may be more amenable to land application if the wastewater does not contain human waste or chemicals and surfactants.

Another consideration to bear in mind is the difference in wastewater volume generated between peak and off-peak seasons. The time of year affects many factors, such as the number of visitors to a winery, when wine-making operations are scheduled, and when large events like festivals might occur on or near a winery. The duration of peak versus non-peak flow can likely determine whether an onsite treatment facility makes better economic sense than hauling wastewater offsite (which may include the use of portable toilets) for disposal.

The regulation of wastewater discharges varies depending on the type and the quantity of wastewater. Wastewater can be disposed of by:

- > spraying it onto fields as part of an individual State Pollutant Discharge Elimination System (SPDES) permit;
- > applying it to land under a Part 360 permit, which applies to agricultural waste that is non-sanitary and free of chemicals;
- > discharging it to a municipal treatment plant via a sewer system under a pretreatment discharge permit (Note: Most wineries in Western and Central New York State do not have access to municipal sewage infrastructure.);
- > treating it and then discharging it to subsurface or groundwater sources (e.g., septic systems or leach fields);
- > treating it and then discharging it to a surface water source (e.g., stream, river, or lake); or
- > collecting it in storage tanks prior to periodically hauling to an offsite treatment facility.

Wastewater discharges in New York State are regulated by the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC requires and issues SPDES permits for all subsurface and surface discharges.

Industrial Wastewater:

- > **Subsurface and Surface:** A SPDES permit is required for both subsurface and surface discharges of any size. Since most wineries utilize chemicals and cleaning agents and generate wastewater with high volumes of solids and organics, any discharge will need to be treated for removal of these pollutants before it can be discharged through a permitted outlet.
- > **Land Application:** If the wastewater from wine production is segregated from chemicals, contaminants, and sanitary wastewater, it can be seasonally applied to land through a permitted spray-irrigation system or a NYSDEC Part 360 permit because it would be considered agricultural waste. A NYSDEC Part 360 permit is required for land-spreading or composting of bio-solids.
- > **Hauling and onsite treatment:**
 - The logistics of hauling are largely determined by an individual treatment facility's requirements. It also requires a hauler with a specialized permit to haul waste on public roads. Wastewater can be hauled with a septic truck to a wastewater treatment plant for disposal. As a sustainable alternative, high-strength materials and/or solids could be sent to a digester to produce bio-gas or to a composting service to capture nutrients for fertilizer material.
 - The decision between investing in an onsite treatment versus contracting a hauling service is usually driven by the size and quantity of waste in question, balanced with a winery's sustainability goals.

Sanitary (Commercial) Wastewater:

- > **Subsurface:**
 - Septic systems designed to treat less than 1,000 gallons per day (gpd) of sanitary (only) wastewater are regulated by the New York State Department of Health (NYSDOH), which has its own set of guidelines and requirements outside of NYSDEC. All design documents for these systems can be found on the NYSDOH website. A SPDES permit is not required for small septic systems that contain only sanitary wastewater.

- A SPDES permit is required for a subsurface discharge of 1,000 gpd or greater.
 - Sanitary wastewater usage at a commercial site depends on the type of fixtures used and the kind of food operations underway. Published guidance on water use estimates 3–5 gallons of water is used per day for each visitor and 10–15 gallons per day for every employee. For example, a winery with 10 employees and 150–200 visitors per day can easily exceed the 1,000 gpd mark.
- **Surface:** A SPDES permit (along with treatment) is required for surface-water discharge of any size.
 - **Land Application:** Applying sanitary wastewater to land in any situation is not allowed in New York State.
 - **Hauling:** Individual treatment facilities have specific requirements in place for hauling. Haulers are required to have a specialized permit to haul waste on public roads.

Other Important Information

If segregation is not possible and there is no available sewer to treat and discharge through a municipality, wineries must utilize an onsite wastewater treatment system. Once treated, the wastewater can be discharged to a surface-water source through a SPDES-permitted outfall or to a groundwater disposal system through a permitted septic and leach-field system. Otherwise, the wastewater can be hauled for offsite disposal.

SPDES permits are typically issued by the regional office and applications can be obtained by contacting the NYSDEC Regional Permit Administrator. The application process is coordinated through the regional office. Most related documents can be found on the NYSDEC website.

Other guidance is available that outlines the standards expected by NYSDEC for small treatment systems constructed in New York State. These resources are listed below, the first being the most applicable to wineries and the last being the least applicable:

- New York State Design Standards for Intermediate Sized Wastewater Treatment Systems, 2014
- NEIWPC Guides for the Design of Wastewater Treatment Works Technical Report-16 (TR-16), 2016
- Recommended Standards for Wastewater Facilities (Ten States Standards), 2014

Since New York State wineries tend to produce smaller amounts of wastewater, the 2014 New York State Design Standards for Intermediate Sized Wastewater Treatment Systems and TR-16 are the most applicable for treatment system guidelines. It should be noted that these guidelines were primarily developed for smaller, intermediate sanitary-wastewater treatment systems or for small industrial pretreatment systems that have effectively treated wastewater to a level considered suitable for discharge (treated to typical sanitary or domestic wastewater strength).

These standards do not cover the nuances of industrial winery wastewater, which include variability, chemicals, etc. If sampling cannot be done to establish a wastewater profile to serve as a baseline for further design, reference data for wastewater characteristics, loading, and variability may be found by referring to relevant scientific research studies or networking with other wineries.

Since winery wastewater tends to have more high-strength organics [i.e., five-day biochemical oxygen (BOD₅) and chemical oxygen demand (COD)] and solids than typical sanitary wastewater, a professional engineer that understands how to treat industrial wastewater should be consulted. An engineer can help to establish the

basis of design and selection of treatment before any discharge to subsurface or surface water. NYSDEC will require that a system is reviewed and stamped by a New York state-licensed professional engineer, so it is best to engage an engineer that understands industrial wastewater treatment early in the project.

Note: At the time of publication of this document, most existing plants in New York State are “grandfathered,” which means some of the recent regulations to treat wastewater may not apply. However, new regulations may be established in the state that will require facilities that are new or expanding to utilize treatment as described above.

For those wineries that are using an existing subsurface disposal system, system loading presents a risk factor. For example, if a septic system is not suitably designed for increased wastewater output (organics and solids associated with wine production), the septic system can experience a “blowout.” A blowout is when a lateral is plugged by solids or a layer of biological material and wastewater cannot percolate into the soil as designed. The wastewater will build up in the bed and exit through the surface of the leach field. Should this occur, the leach field will need to be remediated, which can be costly, depending on the extent of failure.

Overloaded septic systems can pollute groundwater, so another risk of onsite treatment is contamination of well water. This generally occurs when the discharge does not have the proper time needed to percolate through the soil to receive further treatment.

The type of treatment and disposal is typically affected by the volume and economics of treatment and disposal. Below are some factors to consider.

- Is a sewer available? If yes, it should be the preferred method of disposal because it is easier than maintaining onsite treatment works and obtaining a SPDES permit. A winery's ability and the cost to do so will depend on the size of the municipal wastewater treatment plant, the size of the winery, and the potential surcharges or pretreatment requirements imposed by the municipality. Of note, most municipalities have limits on what they accept under a pretreatment permit. They typically require fees for treatment, so it is important to understand the ramifications when deciding to discharge to sewer or treat onsite.
- Can sanitary wastewater be segregated from other wastewater and kept under 1,000 gallons per day so that a standard septic system or leach field can be utilized? If some days are higher than others (above 1,000 gallons per day), can equalization be used to keep average daily flow below 1,000 gallons per day?
- Can sanitary wastewater capacity be limited with temporary sanitary or bathroom facilities or by contracting with a hauler during large events or peak season in order to keep the total wastewater volume under 1,000 gallons per day?
- Can wine-production wastewater that is free of chemicals be applied to land? If so, is there enough land to grow crops and provide storage for winter operations?
- What is the cost of hauling to a local wastewater treatment plant? Does the volume of wastewater generated at the winery and the anticipated expense justify construction of an onsite treatment plant? As part of an economic analysis, be sure to include operating costs such as power and chemical to treat the wastewater as well as the cost of maintaining and monitoring wastewater under a SPDES permit.
- If an onsite treatment is needed, it is important to identify a system with as small of an environmental footprint as possible, one that is not energy-intensive and does not rely on use of significant amounts of chemicals.

In summary:

- Wastewater management is evaluated after all source-reduction measures are assessed and implemented wherever possible so that the amount of wastewater is minimized.
- Subsurface discharges from production: All new industrial subsurface discharges or changes to an existing discharge system must be made known to NYSDEC. A SPDES permit will be required for any new construction of a septic system and leach field disposal.
- Subsurface discharges from sanitary sources greater than 1,000 gpd must have a SPDES permit.
- Surface discharges: All surface water discharges (both sanitary and industrial) must have a SPDES permit.
- Land applications: A Part 360 permit or a SPDES permit is required for all applications of wastewater to land.
- Sewer: A winery must coordinate with a local municipality to learn whether the available sewer system can take wastewater. The municipality may require pretreatment or surcharges for disposal, depending on the municipal treatment plant's size and its ability to handle the extra flows and loads from the winery.
- Onsite treatment: A winery should identify a system that is reliable and cost-effective with as few environmental impacts as possible. A professional engineer should be involved early in the project to assist with technology reviews and selection of treatment processes.
- Hauling: Depending on volume and unit cost for hauling, this option may be an economical solution for all wastewater that is considered industrial or contains chemicals. Ideally, sanitary wastewater should be kept low enough to not require a SPDES permit for subsurface discharge and non-chemical containing wastewater can be land applied. This option may be the most economical solution for smaller wineries in New York State. A composting service or a municipal digester may be a good sustainable outlet for high-strength wastewater and solids.



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