

FACT SHEET

for the

Formal Draft Winery General Permit

State Waste Discharge General Permit for
Discharges from Winemaking Facilities

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State of Washington
Department of Ecology
Olympia, Washington 98504

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EXECUTIVE SUMMARY

Under the authority of Chapter 90.48 Revised Code of Washington (RCW), the Washington State Department of Ecology (Ecology) proposes to issue the Winery State Waste Discharge General Permit (Winery General Permit, general permit) to establish waste management practices for winemaking facilities to prevent pollution and protect waters of the state. The general permit conditionally authorizes discharges of winery process wastewater (wastewater) to land, ground water, and wastewater treatment plants.

Wastewater discharges like those from winemaking facilities can:

- Pollute groundwater aquifers that supply drinking water and the water used to make wine.
- Kill aquatic organisms.
- Upset wastewater treatment plants causing untreated sewage to be discharged to streams and rivers.

Ecology anticipates that Permittees' diligent implementation of the requirements of the general permit will likely result in improved waste management systems and practices, and discharges that do **not**:

- Cause or contribute to violations of state water quality standards.
- Harm groundwater aquifers.
- Cause upsets to wastewater treatment plants.
- Damage soil and vegetation.

This Fact Sheet is a companion document to the draft Winery General Permit. It explains and documents:

- The decisions made by Ecology while drafting the general permit.
- The regulatory and technical basis for Ecology's decisions.
- The nature of the proposed discharges conditionally authorized by the general permit.
- The legal and technical basis for permit issuance required in Section 110 of Chapter 173-226 WAC (Washington Administrative Code), also written as WAC 173-226-110.

Ecology will accept comments from the public on the formal draft of the Winery General Permit and this Fact Sheet until February 14, 2018. Details about how to prepare and submit comments are included in **Section 5.0 – Public Involvement** of this Fact Sheet. Ecology intends to revise the formal draft of the Winery General Permit based on feedback from the public and issue the Final Winery General Permit in the summer of 2018. However, the Winery General Permit will **not** be effective until the summer of 2019. See **Section 6.0 – General Permit Timeline** of this Fact Sheet, for more information.

Ecology will respond to public comments received during the public comment period for the formal draft and will include the responses and the comments as an appendix in this Fact Sheet. Ecology will **not** revise this Fact Sheet besides including the response to comments as an appendix.

1.0 INTRODUCTION

The Washington State Legislature (Legislature) gave Ecology the authority to control and prevent the pollution of waters of the state, as stated in the Water Pollution Control law, Chapter 90.48 RCW (Revised Code of Washington). The Legislature also required that industrial and commercial facilities that discharge waste to waters of the state (including ground water) have a permit. Over the past forty (40) years, Ecology has issued more than 15,000 individual permits to numerous industrial and commercial facilities. Ecology has also issued 24 general permits since 1992 and has issued coverage under those general permits to more than 6,000 facilities.

Historically, Washington winemaking facilities have **not** been a major source of pollution. However, there are examples of groundwater contamination from facilities with wastewater that have similar characteristics and that use similar discharge methods. For example, a food-processing plant in Michigan contaminated ground water with metals after spray-irrigating their wastewater on nearby fields. Additionally, there are a few examples of large winemaking facilities in California that land applied wastewater and caused impacts to groundwater quality. Because the wine production in Washington has increased greatly over the past decade, Ecology decided to develop a general permit and establish good waste management practices for this rapidly expanding industry.

Ecology may issue coverage under a general permit or an individual permit to a single facility. An individual permit may be necessary when wastewater discharges or site-specific conditions at the facility are **not** typical of the industrial group or they warrant requirements tailored to their specific situation. However, when an entire class of discharges has similar characteristics, coverage under a general permit may be more appropriate. A general permit is designed to provide environmental protection under conditions typical for the covered industrial group. It allows a unified approach to similar facilities and can simplify the permitting process, saving the facility and Ecology time and resources.

The establishment of a general permit for the winemaking industry is appropriate because:

- The wastewater characteristics among facilities are similar.
- A standard set of permit requirements can effectively provide environmental protection.
- Facilities in compliance with permit conditions will be in compliance with water quality standards.
- A general permit is the most efficient method to handle the large number of permit applications from winemaking facilities.
- The application requirements for coverage under a general permit are far less rigorous than individual permit application requirements and are more cost effective.

At this time, there are fourteen (14) winemaking facilities covered by individual permits. These Permittees are required to apply for coverage under the general permit. Ecology will work with these Permittees to determine if they should remain covered by their existing individual permit or the Winery General Permit. Individual permits may still be issued in instances when a facility requires more detailed guidance or when an individual facility requests to be covered by an individual permit and Ecology approves the request.

On May 21, 2014, Ecology announced the start of the development of the Winery General Permit. Since then, Ecology visited dozens of winemaking facilities, interviewed winery operators, met with wine organizations, presented at industry events, and worked with waste management specialists and engineers to learn about winery waste management systems and practices. Ecology also developed a technical advisory group comprising industry representatives to provide input throughout this process.

On April 11, 2017, Ecology released the preliminary draft of the Winery General Permit to the public and started a 60-day public comment period which ended on June 11, 2017. Ecology carefully reviewed the comments and feedback from the public and made revisions to the preliminary draft and this Fact Sheet; the revised draft is the formal draft of the Winery General Permit.

Ecology released the formal draft of the Winery General Permit, the revised Fact Sheet, the Notice of Intent (application), and the Economic Impact Analysis on November 1, 2017, starting the public comment period which ends on February 14, 2018. Ecology has also scheduled four public hearings: two will be offered as a webinar, one will be held in eastern Washington, and one in western Washington. More information about the public hearings is included in Section 5.0 – Public Involvement. Ecology will make changes to the formal draft based on feedback from the public and issue the final general permit in the summer of 2018. Ecology expects the Winery General Permit will be effective sometime in the summer of 2019. See Section 6.0 – General Permit Timeline of this Fact Sheet, for more information.

The Winery General Permit was written to be user friendly, easy to read, and well organized. Where possible, information was presented both in narrative format and in table format. Important words such as “no” and “not” were bolded so the reader does **not** overlook them. Where appropriate, terms were used that are more familiar to representatives of winemaking facilities. In other situations, terms were **not** modified so that Permittees may become more familiar with environmental regulations. Additionally, some numbers and conversions in the Winery General Permit were rounded to increase the ease of compliance.

Ecology heard from representatives of the winemaking industry that the vast majority of winemaking facilities in Washington have very low annual production volumes and are already heavily regulated. Another regulation demanding resources be spent on facility upgrades, monitoring equipment, management plans, and wastewater analysis would force many to close their business. The Winery General Permit, in this first permit cycle, includes flexibility, compliance options, benchmarks, and appropriately scaled requirements for small producers and existing facilities; and focuses on best management practices and data collection.

Ecology took the following actions to mitigate the compliance cost of the permit. These actions were taken during the development of the permit, as Ecology incorporated input from winemaking facilities to best achieve environmental protection while reducing compliance burden.

- Allowing Permittees to collect a grab sample (one single sample) rather than a composite sample (a combination of three separate samples).
- **Not** requiring Permittees discharging to WWTPs to sample their wastewater. They are only required to report the results of the WWTP’s analysis.

- **Not** requiring permittees discharging to lagoons or other liquid storage structures to sample their wastewater.
- Reducing the frequency of wastewater sample analysis. Permittees required to analyze wastewater samples are only required to do so on a quarterly basis.
- **Not** requiring Group 1 Permittees that discharge as irrigation to managed vegetation to analyze wastewater samples to determine how much wastewater they are permitted to discharge in order to **not** overload their crop/soil. The general permit now contains application rates and application frequencies.
- **Not** requiring Permittees that discharge as road dust abatement to analyze wastewater samples to determine how much wastewater they are permitted to discharge. The general permit now contains application rates and application frequencies.
- **Not** setting a minimum annual frequency for Permittees that discharge to a subsurface infiltration system to clean the tanks. They may clean on an as-needed basis.
- **Not** requiring an annual report.
- **Not** requiring Permittees installing a new subsurface infiltration system to treat domestic sewage separate from wastewater.
- **Not** requiring Permittees discharging to an existing subsurface infiltration system to retrofit their existing system or to treat domestic sewage separate from wastewater.
- Establishing differing reporting requirements for small wineries.
- **Not** covering wineries producing less than:
 - 53,505 gallons of wastewater per calendar year.
 - 7,500 cases of wine or juice per calendar year.
 - 17,835 gallons of wine or juice per calendar year.
- **Not** covering wineries discharging to delegated POTWs or Listed WWTPs.
- Designing requirements for lagoon and subsurface infiltration systems to be able to be done by winery staff or management, without hiring outside engineers or other contractors.
- Requiring only adaptive management when benchmarks are exceeded.
- Allowing small wineries to estimate wastewater flow.
- Phasing in requirements for removal of fine solids and design of a waste management system that accommodates future growth and beneficially reuses wastewater.
- Phasing in assessment requirements.
- Establishing different benchmarks for Group 1 Permittees for some types of wastewater discharge.
- **Not** requiring Permittees to conduct inspections more frequently than twice per year.

As Permittees become more familiar with compliance obligations and Ecology becomes more familiar with the impacts from their wastewater, the Winery General Permit in future permit cycles may include requirements that are more prescriptive and more protective of water quality.

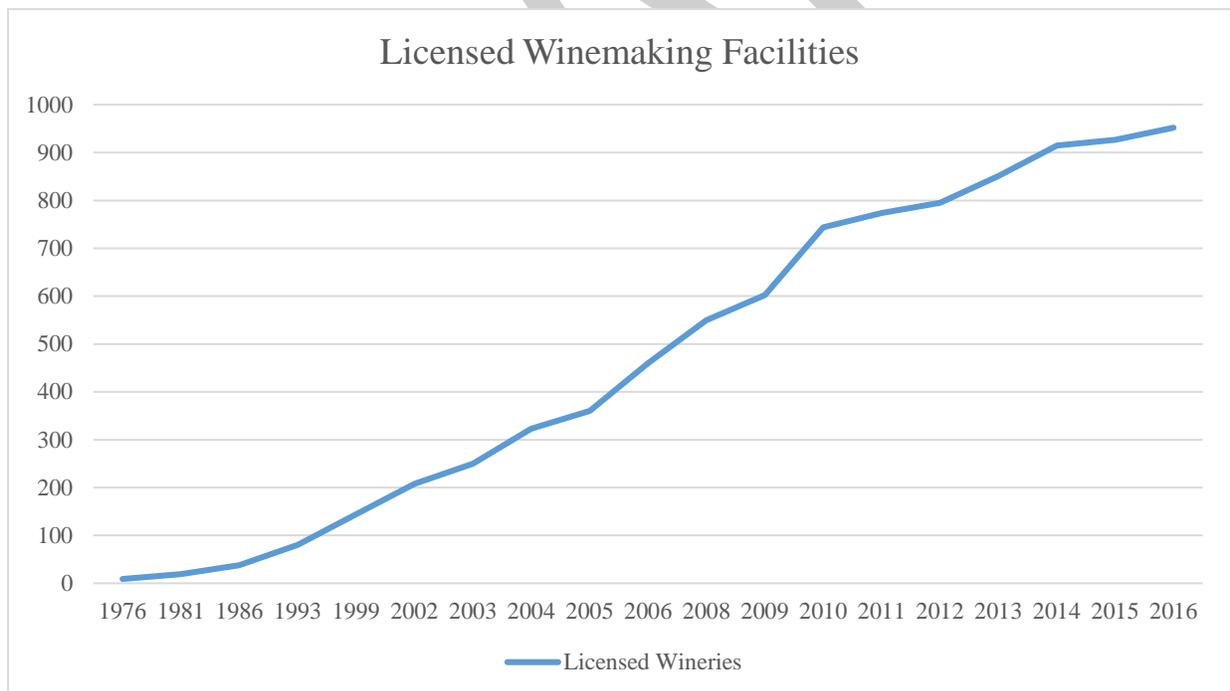
2.0 INDUSTRY OVERVIEW

2.1 Washington’s Winemaking Industry

The roots of Washington’s winemaking industry trace back to 1825, when the first wine grapes were cultivated in Fort Vancouver. In 1869, the first grapevines were planted near Union Gap in the Yakima Valley by the Schanno family. Large-scale irrigation starting in 1903, brought water to the nutrient-rich Eastern Washington and by 1910, wine grapes were growing in most areas of the state. In the 1960’s, the first commercial-scale plantings occurred which led to the industry’s rapid expansion in the mid-1970’s. Today, Washington State is ranked as the second largest wine producer in the United States; California is ranked number one (1) and Oregon is number three (3).

According to the Washington State Wine Commission, the number of Washington winemaking facilities increased by 23.8% from 2009 to 2013. Likewise, wine produced in Washington increased from just under two million cases in 1994 to 14.8 million cases in 2013. **Figure 1 - Number of Licensed Washington Winemaking Facilities**, displays the increase in the number of licensed winemaking facilities in Washington, according to the Washington State Liquor and Cannabis Board and the Wines Northwest website. **Figure 2 – Map of WA Wineries**, shows the location of Washington wineries.

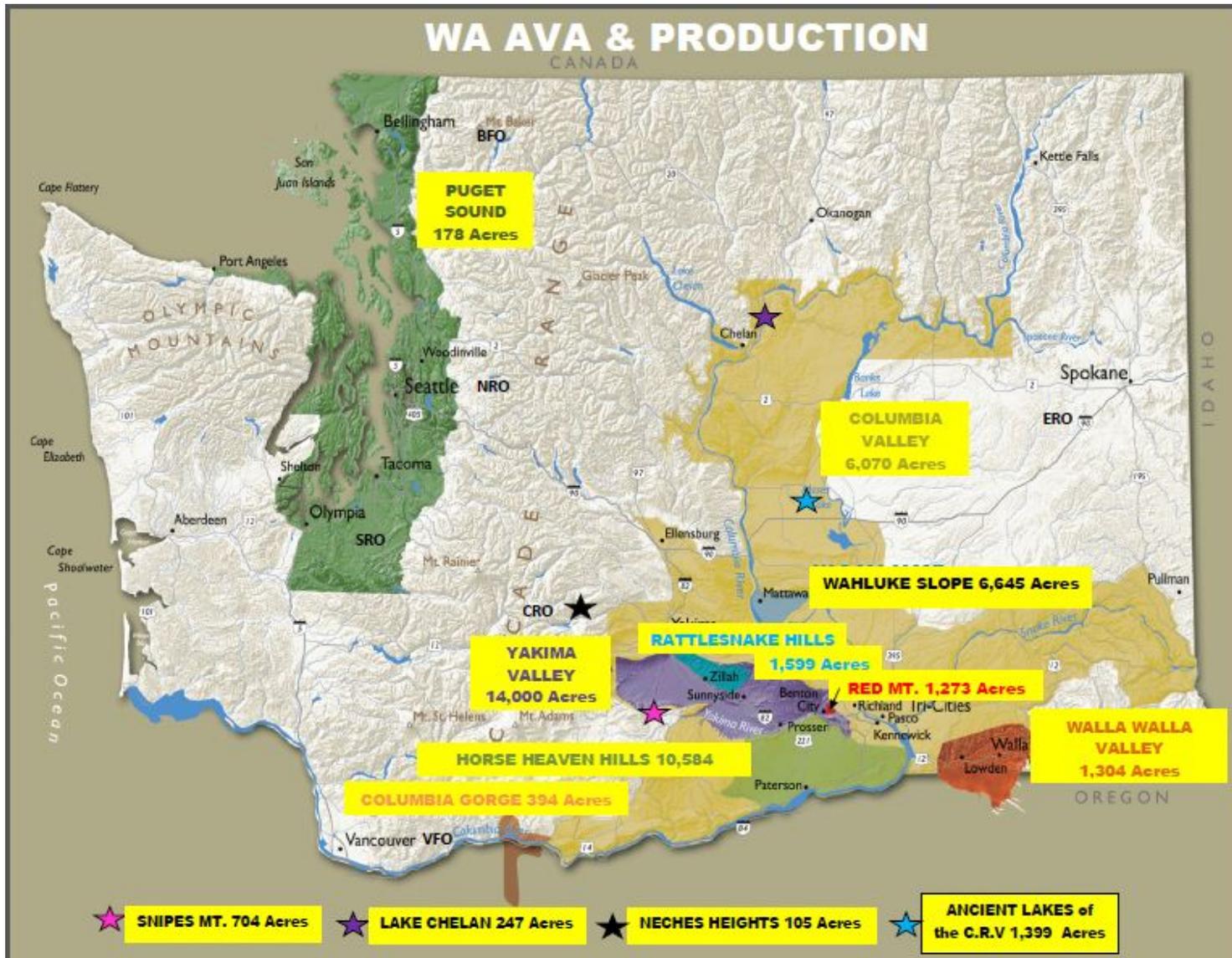
Figure 1
Number of Licensed Washington Winemaking Facilities



(Information sources: (Washington State Liquor and Cannabis Board. 2017.) (Wines Northwest. Website. 2016))

There are officially fourteen (14) American Viticultural Areas in Washington State, as shown in **Figure 3 – Map of Washington AVAs** and as listed in **Table 1 – Washington AVAs**, according to the Washington State Wine Commission and the Northwest Wines website.

Figure 3
Map of Washington AVAs



(Information sources: (Washington State Wine Commission. Website. 2016.) (Wines Northwest. Website. 2016))

Table 1
Washington AVAs

American Viticultural Area (AVA)	Year Established	Total Production
Ancient Lakes	2012	1,399 acres
Columbia Gorge	2004	800 acres
Columbia Valley	1984	6,070 acres
Horse Heaven Hills	2005	10,584 acres
Lake Chelan	2009	704 acres
Lewis-Clark Valley	2016	81 acres
Naches Heights	2011	105 acres
Puget Sound	1995	178 acres
Rattlesnake Hills	2006	1,599 acres
Red Mountain	2001	1,273 acres
Snipes Mountain	2009	704 acres
Yakima Valley	1983	14,000 acres
Wahluke Slope	2006	6,645 acres
Walla Walla Valley	1984	1,304 acres

(Data sources: Washington State Wine Commission. Website. 2016) (Wines Northwest. Website. 2016))

Winemaking facilities are located in different environmental settings throughout Washington State. Some winemaking facilities call the densely-populated city of Seattle home, while others are located in rural environments east of the Cascades like the areas surrounding Prosser and Walla Walla. Each environment has its own benefits and challenges. For example, a winemaking facility located in Seattle or Woodinville is likely to discharge their wastewater to a wastewater treatment plant but is very unlikely to use their wastewater to irrigate managed vegetation. Whereas a winemaking facility located in the country may be able to use their wastewater to irrigate neighboring fields of managed vegetation but is unlikely to be able to discharge to a wastewater treatment plant.

One of the largest wine producers in Washington State is Ste. Michelle Wine Estates, which includes multiple labels and facilities. They averaged eleven (11) million gallons sold per year between 2013 and 2015. The next top one hundred (100) wine sellers sold an average twenty (20) million gallons of wine between 2013 and 2015. The remaining Washington wine producers sold an average of 730,000 gallons of wine between 2013 and 2015. **Table 2 – Average Production Totals** lists the average gallons of wine sold for these three groups.

Table 2
Average Production Totals

Group	Average Sold (2013 – 2015)	
Ste. Michelle Wine Estates	11 million gallons	35%
Top 100 (no Ste. Michelle)	20 million gallons	63%
Remaining winemaking facilities	730,000 gallons	2%

(Data source: Washington State Liquor and Cannabis Board. 2016)

Even though the proposed Winery General Permit is the first statewide water quality regulation for winemaking facilities, environmental protection is not new to this industry. The Washington winemaking industry offers many examples of environmental stewards. Owners and winemakers operate their facilities in environmentally-conscious ways such as composting solid winery waste, capturing and reusing rain water, using solar panels, operating in LEED-certified buildings, and taking steps to be carbon neutral.

2.2 Wastewater Characterization

The conversion of grapes into wine is a multi-step process that uses a significant amount of water. The volume of water used varies for each facility depending on water conservation practices, but the average facility uses about eleven hundred (1,100) gallons of water per ton of grapes. Other sources state that a typical winemaking facility uses about six (6) gallons of water for every one (1) gallon of wine produced. Over the past 30 years, the industry has implemented water-conservation techniques and equipment that reduced water consumption by about 20%. The fresh water used by the winemaking industry is obtained from ground water (e.g., private wells), municipal purveyors, reservoirs, and surface water.

Winemaking generates significant volumes of wastewater that comes from a number of sources and activities throughout the winemaking process. Examples include:

- Cleaning of tanks before and after racking
- Rinsing of transfer lines
- Barrel washing
- Spent wine and product losses
- Bottling sterilization
- Ion exchange columns
- Filtration units
- Laboratory wastewater
- Hosing down of floors and equipment
- Stormwater diverted into, or captured in, the waste management system

The activities that typically generate the greatest amount of wastewater include barrel washing, floor washing, cleaning tanks and equipment used when racking, and other sanitation.

The winemaking process differs depending on the type of wine each facility makes, but the major steps in the winemaking process include:

- Harvest
- Crush and press
- Clarification and acid adjust
- Maturation
- Stabilization
- Filtration
- Blending
- Barrel aging, secondary fermentation
- Balancing
- Bottling and corking

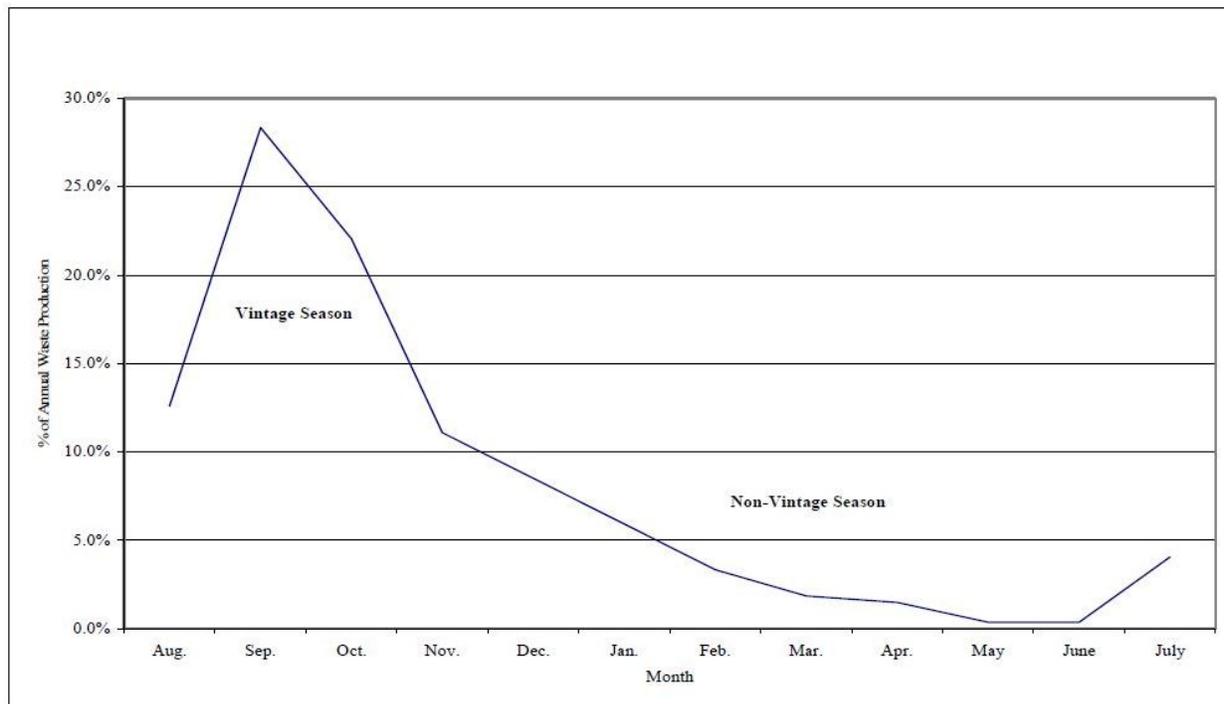
Even though harvest and crush are crucial periods or seasons for winemaking facilities, activities at the facilities occur throughout the year. The wine production year can be divided into two periods, vintage and non-vintage. The main activities in the vintage season include harvesting grapes and grape juice handling and management, also known as “harvest” and “crush”. The length of the vintage season varies from forty-two (42) days (six (6) weeks) to one hundred forty (140) days (twenty (20) weeks), depending on the production size of the winemaking facility. The type of wine produced by the facility and the variety of grapes used can affect the length of the vintage season. The non-vintage season includes activities associated with managing fermented wine (stabilization, maturation, and blending wine) and cleaning the various components of the facility. These periods overlap, and typically as the vintage season slows down, the non-vintage activities increase.

Wastewater flows occur throughout the year, but activities during harvest and crush typically generate significant amounts of wastewater. According to one source, some small winemaking facilities can produce up to 80% of their annual wastewater total during harvest and crush, while some medium and large winemaking facilities typically generate anywhere from 25% to over 50% of their total annual wastewater.

Late fall and winter months have the greatest wastewater flow with flows decreasing during late spring and early summer. Wastewater flows increase in late summer as the facility is cleaned and preparations occur for the upcoming harvest and crush. **Figure 4 – Wastewater Generation throughout the Year** shows the percentage of wastewater generated at a typical winemaking facility throughout the year and the months and season when the majority of wastewater is generated.

Cleaning waste and rinse water is the largest contributor to the winemaking facility’s overall total volume of wastewater generated. It is critical to winemakers to avoid contamination and spoilage so they typically use a large amount of water to clean their equipment and facility. The composition of wastewater varies throughout the year. Wastewater can include remnants from winemaking such as alcohol and sugars, unused fruit and juice, and chemicals used as cleaning agents. **Table 3 – Stages of Wastewater Generation** shows the periods of time throughout the year when wastewater is generated. **Figure 5 – Typical Sources of Winery Wastes** illustrates where waste is generated at each step of the winemaking process.

Figure 4
Wastewater Generation throughout the Year

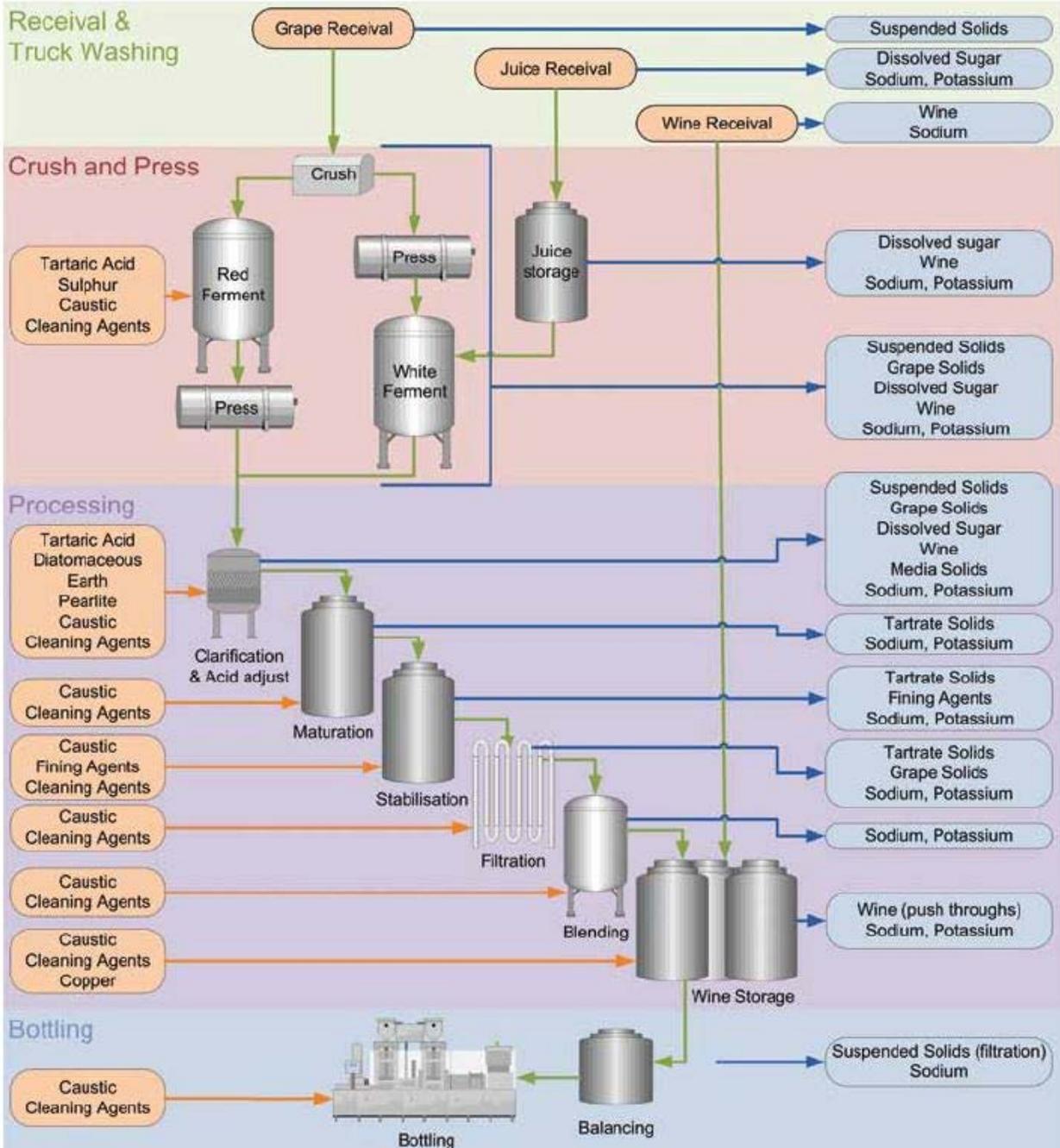


(Graph source: Oakley Water Strategies. Winery Waste Management – Technical Memorandum. 2009)

Table 3
Stages of Wastewater Generation

Months	Activities and Sources of Wastewater
December to June	Wastewater generation is at its lowest. Generally less than 30% of the maximum weekly flows that occur during harvest and crush. Wastewater quality is highly dependent on day-by-day activities. Racking and barrel washing can generate high volumes of wastewater.
July to August	Bottling, caustic washing of tanks, non-caustic washing of equipment to prepare for harvest and crush.
August to September	Grapes are harvested. Wastewater production is rapidly rising to peak flows.
September to November	Grapes are crushed. Wastewater generation is at its peak.
October to December	Wastewater production is rapidly falling and has decreased to 40% of the maximum weekly flow.
November to March	Pre-fermentation operations have ceased. The impact of caustic cleaning, ion exchange, etc., is at its greatest and wastewater quality may be poor.

Figure 5
Typical Sources of Winery Wastes



(Figure source: Grape and Wine Research and Development Corporation. Winery Wastewater Management & Recycling Operational Guidelines. 2012)

The characteristics of wastewater depend on the type and amount of wine produced and the operation of the winemaking facility. **Not** only is the volume of wastewater extremely variable, the quality and strength is as well. Generally, the wastewater has a high pH range and a high concentration of organic material, dissolved salts, and suspended solids. **Table 4 – Wastewater Characteristics**, lists the typical ranges for some wastewater quality pollutants.

Table 4
Wastewater Characteristics

Pollutants	Units	Wastewater Characteristics		Untreated Domestic Sewage
		During Vintage	During Non-Vintage	
Load Duration	Days	75	290	-
BOD ₅	mg/l	500 – 12,000	300 – 3,500	110 – 400
pH	s.u.	2.5 – 9.5	4 – 7	7
Total dissolved solids	mg/l	80 – 2,900	200 – 700	280 – 850
Total suspended solids	mg/l	40 – 800	10 – 400	100 – 350
Total phosphorous	mg/l as P	1 – 10	1 – 40	4 – 15
Total nitrogen	mg/l as N	1 – 40	1 – 40	20 – 85

(Data sources: CA Central Coast RWQCB WDR for Wineries (2008), CA Napa Winery Waste Management Report (2009), Winewatch Factsheet (Australia) (2009), Shepherd, Grismer, Tchobanoglous (2014))

Because wastewater contains small amounts of nitrogen and phosphorous relative to organic material, Ecology determined that focusing on organic material, and **not** nitrogen or phosphorous, was appropriate. The main pollutants of concern include organic material, pH, salinity, and solids. Each is discussed below.

- **Organic material**

Wastewater has a much higher concentration of organic material compared to domestic sewage. The organic composition of wastewater contains simple dissolved compounds such as organic acids, sugars, and alcohols. Sources of organic material in wastewater include product loss (juice, wine, and lees), residues in cleaning waste and from diatomaceous earth filters, and solids such as skins and seeds. Concentrations of organic material are typically greatest during activities like crush and racking. The concentrations of organic materials from these activities can be more than ten times greater than that of domestic sewage. Bottling activities (typically in late winter) also generate wastewater with high levels of organic materials.

The concentration of organic material is listed as BOD (biological oxygen demand) in Table 4 above, but other tests are used to determine the concentration of organic material in wastewater such as biochemical oxygen demand (BOD) and carbonaceous biochemical oxygen demand (CBOD).

- **Acidity**

Wastewater is typically slightly acidic, with a water pH of 6.5 to 6.9, but can vary from mildly acidic (pH = 5.0) to significantly basic (pH = 10.0). Activities and materials that can affect the water pH of wastewater include ion exchange (acidic), product loss (juice, wine, and lees) (acidic), cleaning agents (basic or acidic), and the microbial metabolism of organic substrates during storage of wastewater further acidifies the wastewater. The acidity of wastewater is listed as pH in Table 4 above.

- **Salinity**

Activities and materials that affect the salinity of wastewater include alkali washing (caustic), product loss (juice, wine, and lees), ion exchange, and saline water used for cleaning. Typically, the largest source of high salt concentrations in wastewater is the water supplied to the winemaking facility. The concentration of salinity in wastewater is listed as total dissolved solids (TDS) in Table 4 above. Typically a percentage of the TDS is organic, which will generally decompose into its component elements. When discharging as irrigation to managed vegetation, the organic portion of TDS can be utilized by plants and microorganisms in the soil. Fixed dissolved solids (FDS) are also a concern for Permittees that discharge wastewater as irrigation to managed vegetation or as road dust abatement. The FDS is primarily that portion of the TDS that consists of inorganic constituents, which can accumulate in the soil.

- **Solids**

Activities and materials that contribute solids to wastewater include product loss (juice, wine, and lees), residues in caustic/citric acid cleaning waste, residues in diatomaceous earth filter waste, and skins and seeds bypassing screens and filters. Large suspended matter consists of leaves, stems, seeds, and fruit skins. The smaller suspended solids include dead yeast cells (lees), grit, dirt, bentonite, and diatomaceous earth. The concentration of solids in wastewater is listed as total suspended solids (TSS) in Table 4 above.

The “strength” of wastewater refers to the concentration of the water quality pollutants (listed above) in the wastewater. The strength of the wastewater fluctuates greatly depending on the time of year and the activity that generates the wastewater. For example, one activity that impacts the strength is cleaning the winemaking equipment and facility. Cleaning activities vary from facility to facility, but the main variables to consider include the methods of tank disinfection (steam sterilization vs. chemical), type of disinfectant used, and the cleaning frequency. The activities that produce the highest strength wastewater are crush and spring barrel washing.

2.3 Storage and Discharge Methods

Washington winemaking facilities use a variety of methods to discharge their wastewater. The general permit conditionally authorizes six (6) types of discharge methods. The inclusion of these discharge methods was based on visits to dozens of Washington winemaking facilities,

conversations with owners/operators and other industry experts, and the analysis of available information about the winemaking industry. Permittees may use any one (1), or a combination, of the discharge methods. A brief summary of each type of discharge method is provided below.

- **Discharges to a wastewater treatment plant (WWTP) (either publicly- or privately-owned) that has NOT been delegated permitting authority by Ecology or is NOT a Listed WWTP**

This discharge method applies to wastewater treatment plants that treat process wastewater from commercial or industrial facilities. In the general permit, the term “WWTP”, refers to a wastewater treatment plant that has **not** been delegated permitting authority by Ecology. Discharging wastewater to a WWTP is an excellent discharge method because wastewater treatment plants are designed to treat wastewater, their staff are experts in treating wastewater, and their main purpose is to treat wastewater.

- **Discharges to land treatment via irrigation to managed vegetation**

Land treatment via irrigation to managed vegetation refers to the controlled application of wastewater to irrigation lands for treatment. The wastewater is treated by soil microbial processes as it flows through the root zone and soil matrix. The primary goal of this discharge method is to maximize the pollutant uptake by the vegetation and minimize pollutant leaching below the root zone and uppermost aquifer.

The system generally consists of fields having managed vegetation (irrigation land) and a distribution system (e.g., sprinklers, center pivot) for uniformly distributing the wastewater. “Managed vegetation” refers to vegetation (whether used as a crop or in landscaping) that is maintained and is used to provide additional treatment for wastewater. Ecology recognizes that some winemaking facilities discharge wastewater to plants used in landscaping as well as crops, so decided to broaden the discharge method to include any vegetation as long as it remains healthy and viable. “Irrigation lands” refers to an area covered by managed vegetation that receives wastewater as irrigation and is intended to be used as land treatment. A storage tank or lagoon for holding the wastewater during periods when irrigation is prohibited, (e.g., frozen or flooded ground) may be necessary.

- **Discharges to lagoons or other liquid storage structures**

A lagoon is a structure constructed and used to hold, and sometimes treat, wastewater. They typically rely on evaporation for water removal or serve as temporary storage. “Other liquid storage structure” refers to a structure other than a lagoon that was constructed and used to hold, and sometimes treat, wastewater. Other types of liquid storage structures include pre-manufactured tanks that can be aboveground or underground, and are sometimes made of fiberglass or steel. The general permit does **not** specify the material composition of the “other liquid storage structure”.

- **Discharges as road dust abatement**

Road dust abatement refers to the discharge of wastewater to unpaved roads (e.g., roads at a winemaking facility) or unpaved driveways or parking lots for the purpose of suppressing dust. This is accomplished by a light, uniform application of wastewater via sprinkler system or truck to keep the area damp.

- **Discharges to a subsurface infiltration system**

A subsurface infiltration system is a below-ground system located at a winemaking facility that treats wastewater (winery process wastewater) before discharging it to a drainfield where additional treatment occurs. The subsurface infiltration system includes the system that treats the wastewater and the drainfield. A subsurface infiltration system constructed before the effective date of the general permit may be designed to treat wastewater (winery process wastewater) or may **not** be (an example is a septic system designed to treat domestic sewage). A subsurface infiltration system constructed six (6) months after the effective date of the general permit must be designed for the volumes, rates, and characteristics of the wastewater (winery process wastewater). Ecology developed the term “subsurface infiltration system”, to avoid confusion between a system that is designed specifically for wastewater (winery process wastewater) and one that is designed to treat domestic sewage.

- **Discharges to an infiltration basin**

An infiltration basin is a structure where **treated** wastewater is discharged and allowed to infiltrate into the ground to recharge ground water. The general permit requires wastewater to be treated to meet the Water Quality Standards for Groundwaters of the State of Washington (Chapter 173-200 WAC) for pH, TDS, Nitrate, Chloride, and Sulfate. The Technical Advisory Group (TAG) as well as numerous winery representatives requested this discharge method be allowed under the general permit. Many winemaking facilities support recharging ground water and view their wastewater as a resource, **not** to be discarded. Some wastewater treatment companies offer prepackaged treatment systems that can effectively treat wastewater.

Table 5 – Estimates of Storage and Discharge Methods lists the estimated number of winemaking facilities that use each type of storage and discharge method based on a 2015 survey conducted by Winerywise.

Table 5
Estimates of Storage and Discharge Methods

Storage and Discharge Method	Percentage	# of WA Wineries ¹
WWTP	8.69%	78
Irrigation to Managed Vegetation	23.91%	215
Lagoon or Storage Structure	19.57%	176
Road Dust Abatement	2.17%	20
Subsurface Infiltration System	35.87%	323
Infiltration Basin	Unknown ²	Unknown ²
Other discharge methods.	9.79%	88

1 = Assumes 900 winemaking facilities in Washington.
2 = Infiltration basins were **not** included in the survey conducted by Winerywise.

(Data source: Winerywise. 2015.)

2.4 Potential Impacts from Discharges

In Washington, ground water is an extremely important water supply. Roughly 60% of Washington citizens receive their drinking water from groundwater aquifers, and almost all of the rural population receive their drinking water from ground water. Ground water can also seep into surface waterbodies that support fish, wildlife, and human recreation. This connectivity occurs in various locations throughout Washington State. However, the connectivity between any specific ground water and surface water is a site-by-site and fact-specific matter.

Wastewater discharges from winemaking facilities can negatively impact the environment and organisms within the environment in many ways. The following is a list of typical impacts caused by untreated discharges of wastewater.

- Human health is affected by sources of drinking water being impacted by extreme water pH ranges that can leach heavy metals from the soil.
- Aquatic organisms are affected by oxygen depletion from organic material, extreme water pH ranges, salinity, and nutrients that cause eutrophication.
- Crops and vegetation are affected by oxygen imbalance in soils from organic material, toxicity of some heavy metals made available by fluctuations in soil pH, nutrients that acidify soil over time, and salinity that affects the water availability in soil.
- Nuisances like odors and vectors (such as flying insects that can transmit infectious diseases) are caused by the depletion of oxygen in wastewater and algal blooms from high nutrient levels.

The following pollutants are addressed in the Winery General Permit as well as the potential impacts from discharging them in excessive amounts.

- **Oxygen demand**

Dissolved oxygen is a key element in water quality that is necessary to support aquatic life. A demand is placed on the natural supply of dissolved oxygen in soil and waterbodies by many organic pollutants in wastewater. The available oxygen is used by bacteria to break down the organic pollutants. When wastewater with a high content of organic material is discharged to soil or a waterbody, oxygen in the soil or waterbody will be used up by the bacteria leaving less oxygen for plants and aquatic organisms. In other words, organic material is oxygen-demanding organic material.

Wastewater with high amounts of oxygen-demanding organic material can cause soils to become anaerobic (an environment that lacks oxygen) and lead to the release of metals from the soil and rock matrix into the ground water. When heavy metals such as iron, manganese, and arsenic become water soluble they become mobile and can then leach into the ground water, and possibly harm people that use the ground water as a source of drinking water.

If wastewater with high amounts of oxygen-demanding organic material is discharged to surface waterbodies (either as runoff from the winemaking facility or from ground water seeping into surface water), the dissolved oxygen may be quickly consumed causing aquatic life to suffocate. Wastewater with high levels of oxygen-demanding organic material can also affect soil permeability and can cause foul odors.

Levels of oxygen-demanding organic material in wastewater are monitored and reported as Biochemical Oxygen Demand (BOD). For Permittees that discharge to subsurface infiltration systems, levels of oxygen-demanding organic material in wastewater are monitored and reported as Carbonaceous Biochemical Oxygen Demand (CBOD).

- **Salinity**

Salinity is the concentration of dissolved mineral salts in water. Discharges of wastewater with high salinity cause clay particles to bond together preventing plants from absorbing water, which can lead to reduced yields and inhibit germination. Soil with high levels of salt are also less stable and more erodible.

When salts accumulate in the soil profile they can be leached past the root zone and then degrade ground water. Water containing high levels of salt can be harmful to humans and aquatic organisms, damage crops and plants used in landscape, and damage equipment. Most salts do **not** degrade and can remain in ground water indefinitely.

Levels of salinity in wastewater can be measured in units of Total Dissolved Solids (TDS) or Fixed Dissolved Solids (FDS). TDS consists of both volatile (organic) and fixed (inorganic) fractions. In a well operated land treatment system, volatile dissolved solids in the wastewater that percolates through the soil matrix will be reduced to negligible concentrations. Numerous sources state that FDS better represents the inorganic fraction of salts that would **not** be broken down by microbial processes in the soil before infiltrating to ground water. Therefore, the Winery General Permit requires that Permittees that discharge as irrigation to managed vegetation or as road dust abatement, monitor and report levels of salinity in wastewater as FDS.

- **Suspended solids**

Suspended solids are particles suspended in water which will **not** pass through a filter. These particles are “suspended” in water but settle to the bottom of a container or waterbody over time. High levels of suspended solids can make water appear cloudy.

Suspended solids are a mixture of fine particles from yeast, bacteria, additives like bentonite, and filter material like diatomaceous earth. Discharges of wastewater with high levels of suspended solids can block soil pores, decreasing the permeability of the soil and causing ponding and odors. Decreased soil permeability damages drainfields, kills vegetation, and reduces crop yields.

Levels of suspended solids in wastewater are monitored and reported as Total Suspended Solids (TSS).

- **Water pH**

pH stands for “power of hydrogen” and is a determined value based on a defined scale (0 to 14). The pH of a liquid is a measurement of how basic or acidic it is. Water that has a pH of 7 is described as neutral, whereas water with a pH less than 7 is said to be more acidic and water with a pH greater than 7 is said to be more basic.

Living organisms are greatly affected by water that is either too acidic or too basic. Living organisms typically prefer a pH range of 6.5 – 9.0. The pH of water can also affect the solubility and toxicity of chemicals and heavy metals in water. Activities and materials that can affect the pH of wastewater include ion exchange (acidic), product loss (juice, wine, and lees) (acidic), alkali/caustic (cleaning agent) (basic), and the microbial metabolism of organic substrates during storage of wastewater further acidifies the wastewater.

If wastewater discharged to a wastewater treatment plant is extremely acidic (has a low pH), the infrastructure of the wastewater treatment plant can be degraded. For instance, concrete structures are corroded by acidic wastewater. Wastewater that is extremely basic (has a high pH) can leach calcium from concrete leading to pipe degradation in wastewater treatment plants.

Water pH is monitored and reported as pH.

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3.0 OVERVIEW OF REGULATIONS

3.1 Applicable Laws and Rules

This section contains a brief description of Washington State statutes and rules that apply to the Winery General Permit. This review is **not** intended to be exhaustive. It provides a broad overview of the laws and rules under which Ecology has authority to regulate discharges to waters of the state.

The Washington State Legislature gave Ecology the authority to control and prevent the pollution of waters of the state, as stated in the Washington State Water Pollution Control Act, Chapter 90.48 RCW. This statute requires that an industrial or commercial facility obtain a permit before discharging wastes to waters of the state. In order to control and prevent the pollution of state waters, Ecology adopted the following rules which also form the basis for requirements in the Winery General Permit.

- Water Quality Standards for Groundwaters of the State of Washington.
(Chapter 173-200 WAC)
- Requirements for installing and operating an underground injection well.
(Chapter 173-218 WAC)
- Determination and payment of permit fees.
(Chapter 173-224 WAC)
- Requirements for implementing and managing the State Waste Discharge Program.
(Chapter 173-226 WAC)

Washington State Water Pollution Control Act

The Winery General Permit implements portions of the Washington State Water Pollution Control Act (Chapter 90.48 RCW). RCW 90.48 declares that maintaining the highest possible standards to insure the purity of all waters of the state is the policy of the state. Healthy water quality must be maintained for public health, public enjoyment, protection of terrestrial and aquatic life, and the industrial development of the state. All known, available, and reasonable methods must be used by industries and others to prevent and control pollution (AKART).

In addition, it is unlawful for any person to discharge pollutants to waters of the state unless a permit to discharge is obtained from Ecology prior to the discharge occurring. (RCW 90.48.080 and 90.48.160)

Water Quality Standards for Groundwaters of the State of Washington

Chapter 173-200 WAC – Water Quality Standards for Groundwaters of the State of Washington, establishes groundwater quality standards which protect the environment, human health, and existing and future beneficial uses of ground water. The goal is to maintain the highest quality of the state’s ground water and to protect the many uses of ground water through the reduction or elimination of contaminants discharged to the state’s ground waters.

Underground Injection Control Program

Chapter 173-218 WAC – Underground Injection Control Program, prevents ground water contamination by regulating the discharge of waste liquids from industrial, commercial, or municipal sources, or multifamily dwellings, into underground injection control (UIC) wells located in Washington State.

Waste Discharge General Permit Program

Chapter 173-226 WAC – Waste Discharge General Permit Program establishes a state general permit program for the discharge of pollutants to waters of the state under the authority granted to Ecology in Chapter 90.48 RCW. Permits issued in accordance with Chapter 173-226 WAC may be State Waste Discharge General Permits or combined National Pollutant Discharge Elimination System and State Waste Discharge General Permits.

State Environmental Policy Act

Chapter 197-11 WAC – State Environmental Protection Act (SEPA), requires consideration of impacts on the environment by significant activities. These activities may be construction projects or implementation of policies, plans, ordinances, or regulations.

3.2 Antidegradation

Chapter 173-200 WAC – Water Quality Standards for Groundwaters of the State of Washington, establishes a groundwater quality antidegradation program. The purpose of the antidegradation program is to:

- Ensure the purity of Washington State’s ground waters and to protect the natural environment.
- Protect existing and future beneficial uses of Washington’s ground water.
- Safeguard high quality ground waters constituting an outstanding national or state resource.
- Maintain the highest possible quality of the ground waters of Washington.

Winery General Permit’s Compliance with the Antidegradation Requirement

Antidegradation requirements can be considered met for general permits and programs that have a formal process to select, develop, adopt, and refine control practices for protecting water quality and meeting the intent of Chapter 173-200 WAC. This adaptive process must:

- Ensure that information is developed and used expeditiously to revise permit or program requirements.
- Review and refine management and control programs in cycles **not** to exceed five years or the period of permit reissuance.
- Include a plan that describes how information will be obtained and used to ensure full compliance with this chapter. The plan must be developed and documented in advance of permit or program approval under Chapter 173-200 WAC.

While developing the Winery General Permit, Ecology staff reviewed the following sources of information to determine if the proposed requirements are adequate or if additional or more stringent requirements should be included.

- **Comments on the draft general permit**

Ecology's public process for developing the proposed general permit included stakeholder meetings, public hearings, and multiple public comment periods.

- **Discussions with the Technical Advisory Group**

The Technical Advisory Group consisted of winemakers, grape growers, members of associations, engineers, consultants, and Ecology staff from all over Washington State. Throughout the development of the general permit, the Technical Advisory Group discussed challenges of Washington winemaking facilities, the best approach to take to achieve our goal of protecting water quality and developing a permit that Washington winemaking facilities can implement, as well as elements of the general permit like best management practices and monitoring requirements.

- **Permittee compliance reports**

Winemaking facilities currently covered by an individual State Waste Discharge permit submit monitoring results to Ecology. Ecology staff reviewed the reports to gain an understanding of the variability of the strength and volumes of wastewater throughout the calendar year.

- **Informal literature review and expert discussions**

Ecology staff reviewed literature and consulted experts (hydrogeologists, professional engineers, waste treatment and management professionals, policy experts, etc.) to develop the Winery General Permit and determine the most appropriate requirements to include in the general permit.

The information collected for the development of the Winery General Permit was included in this Fact Sheet, which constitutes the antidegradation plan for the Winery General Permit.

3.3 Limitations on Discharge

Section 070 of Chapter 173-226 WAC requires that any general permit issued by Ecology must prevent damage to waters of the state and include conditions so that all authorized discharges meet Washington State Water Quality Standards. The Winery General Permit only authorizes discharges to land, ground water, and WWTPs, and does **not** authorize discharges directly to surface water. Therefore, the general permit and Fact Sheet focus on compliance with the Water Quality Standards for Groundwaters of the State of Washington in Chapter 173-200 WAC, which were developed in accordance with Section 035 of Chapter 90.48 RCW.

Untreated discharges of wastewater can contaminate ground water and surface water, degrade soil, damage vegetation, cause nuisances such as odors and vectors, and violate the Water Quality Standards for Groundwaters of the State of Washington. To help Permittees avoid these potential impacts, the Winery General Permit includes requirements such as benchmarks, effluent limitations, prohibited discharges, and best management practices. A Permittee that diligently complies with the requirements of the general permit is presumed to have discharges of wastewater that comply with the Water Quality Standards for Groundwaters of the State of Washington.

In addition to the Washington State water quality standards, which are water-quality based limits, mentioned throughout the Winery General Permit, state law also requires:

“The use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington.”

All known, available, and reasonable methods of prevention, control, and treatment (AKART) is a technology-based limit that can include discharge standards, prohibitions, and limits based on pollution control technologies. In addition to treatment, AKART may also include best management practices such as prevention and control methods (e.g., waste minimization, waste/source reduction, or reduction in total contaminant releases to the environment). AKART is discussed in Washington State law under Chapters 90.48.010 RCW, 90.48.520 RCW, 90.52.040 RCW, and 90.54.020 RCW.

State statutes and rules (RCW 90.48.010 and 520, WAC 173-200-030, and WAC 173-226-070) require that discharge limits set in general permits be either technology-based or water-quality based. The Winery General Permit requires compliance with both technology-based limits (AKART) and water quality-based limits (Water Quality Standards for Groundwaters of the State of Washington), per Section 070 of Chapter 173-226 WAC).

- **Technology-based limits**

Technology-based limits are set by regulation or developed on a case-by-case basis. Technology-based limits are based on the treatment methods available to control or treat specific pollutants.

Winemaking facilities are required to use technology-based controls like AKART to control pollutants. AKART is meant to be conditioned by a judgment of reasonableness, include pollution prevention and best management practices, and may be:

- Established for an industrial category or on a case-by-case basis.
- More stringent than federal requirements.
- Imposed through the use of best management practices, such as prevention and control methods (e.g., waste minimization, waste/source reduction, or reduction in total contaminant releases to the environment).

Specific technology-based requirements included in the general permit are discussed in the applicable subsections related to benchmarks, limits, and best management practices, found in **Section 4.0 – Explanation of Permit Conditions** of this Fact Sheet.

- **Water quality-based limits**

In Chapter 90.48.035 RCW, the Washington State Legislature authorized the establishment of water quality standards for waters of the state. To implement Chapter 90.48 RCW, Ecology established water quality standards for waters of the state in the following rules.

- Chapter 173-200 WAC – Water Quality Standards for Groundwater of the State of Washington

- Chapter 173-201A WAC – Water Quality Standards for Surface Waters of the State of Washington
- Chapter 173-204 WAC – Sediment Management Standards

These regulations require that all waste discharge permits prevent damage to waters of the state and include conditions so that all authorized discharges meet Washington State Water Quality Standards. The Washington State Water Quality Standards also include an antidegradation policy which requires Ecology to protect aquatic life, recreation, aesthetic values, and human health.

Discharges of wastewater from winemaking facilities may contain pollutants which, in excessive amounts, have a reasonable potential to cause, or contribute to, violations of Washington State Ground Water Quality Standards due to the presence of dissolved solids, oxygen-demanding organic material, settleable solids, and a high or low water pH. Ecology determined that if the Permittee properly treats and disposes their wastewater in accordance with the terms and conditions of the general permit, they will likely:

- Ensure compliance with Washington State Water Quality Standards.
- Protect publicly owned treatment works.
- Maintain and protect the existing characteristic beneficial uses of the waters of the state.
- Protect human health.

Ecology may reopen the general permit if new information collected during this permit cycle indicates violations of Washington State Water Quality Standards.

Ecology used the numerical groundwater quality criteria along with chemical and physical data for the wastewaters to derive benchmarks and effluent limitations in the general permit. During this first permit cycle, the combination of benchmarks and an adaptive best management practice approach will provide protective limits while allowing the winemaking facilities a flexible approach to complying with water quality standards.

Ecology determined that including benchmarks for some discharge methods rather than effluent limitations was appropriate for this permit cycle. Benchmarks provide clear levels for winemaking facilities that, if exceeded, trigger the requirement for additional action. If a Permittee exceeds a benchmark, then they must perform the required adaptive management actions; they must determine what caused the exceedance, how to correct it, and what to do to prevent the exceedance from repeating. This form of adaptive management is an excellent way for facilities new to environmental regulation to learn how to manage their wastewater and avoid negative impacts to the environment and permit violations.

Most discharge methods include benchmarks except for two. Discharges to WWTPs and discharges to infiltration basins include effluent limitations rather than benchmarks.

- A facility that discharges to a WWTP is required to comply with the effluent limitations established by the WWTP receiving their discharge. Because the WWTP establishes effluent limitations and not benchmarks, it was appropriate that this requirement in the Winery General Permit also be viewed as an effluent limitation.

- A facility that discharges to an infiltration basin is required to comply with effluent limitations because this discharge method provides no additional treatment after discharge and the wastewater has the potential to reach ground water.

Specific water quality-based requirements included in the general permit are discussed in the applicable subsections related to benchmarks, limits, and best management practices, found in Section 4.0 – Explanation of Permit Conditions of this Fact Sheet.

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4.0 EXPLANATION OF PERMIT CONDITIONS

Permit conditions from the Winery General Permit are discussed below along with Ecology's rationale for the permit conditions.

4.1 Special Condition S1. Permit Coverage

Activities Covered under the General Permit

The Winery General Permit conditionally authorizes the discharge of wastewater (winery process wastewater) to land, ground water, or to a WWTP (non-delegated wastewater treatment plant that is **not** a Listed WWTP) anywhere in Washington State where Ecology has authority (Chapter 90.48 RCW). The general permit does **not** apply to facilities located on federal land or that are federally owned or operated. The general permit also does **not** apply to facilities located on "Indian Country" as defined in 18 U.S.C. §1151, except portions of the Puyallup Reservation as noted in the general permit.

The general permit provides coverage for owners/operators of a new or existing winemaking facility where wastewater is discharged:

- To a WWTP that is **not** a Listed WWTP.
- To land treatment via irrigation to managed vegetation.
- To a lagoon or other liquid storage structure.
- As road dust abatement.
- To a subsurface infiltration system.
- To an infiltration basin.

These storage and discharge methods were included in the general permit because industry representatives said they reflect current, common practices and desired practices of Washington winemaking facilities. Representatives of the Washington winemaking industry felt strongly about two (2) of the discharge methods (discharges to subsurface infiltration systems and discharges to infiltration basins), and supported their inclusion in the Winery General Permit. See **Appendix A – General Permit Applicability Flow Diagram**, for more information about who is required to apply for coverage under the Winery General Permit.

The owner/operator of a winemaking facility that is required to apply for coverage under the Winery General Permit becomes the Permittee once permit coverage is issued. The Permittee typically has financial and operational control of the facility including the waste management system and infrastructure. Wineries that share space or equipment or that do **not** own the infrastructure of the waste management system, should work with the owner of the infrastructure of the waste management system to comply with the Winery General Permit.

Activities NOT Covered under the General Permit

The general permit applies to all winemaking facilities that discharge wastewater to waters of the state, with some exceptions. The exceptions were developed after careful consideration of information obtained from representatives of winemaking facilities (both permitted and unpermitted facilities), Ecology staff, representatives of other agencies, and wastewater treatment

professionals. The following are exceptions included in the general permit and Ecology's rationale for their inclusion.

- **A new or existing facility that discharges all wastewater to a publicly owned treatment works that has been delegated permitting authority by Ecology**

Ecology was granted authority by the Environmental Protection Agency (EPA) to delegate permitting authority to publicly owned treatment works that meet certain criteria. For instance, these facilities receive wastewater from significant industrial users, have established pretreatment programs, issue permits to industrial users, and comply with federal and state water quality standards. Winemaking facilities that discharge to publicly owned treatment works that have been delegated permitting authority by Ecology already have a waste discharge permit from the publicly owned treatment works. Ecology determined the owner/operator of these winemaking facilities are **not** required to apply for coverage under the Winery General Permit. Visit Ecology's webpage, included below, for a list of delegated publicly owned treatment works.

<http://www.ecy.wa.gov/programs/wq/permits/winery/faqs.html>

- **A new or existing facility that discharges all wastewater to a double-lined evaporation lagoon with a leak detection system**

Properly installed and maintained double-lined evaporation lagoons typically have minimal seepage. Ecology determined that the de minimis seepage rates are unlikely to impact ground water. Therefore, a winemaking facility that discharges all wastewater to a double-lined evaporation lagoon with a leak detection system is **not** required to apply for coverage under the Winery General Permit.

- **A new or existing facility that discharges all wastewater to a contained storage tank to be pumped and hauled to an offsite treatment facility**

A winemaking facility whose wastewater is hauled to an offsite treatment facility is **not** discharging wastewater to waters of the state, therefore, is **not** required to apply for coverage under the Winery General Permit. This exception does **not** include winemaking facilities that discharge wastewater to a WWTP through the sanitary sewer system.

- **A new or existing facility that discharges all wastewater to a Listed WWTP**

Wastewater treatment plants that are municipally owned (also called publicly-owned treatment plants or POTWs) must meet numerous requirements in order to be delegated permitting authority by Ecology. In some cases, a POTW might have a robust waste treatment program but might **not** meet all requirements in order for Ecology to authorize the POTW to issue permits to their industrial users. Ecology determined that certain wastewater treatment plants (WWTPs), whether publicly owned or privately owned, have resources, tools, and programs to effectively regulate wastewater discharges from winemaking facilities. These WWTPs also have adequate infrastructure to effectively handle the volume and strength of wastewater discharges from winemaking facilities. For these reasons, Ecology decided to closely examine these WWTPs.

During the development of the Winery General Permit, Ecology assessed certain WWTPs to see if their program and infrastructure is adequate to regulate wastewater discharges from

winemaking facilities. Those Ecology determined to meet the established criteria are considered “Listed WWTPs”. A winemaking facility that discharges all wastewater to a Listed WWTP is **not** covered by the Winery General Permit and, therefore, is **not** required to apply for coverage under the general permit. Once the general permit is issued, WWTPs wanting to be approved by Ecology so that winemaking facilities that discharge to them do **not** need permit coverage, may contact Ecology to start the assessment.

An example of the criteria that was used by Ecology during the assessment include the following. Listed WWTPs must:

- Certify that they had **no** upsets from discharges from winemaking facilities and that their infrastructure is adequate and **not** negatively impacted by discharges from winemaking facilities (**not** overloaded hydraulically or overwhelmed chemically).
- Have adequate controls and a mechanism to regulate winemaking facilities including revoking authorized discharges.
- Have a user contract or agreement that includes monitoring of effluent, provides for protection against prohibited discharges which could cause pass through or interference, includes notification provisions for slug discharges, penalties for violations, and remedies if user fails to perform including revoking authorization to discharge.
- Require the winemaking facility to implement best management practices (BMPs) and notify the WWTP of *slugs* and other discharges that could harm the WWTP’s system.

WWTPs approved by Ecology either before or after the general permit is issued, are regulated by Ecology through coverage under a National Pollutant Discharge Elimination System (NPDES) permit so Ecology may assess the WWTP’s oversight of the winemaking facilities **not** covered by the Winery General Permit. If discharges from these winemaking facilities impact waters of the state, Ecology may require the winemaking facilities to apply for coverage under the Winery General Permit. The Listed WWTPs are included in **Table 6 – Listed WWTPs**.

Table 6
Listed WWTPs

ECY Regional Office ¹	Name of WWTP
Central Regional Office	City of Cashmere
	City of Grandview
	Port of Sunnyside
	City of Prosser
	City of West Richland
Eastern Regional Office	None at this time
Northwest Regional Office	Anacortes WWTP
	Bremerton STP
	Burlington WWTP
	Edmonds STP
	Everett STP
	Fisherman Bay STP
	Gig Harbor STP
	Kitsap Co. Central Kitsap WWTP
	Kitsap Co. Kingston WWTP
	La Conner STP
	Lake Stevens Sewer District WWTP
	Lynnwood STP
	Marysville STP
	Midway Sewer District WWTP
	Monroe STP
	Mt. Vernon WWTP
	Mukilteo Water and Wastewater District WWTP
Roche Harbor Resort WWTP	
Rosario WWTP	
Sedro Woolley WWTP	
Skagit Co. Sewer District 2 Big Lake WWTP	
Stanwood STP	
Southwest Regional Office	None at this time

1 = See Ecology's website for a map of the regional offices. <http://www.ecy.wa.gov/directory.html>

- **A new or existing facility that discharges less than 53,505 gallons of wastewater per year or produces less than 7,500 cases of wine/juice or 17,835 gallons of wine/juice per calendar year**

The Washington winemaking industry includes over 900 licensed winemaking facilities. While complying with requirements in the Winery General Permit is important to protect waters of the state, Ecology recognizes that the vast majority of wine is produced by winemaking facilities that produce more than 7,500 cases of wine per year.

Ecology worked with the Technical Advisory Group, representatives of winemaking facilities, industry experts, and representatives of other agencies to determine the appropriate applicability threshold. Ecology also analyzed data from the Washington State Liquor and Cannabis Board and a survey conducted by Winerywise in 2015. Based on this data, Ecology determined that even though the total number of Washington winemaking facilities that sell/produce less than 7,500 cases of wine per year is on average 81% of the total number of Washington winemaking facilities, their total sales/production volume is on average 4% of the total volume of wine sold/produced in Washington per calendar year. In other words, about 96% of Washington's total wine sales/production occurs at winemaking facilities that sell/produce greater than 7,500 cases of wine per year. This data is shown in **Table 7 – Annual Sales and Production Data to Determine Applicability**.

Ecology recognizes that winemaking facilities that have small annual production could suffer disproportionate hardship from the costs related to compliance with the Winery General Permit. Due to their small production size, wastewater discharges from these winemaking facilities are less likely to impact groundwater quality. It is Ecology's intent to provide permit coverage to facilities that have dischargers that are more likely to impact groundwater quality. Providing permit coverage to facilities that produce greater than 7,500 cases of wine per year will meet Ecology's intent and avoid causing a hardship to winemaking facilities that have small annual production.

Additionally, during the 2017 legislative session, House Representatives proposed in House Bill 1040 to amend RCW 66.24.210 (Licenses-Stamp Taxes), to provide "small winery tax relief". They proposed to define "small winery" as those that sell twenty thousand (20,000) gallons of wine per calendar year or less. This threshold nearly mirrors the applicability threshold proposed by Ecology.

Ideally this applicability threshold (wastewater discharged or cases/gallons produced) would be based only on gallons of wastewater discharged. However, Ecology recognizes that **not** all winemaking facilities know or have data to support the volume of wastewater they discharge annually. Therefore, in addition to gallons of wastewater, the Winery General Permit also includes the production volumes. In future permit cycles, the applicability threshold may only be based on gallons of wastewater discharged.

Literature about the winemaking industry says that winemaking facilities typically generate between six (6) and ten (10) gallons of water per gallon of wine produced (6:1 to 10:1 ratio). Representatives of Washington winemaking facilities say with new technology and management practices it is more common to generate between four (4) and six (6) gallons of

wastewater for every gallon of wine produced (4:1 to 6:1 ratio). But at least one Washington winemaking facility uses as little as one (1) gallon of water for every one (1) gallon of wine produced (1:1 ratio).

Ecology hopes to encourage winemaking facilities to be more water conscientious and generate less wastewater by reducing the amount of water they use. Representatives of winemaking facilities and technical experts agreed and recommended using a ratio of three (3) gallons of water used per one (1) gallon of wine discharged in the applicability threshold. Using the 3:1 ratio, a winemaking facility that produces 17,835 gallons of wine generates 53,505 gallons of wastewater.

Owners/operators of winemaking facilities should base the applicability determination on data that reflects their typical annual wastewater generation or on their typical production. They may:

- Use your projections for the next year, if they have data to support this projection.
- Average the past three (3) years of wastewater generation data or production data.

A winemaking facility that discharges less than 53,505 gallons of wastewater or produces less than 17,835 gallons of wine and less than 7,500 cases of wine in a typical year, is **not** required to apply for coverage under the Winery General Permit.

Table 7
Annual Sales and Production Data to Determine Applicability

Based on Annual Sales Data from the Liquor and Cannabis Board										
Year	Total Production	Total # of Wineries	< 17,835 Gallons (7,500 Cases)				≥ 17,835 Gallons (7,500 Cases)			
			# of Wineries	% of Total	Total Gallons	% of Total	# of Wineries	% of Total	Total Gallons	% of Total
2015	32,755,164	928	842	91%	1,272,430	3.9%	86	9%	31,482,734	96.1%
2014	27,943,883	917	844	92%	1,363,571	4.9%	73	8%	26,580,311	95.1%
2013	35,800,019	853	776	91%	1,192,498	3.3%	77	9%	34,607,521	96.7%
2012	26,868,823	797	724	91%	1,107,951	4.1%	73	9%	25,760,872	95.9%
2011	35,029,647	776	718	93%	995,608	2.8%	58	7%	34,034,040	97.2%
2010	17,599,908	746	689	92%	953,742	5.4%	57	8%	16,646,166	94.6%
Note: Sales data from LCB included information from winemaking facilities that reported negative sales and zero sales.										
Production Data Based on a 2015 Survey Conducted By Winerywise										
Year	Avg. Total Production	Total # of Wineries	<17,835 Gallons (7,500 Cases)				>17,835 Gallons (7,500 Cases)			
			Avg # of Wineries	% of Total	Avg Total Gallons	% of Total	Avg # of Wineries	% of Total	Avg Total Gallons	% of Total
2015	76,905,228	900	640	71%	2,652,832	3.5%	260	29%	74,252,396	96.5%

Based on the information available, Ecology assumed the following conversions, listed in **Table 8 – Wine Production Conversions**, to determine the equivalency between gallons of wastewater discharged and cases/gallons of wine produced.

Table 8
Wine Production Conversions

	Cases	Gallons
1 Case of Wine	1 case	2.378 gallons
1 Gallon of Wine	1/2.378 cases	1 gallon

(Data sources: (Cornell University. 2011 Newsletter. Website. 2016) (UC Davis Extension. Small Vineyard Series. Website. 2016) (UnwinedVA. Wine by the Numbers. Website. 2016))

- **A new or existing facility that is covered by an Individual State Waste Discharge Permit**
Existing winemaking facilities covered by an Individual State Waste Discharge Permit before the effective date of the Winery General Permit are required to apply for coverage under the Winery General Permit. Ecology will work with those facilities to determine if they should remain covered by an individual permit or should receive coverage under the general permit.

Ecology may, at its discretion, require the Permittee to obtain an individual permit (WAC 173-226-240(2)). Individual permits are site specific in nature. This allows Ecology to design a permit that addresses the unique characteristics at the facility beyond that available in a general permit. A winemaking facility required by Ecology to apply for coverage under an individual permit for wastewater discharges is **not** also required to be covered by the Winery General Permit.

- **A new or existing winemaking facility, vineyard, or tasting room that does NOT discharge wastewater**
If a facility does **not** discharge wastewater (winery process wastewater) then that facility is **not** required to apply for coverage under the Winery General Permit. Domestic wastewater from tasting rooms or restaurants does **not** constitute wastewater (winery process wastewater).
- **Home manufacturing of alcoholic beverages**
Activities like the home manufacturing of alcoholic beverages are **not** required to apply for coverage under the Winery General Permit because the wine is for private use. Coverage under the Winery General Permit is only required for a commercial or industrial operation that discharges wastewater.

Significant Contributor of Pollutants and Significant Industrial User

If Ecology determines a winemaking facility is a Significant Contributor of Pollutants or a Significant Industrial User, then the owner/operator may be required to apply for permit coverage even if they are considered one of the exceptions listed above.

- **Significant contributor of pollutants**

Chapter 90.48 RCW authorizes Ecology to require permit coverage for a winemaking facility that discharges to waters of the state and is unpermitted (or categorized as one of the exceptions listed above), which:

- Ecology determines to be a significant contributor of pollutants to ground or surface waters of the state; **OR**
- May reasonably be expected to cause a violation of a water quality standard.

- **Significant industrial user**

The Federal Clean Water Act and Chapter 90.48 RCW authorize Ecology to require any winemaking facility that discharges to a POTW to apply for coverage under the Winery General Permit, if the facility is considered a significant industrial user as defined by 40 Code of Federal Regulations (CFR) § 403.3. A winemaking facility may be considered a significant industrial user if they:

- Discharge an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling water, and boiler blow-down wastewater);
- Contribute a process waste-stream that makes up 5% or more of the average dry weather hydraulic or organic capacity of the POTW; **OR**
- Are designated as such by Ecology on the basis that the industrial user has a reasonable potential to adversely affect the operation of the POTW or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Geographic Area Covered under this General Permit

The Winery General Permit applies to the discharge of wastewater (winery process wastewater) to land, ground water, or to a WWTP (non-delegated wastewater treatment plant that is **not** a Listed WWTP) anywhere in Washington State where Ecology has authority (RCW90.48.020, WAC 173-200-020, and WAC 173-226-030). The general permit does **not** apply to facilities located on federal land or that are federally owned or operated. The general permit also does **not** apply to facilities located on “Indian Country” as defined in 18 U.S.C. §1151, except portions of the Puyallup Reservation as noted in the general permit.

4.2 Special Condition S2. General Requirements

Discharge Limits

Wastewater discharges from winemaking facilities are complex and place high demands on a treatment system. They have high levels of oxygen-demanding organic material, dissolved solids like salt, and suspended solids like bentonite and diatomaceous earth. They also have extreme ranges in water pH because grape juice is naturally acidic and winemaking facilities use caustic

cleaning materials. Finally, winemaking activities are seasonal so wastewater is **not** discharged continuously throughout the year, and the volume discharged can vary greatly.

Discharges from winemaking facilities may contain pollutants which, in excessive amounts, have a reasonable potential to cause, or contribute to, violations of Washington State Water Quality Standards. To ensure wastewater discharges from permitted winemaking facilities do **not** degrade groundwater quality, Ecology established benchmarks, effluent limitations, and prohibited discharges. The benchmarks, effluent limitations, and prohibited discharges for each discharge method are discussed in their corresponding sections throughout the Fact Sheet. The general discharge limits as well as group determination and adaptive management actions, are discussed in this section.

General Limits

Ecology established water quality standards for waters of the state in WAC 173-200, WAC 173-201A, and WAC 173-204, as authorized by Chapter 90.48.035 RCW. Any general permit issued by Ecology, in accordance with WAC 173-226-070, must prevent damages to waters of the state and include conditions so that all authorized discharges meet Washington State Water Quality Standards. Therefore, regardless of the discharge method used by the Permittee, the Winery General Permit prohibits any discharge that causes or contributes to a violation of the Washington State Water Quality Standards.

Group Determination

Because the Washington winemaking industry includes a spectrum of winemaking facilities that range in production size and resources, Ecology established requirements that are scaled based on the volume of wastewater discharged. Examples of these requirements include benchmarks and additional documentation. Permittees are either in Group 1 or in Group 2 and are given multiple ways to determine what group they are in. Small winemaking facilities are in Group 1 and large winemaking facilities are in Group 2. Depending on their size, medium winemaking facilities may fall in either group.

After consulting with technical experts and stakeholders, Ecology determined that the appropriate threshold for establishing more stringent benchmarks and requiring additional documentation is 600,000 gallons of wastewater discharged in a typical calendar year. A winemaking facility that discharges more than 600,000 gallons of wastewater each year could have total flows during crush of 150,000 gallons, which could result in a peak daily flow of about 3,600 gallons per day. Additionally, the Federal Alcohol and Tobacco Tax and Trade Bureau defines a small winemaking facility as one that sells less than 100,000 gallons of wine (approximately 600,000 gallons of wastewater) each year.

According to the Washington State Liquor and Cannabis Board and the 2015 survey conducted by Winerywise, about 87% of total gallons of wine sold by winemaking facilities in Washington would be in Group 2. The two sources of data differ on the percentage of licensed winemaking facilities that could be in this group. The Washington State Liquor and Cannabis Board data shows that about 3% of licensed Washington winemaking facilities would be in Group 2, whereas the

Winerywise survey data shows that about 11% would be in Group 2. This data is shown in **Table 9 – Annual Sales and Production Data to Determine Group Thresholds.**

Ecology will use the information from the application for coverage to make the group determination, and will include the Permittee's group number in their Coverage Letter. If the applicant did not include the volume of wastewater their winemaking facility discharges in a typical year, then Ecology will use the following steps and equation to make the group determination.

- Determine the gallons of wine/juice produced in a typical year by multiplying the number of cases produced in a typical year by 2.387. (Convert cases to gallons of wine/juice)
- Determine the gallons of wastewater discharged in a typical year by multiplying the number of gallons of wine/juice produced by six (6). (Converts gallons of wine/juice to gallons of wastewater)

If the applicant demonstrates in their application for coverage that the facility is more water efficient and generates less than six (6) gallons of wastewater for every one (1) gallon of wine/juice produced, then Ecology may use the more accurate ratio.

$$\text{Gallons of wastewater per year} = \text{Cases of wine or juice per year} \times 2.387 \frac{\text{gallons}}{\text{cases}} \times 6$$

X = multiply by

2.387 gallons/cases = conversion of cases to gallons

6 = conversion factor for converting gallons of wine to gallons of wastewater

A Permittee is **not** required to reevaluate their group determination if their wastewater discharge volume changes, unless their volume of wastewater discharge changes by 25% or more than indicated on their application for coverage. If a Permittee's wastewater volume increases or decreases by 25% or more than indicated on their application for coverage, then they must submit an application to Ecology to modify their permit coverage. They must also reevaluate their group determination and begin complying with the requirements of the new group.

Table 9
Annual Sales and Production Data to Determine Group Thresholds

Based on Annual Production Data from the Liquor and Cannabis Board										
Year	Total Production	Total # of Wineries	< 600,000 Gallons of Wastewater				≥ 600,000 Gallons of Wastewater			
			# of Wineries	% of Total	Total Gallons	% of Total	# of Wineries	% of Total	Total Gallons	% of Total
2015	32,755,164	928	902	97.20%	4,141,871	12.64%	26	2.80%	28,613,293	87.36%
2014	27,943,883	917	893	97.38%	3,539,114	12.67%	24	2.62%	24,404,768	87.33%
2013	35,800,019	853	827	96.59%	3,441,440	9.61%	26	3.05%	32,358,579	90.39%
2012	26,868,823	797	777	97.49%	3,335,237	12.41%	20	2.51%	23,533,586	87.59%
2011	35,029,647	776	755	97.29%	2,387,170	6.82%	21	2.71%	32,642,477	93.19%
2010	17,599,908	746	730	97.86%	2,556,359	14.52%	16	2.51%	15,043,549	85.48%
Note: Sales data from LCB included information from winemaking facilities that reported negative sales and zero sales.										
Based on the 2015 Winerywise Survey										
Year	Avg. Total Production	Total # of Wineries	<100,000 Gallons of Wine				>100,000 Gallons of Wine			
			Avg # of Wineries	% of Total	Avg Total Gallons	% of Total	Avg # of Wineries	% of Total	Avg Total Gallons	% of Total
2015	76,905,228	900	803	89.22%	9,905,252	12.88%	97	10.78%	66,999,976	87.12%

Adaptive Management Actions

If a benchmark is exceeded, the Winery General Permit requires that the Permittee implement adaptive management actions to correct the exceedance and prevent its occurrence in the future. If the Permittee does **not** implement the required adaptive management actions, then they have violated the terms and conditions of the Winery General Permit.

Adaptive management actions inform the Permittee of best management practices that are **no** longer working and need to be corrected or of new best management practices needed in order to achieve compliance with the applicable benchmark. The intent of this permit condition is to act as an informative feedback loop to guide the Permittee to make good waste management decisions. (WAC 173-226-070(1)(d))

If the benchmark for a particular pollutant is met, the discharge is presumed to **not** cause or contribute to a violation of water quality standards for that pollutant. If a benchmark is exceeded, the facility is required to review their Winery Pollution Prevention Plan (WPPP) and their best management practices (BMPs) currently in use. They must also, as necessary, modify BMPs, implement additional BMPs, and revise their WPPP.

If a benchmark is exceeded numerous times, the potential for a violation of water quality standards increases, and if the Permittee does **not** comply with the specific adaptive management action requirements, it is considered a permit violation.

Monitoring Requirements

Regular monitoring and data collection can improve operations and help the Permittee make future decisions and improvements to the waste management system. The purpose of monitoring is to:

- Document facility operations and management practices.
- Track variations in the quantity and quality of wastewater discharges.
- Evaluate the effectiveness of the waste management system.
- Determine compliance with the Winery General Permit.

Section 090 of Chapter 173-226 WAC provides Ecology the authority to require a Permittee to:

- Monitor any discharge authorized by a general permit.
- Install and maintain monitoring equipment.
- Maintain the results of the required monitoring for a minimum of five (5) years.
- Periodically report the results of the required monitoring.

The Winery General Permit includes monitoring, recording, and reporting requirements to verify that the BMPs and waste management system function properly and that wastewater discharges comply with the requirements of the Winery General Permit. The Permittee should consider making changes to BMPs or the waste management system when monitoring results show trends toward objectionable outcomes.

Timing

Environmental compliance is new to the winemaking industry, so these facilities are given a little time to adjust and prepare for compliance. Winemaking facilities should use the time between the issuance of the Winery General Permit (summer 2018) and the effective date (summer 2019) to make arrangements to comply with monitoring requirements (establish procedures, start developing the Winery Pollution Prevention Plan, contract with a laboratory for sample analysis, purchase and install a meter or gather water usage records to calculate wastewater volumes, etc.).

At the beginning of the first complete quarter after the Permittee receives permit coverage, they are required to monitor wastewater flow and analyze samples of wastewater discharged (depending on the discharge method) every quarter that a discharge occurs. This information will demonstrate when the winemaking facility discharges wastewater throughout as well as the quantity and strength of each discharge.

During the preliminary draft of the Winery General Permit, it was proposed that Permittees should monitor wastewater flow and sample discharges once per calendar month. It was also proposed that all Permittees regardless of the discharge method they used were required to sample their wastewater. Ecology reduced the sample analysis frequency and limited the sampling requirement to certain discharge methods, to reduce compliance costs.

Analyzing wastewater discharges every month will provide a more complete representation of the fluctuation of the strength of wastewater throughout the year. The Winery General Permit requires that Permittees, depending on their discharge method, analyze samples of wastewater discharges once per quarter for every quarter a discharge occurs. This frequency will **not** provide a more complete representation of the wastewater than monthly analysis would, but it will be adequate to demonstrate compliance.

Even though Permittees are required to conduct quarterly sampling, they are only required to sample **if** a discharge occurs. If there is no discharge during that monitoring period, then there is nothing to sample, therefore, they are **not** required to sample. If a Permittee is concerned about the amount of sampling, scheduling certain activities during the same discharge monitoring period will reduce the number of samples.

Wastewater Flow

Tracking the volume of wastewater discharged by the winemaking facility is an essential tool in wastewater planning and management. Knowing the volume of wastewater discharged throughout the year helps the Permittee determine the water efficiency of the winemaking facility and identify if adjustments are needed. Some requirements in the Winery General Permit are based on the volume of the wastewater discharged rather than the production volume, so by reducing the volume of wastewater discharged a Permittee could change from a Group 2 facility to a Group 1 facility and have reduced requirements. In order to change their Group classification, a Permittee would need to reapply for coverage under the Winery General Permit.

The Winery General Permit requires that each month a discharge occurs, Permittees determine the total monthly flow and the number of days a discharge occurs. This information provides a profile

of the winemaking facility that can help Ecology understand the potential impacts to groundwater quality and help the Permittee when planning environmental compliance strategies.

Permittees that are new facilities **and** in Group 2 are required to also determine their maximum daily flow. This information is necessary to determine if the current waste management system and practices are sized appropriately to effectively manage the peak daily wastewater flows. This information can also be very useful to the Permittee when considering possible expansions to current operations or modifications to the existing waste management system. Future versions of the Winery General Permit **may** require **all** Permittees to use a meter to monitor flow and for **all** Permittees to determine their maximum daily flow.

There are multiple ways to track the volume of wastewater discharged, but the most accurate method is using a dedicated wastewater flow meter. Flow meters that specifically measure the volume of wastewater discharged allow the Permittee to more accurately determine hydraulic and chemical loads. There are various types of wastewater flow meters, examples include magnetic flow meters, mechanical flow meters, and ultrasonic flow meters. Some methods are subject to error due to faulty equipment, fouling, or poor maintenance, therefore, the Winery General Permit requires they be calibrated according to the manufacturer's specifications.

The Winery General Permit requires that a Group 2 facility use a wastewater flow meter to track the volume of wastewater discharged each month. Even though flow meters can be costly, using one to track wastewater volumes is the most accurate method, therefore, Ecology determined it was appropriate for a Group 2 facility.

Ecology recognizes that requiring a Group 1 facility to use a wastewater flow meter may create a financial hardship, so the Winery General Permit allows each Group 1 facility to use a meter **or** to estimate the volume of wastewater discharged. If a Group 1 facility chooses to make an estimation, they must base their estimation on reliable data like the volume of water used at the winemaking facility. This method uses the flow meter or run-time meters installed on pumps used to deliver water into the winemaking facility.

Wastewater Quality

Analyzing wastewater samples from the winemaking facility will show the wastewater characteristics and the concentration of certain pollutants. This information is not only useful to understand the characteristics of wastewater, Permittees also need to collect it throughout the duration of their permit coverage to determine if their discharges comply with permit requirements. Knowing this information can also help the Permittee:

- Determine how effectively current practices and procedures reduce the strength of wastewater and protect groundwater quality.
- Plan for future growth or to modify the existing waste management system.
- Demonstrate compliance with the Winery General Permit.

Literature, technical experts, and other agencies that regulate wastewater from winemaking facilities provide a wide array of pollutants to measure in order to adequately characterize wastewater from winemaking facilities. Examples include total nitrogen, total phosphorous, total

potassium, electrical conductivity, sodium, magnesium, iron, sodicity, chloride, carbonate, and bicarbonate. Requiring the analysis of a plethora of pollutants would more thoroughly characterize wastewater discharges but it would be cost prohibitive.

Additionally, not all discharge methods are associated with requirements to sample wastewater. The preliminary draft of the Winery General Permit required all Permittees regardless of their discharge method to analyze samples of wastewater. According to industry experts, the strength of wastewater discharges from winemaking facilities stays relatively consistent. Because of this information and to reduce compliance costs for Permittees, Ecology decided to only require wastewater discharges from the following discharge methods to be sampled. The results of the sample analysis will be used to demonstrate compliance with benchmarks and effluent limitations.

- Irrigation to managed vegetation
- Subsurface infiltration system (Group 2 only)
- Infiltration basin

A basic set of pollutants was selected to provide an indication of how well the winemaking facility's BMPs and waste management system are functioning to prevent violations of the Winery General Permit and Washington State Water Quality Standards. Ecology selected these pollutants to minimize the level of laboratory expenses to what is necessary to reasonably ensure compliance with conditions of the Winery General Permit.

- **Discharges to land treatment via irrigation**

A Permittee that discharges as irrigation to managed vegetation (land treatment), is required to determine the pH and BOD₅ concentration of their wastewater as well as calculate their BOD₅ loading

- **Discharges to subsurface infiltration systems**

A Group 2 Permittee that discharges to a subsurface infiltration system is required to determine the pH, CBOD₅ concentration, and the TSS concentration of their wastewater. They must use CBOD₅ to measure the concentration of organic material in wastewater. Measuring the concentration and determining the loading of CBOD₅, rather than BOD₅, is a more effective method for determining the amount of organic material in wastewater that is discharged to a subsurface infiltration system. This is because the subsurface infiltration system is an environment where the nitrification of ammonia may **not** be complete resulting in high levels of ammonia and possibly false BOD₅.

- **Discharges to infiltration basins**

A Permittee that discharges to an infiltration basin must analyze their wastewater discharges and determine the pH and concentration of BOD₅, TDS, nitrate, chloride, and sulfate to demonstrate their compliance with the effluent limitations. Even though this information could be useful for a Permittee that uses any discharge method, Ecology decided **not** to require analysis of these pollutants for any other discharge method because it could be cost prohibitive, especially for a Group 1 Permittee.

A Permittee that discharges wastewater as irrigation to managed vegetation, must determine the loading of BOD₅ that is applied to the irrigation lands. To determine the loading for wastewater discharged to the irrigation lands in one day, divide the loading (determined using the equation presented below) by the total acreage that received the wastewater in one day. The units are pounds per acre per day, or lbs/acre/day.

To calculate the loading for BOD₅, enter the concentration of BOD₅ and the total volume of wastewater discharged, into the following equation.

$$\text{Loading in } \frac{\text{lbs}}{\text{day}} = \text{Concentration in } \frac{\text{mg}}{\text{L}} \times \frac{\# \text{ of gallons discharged daily}}{1,000,000 \text{ gallons}} \times 8.34 \text{ in } \frac{\text{lbs}}{\text{gal}}$$

Lbs/day = pounds per day

X = multiply by

8.34 = unit conversion factor in pounds per gallon

A Permittee may collect a grab sample or a composite sample. Grab samples are obtained by filling a water container in the wastewater flow. A composite sample consists of multiple grab samples collected at various intervals within a 24-hour time period that are then combined into one sample. Composite samples provide a more accurate representation of wastewater that can be highly variable, like wastewater discharges from winemaking facilities. The composite sample provides an estimate of the average water quality conditions. Even though a composite sample is likely to provide a more accurate representation of the wastewater characteristics, it can be time consuming or challenging for some winemaking facilities. Therefore, each Permittee may decide to collect either a grab sample or composite sample of their wastewater discharges.

Permittees are also required to submit certain information about each wastewater sample that is analyzed. Section 090 of Chapter 173-226 WAC specifies what data must be tracked and reported for every sample collected and analyzed. Permittees are also required to have their wastewater samples analyzed by an accredited laboratory in accordance with Chapter 173-50 WAC. This is to ensure that the wastewater samples are analyzed by a laboratory that meets certain requirements and standards so the results of the analysis are accurate and dependable. Information on how to obtain accreditation is available from Ecology's lab accreditation program at <http://www.ecy.wa.gov/programs/eap/labs/index.html> or by calling 360-871-8840.

Best Management Practices

General Best Management Practices

Best management practices or "BMPs" are practices and tools used to manage and treat wastewater to prevent or reduce pollution of state waters. BMPs typically focus on good housekeeping practices, good management techniques, operational changes, materials substitution, and materials and water conservation. They encompass any tool or activity used to reduce the generation of pollution and to properly manage wastes.

Not only are BMPs good for the protection of water quality, they can also be financially beneficial to the Permittee. Changing operational practices and materials used may offer the Permittee savings by reducing raw materials, extending the life of processing equipment, and reducing liability costs.

BMPs should be used to:

- Reduce the amount of pollution or waste generated.
- Manage the pollution or waste generated.
- Maintain equipment and processes to minimize malfunctions, spills, and leaks.
- Contain and clean up spills and leaks.
- Assess processes, practices, and equipment to identify areas of improvement.

Even though permitted facilities will implement similar BMPs, each Permittee should tailor BMPs to their facility and operation. To enable flexibility, the Winery General Permit allows a Permittee to use an alternative BMP as long as it is as equally effective as the BMP required by the Winery General Permit.

Ecology has the authority to specify, in each waste discharge permit, conditions necessary to avoid pollution (RCW 90.48.180). The Winery General Permit includes required BMPs for all Permittees regardless of the discharge method they use, and it includes required BMPs unique to each discharge method. Based on a recommendation from the Technical Assistance Group, Ecology included a compliance schedule so that Permittees may gradually comply with the required general BMPs over the first three years of the permit cycle. Ecology hopes to ease compliance costs to Permittees by including the compliance schedule.

The required general BMPs that apply to all discharge methods focus on the following concepts.

- **Properly operate and maintain the facility and waste management system**

Operating a facility and waste management system is complex and involves many steps. Regularly assessing the process and procedures ensures that the facility and waste management system are operating as efficiently as possible. Identifying and implementing ways to improve procedures and practices can reduce costs and impacts to the environment. Train staff so they know how best to operate the waste management system and can identify ways to improve processes and minimize the generation of wastewater.

- **Remove solids from wastewater**

The winemaking process generates many solids that end up in wastewater. Examples include lees, pomace, filtered solids, and wastewater sludge. Solids like pomace and lees (seeds, skins, pulp, dead yeast cells, etc.) have high levels of oxygen-demanding organic material that can cause challenges for all discharge methods. Solids can also be problematic for the waste management system by damaging pumps and blocking nozzles and valves. Suspended solids from cleaners and filters can damage irrigation systems and drainfields by clogging soil pores and reducing permeability.

Sources of solids include the crush pad, barreling, lees handling, fining, filtration, and centrifuge. Solids should be screened, collected, and disposed of in a way that minimizes impact to the environment. This will greatly reduce the strength of the wastewater and the wear and tear on the equipment in the waste management system. Some companies collect solids from winemaking facilities and use them for compost, distill them, or feed them to livestock.

Changing practices to minimize the amount of solid waste entering the waste management system will reduce:

- The amount of treatment needed to reduce the strength of the wastewater.
- The impact to discharge systems and their possible failure.
- Nuisances like odors and vectors that make winemaking facilities less appealing.
- Possible time spent responding to regulatory compliance issues.

- **Properly use and dispose of chemicals**

Chemicals are needed to clean and maintain the facility and waste management system. But they are expensive and can be problematic for equipment if they are **not** handled and disposed of properly. Staff should be trained on proper handling and disposal of chemicals. This will minimize the impact to the waste management system and the occurrence of chemical spills.

The Federal Insecticide, Fungicide, and Rodenticide Act of 1979 (FIFRA) assures that manufacturers will properly label pesticides and that, if used in accordance with label specifications, they will **not** cause unreasonable harm to the environment. (<http://www.epa.gov/oecaagct/lfra.html>) Safety Data Sheets (SDS) are intended to provide comprehensive information about substance or mixture for use in workplace chemical management. Both sources of information include safe handling and disposal procedures. (WAC 173-226-070)

- **Know how water is used at your facility**

Permittees are required to conduct a water balance to determine the average gallons of wastewater discharged per gallon of wine produced. This information can be used in a number of ways to improve operation, but the most important in relation to the Winery General Permit is minimizing the amount of wastewater generated.

Minimizing the generation of wastewater has numerous environmental and financial benefits. For example, reducing the amount of wastewater generated reduces the amount that has to be managed, treated, and discharged. This reduces the costs associated with treatment and storage of the wastewater and could reduce costs associated with the maintenance of the waste management system.

One example of reducing the amount of wastewater generated is to reduce the use of water to clean the floor in the facility. Instead, the Permittee could use a broom for the first round of cleaning and then use a hose with a shut-off valve for the final rinse. This will keep the facility clean and generate less wastewater. Other examples include, using:

- Ozonated water for cleaning.
- Steam instead of hot water for bottling.
- Automatic cleaning systems that combine high pressure and hot water.

Minimizing the amount of wastewater discharged can also reduce and prevent some of the nuisances associated with managing wastewater, like odor and vectors, which can negatively impact the aesthetics at a winemaking facility.

Alternative Best Management Practices

The Winery General Permit allows a Permittee to use a BMP other than one required by the general permit if the alternative BMP effectively meets the intent and requirement. Some owner/operators of winemaking facilities are very experienced at operating their winemaking facility including managing their waste. Ecology recognizes that providing Permittees the opportunity to use alternative BMPs **not** only benefits that Permittee, it also benefits the entire industry because the alternative BMPs may become a standard BMP in future permit cycles.

Training

The Winery General Permit requires that the Permittee train their employees that manage wastewater or are responsible for pollution prevention. Training can be a very useful BMP because employees who receive the training are:

- More familiar with the waste management system and waste management policies.
- Better able to identify ways to improve existing wastewater management practices.
- Knowledgeable about what to do in the event of a spill.
- Comfortable with water quality issues and the requirements of the Winery General Permit.

Employees that work with wastewater and/or are responsible for pollution prevention should know how to identify problems with the waste management system, proper chemical use practices, what to do in the event of a spill, and who to contact if they need assistance. Employee training is critical to achieving timely and consistent spill response.

Additionally, employees that inspect the waste management system should know how to conduct and document the inspection. Visual inspection of the facility may be integrated into the work the Permittee and their employees are already performing, thus reducing the burden on the permitted facility. Visual inspection does **not** have to be separate from daily tasks.

4.3 Special Condition S3. WWTPs

Discharge Limits

Wastewater discharges to WWTPs are treated at the WWTP before being discharged to land (ground water) or to a surface waterbody. A Permittee that discharges wastewater to a WWTP has a user agreement or contract with the WWTP receiving their discharge. The WWTP is required to set limits for their industrial users to ensure the WWTP is in compliance with their Ecology-issued NPDES permit and is protective of water quality. Because the WWTP accepts the wastewater discharge from the winemaking facility and is responsible for ensuring that the

discharge does **not** cause a violation of their NPDES permit, Ecology determined it was unnecessary, at this time, to establish additional numeric limits for the winemaking facility.

Section 070 of Chapter 173-226 WAC, requires that general permits authorizing the discharge of wastewater to a WWTP comply with the pretreatment requirements of the Federal Clean Water Act. Therefore, the general permit includes prohibited discharges for a Permittee that discharges to a WWTP to reinforce the federal requirements and protect the WWTP from discharges that could cause pass through or interference. The prohibited discharges in the Winery General Permit are standard for discharges to WWTPs and should be similar to the prohibited discharges in a contract or user agreement between the Permittee and the WWTP. For more information about the Federal General Pretreatment Regulations, see Title 40 of the Code of Federal Regulations, Chapter I, Subchapter N, Part 403 (40 CFR 403).

The Permittee is responsible for **not** causing:

- A violation of federal, state, and local pretreatment requirements.
- Hydraulic overloading in the collection system.
- Organic overloading at the WWTP.
- Other contamination, pass through, interference, or upset of the WWTP.

Wastewater discharges **not** in compliance with the Winery General Permit could cause upsets to the WWTP receiving those discharges, which could lead to discharges of untreated sewage to streams, rivers, and the Puget Sound.

A Permittee that diligently complies with the requirements of the Winery General Permit is presumed to have wastewater discharges that comply with the Washington State Water Quality Standards and **not** negatively impact the WWTP receiving their discharge.

Monitoring Requirements

The monitoring requirements for discharges to WWTPs are discussed in section 4.2 Special Condition S2. General Requirements – Monitoring Requirements.

Best Management Practices

Wastewater discharged to WWTPs **not** in compliance with the Winery General Permit and the contract or agreement with the WWTP receiving the discharge can be problematic for many reasons. Wastewater with high organic loads or extremely high or low levels of pH water can upset the microbial makeup of the plant and can damage the infrastructure; for instance corroding concrete pipes. Another major concern is when the WWTP receives an unusually large volume of wastewater that they might **not** have the capacity to manage if they receive the discharge at the same time as discharges from other users.

To prevent upsets and damages to WWTPs, a Permittee may be required by the WWTP to implement BMPs at their winemaking facility like reducing the strength of their wastewater or making their wastewater more pH neutral. They should contact their WWTP to discuss the WWTP's requirements concerning BMPs, limits, and preferences for communicating with the Permittee. The Permittee and WWTP receiving their discharge should work together to establish

communication procedures for routine situations and emergency situations. Establishing these procedures early on will better prepare the Permittee for potential emergencies.

The Winery General Permit requires that a Permittee work with their WWTP and discuss how best to handle slug discharges. A slug discharge is any discharge that is **not** routine, has uncharacteristic qualities like a greater volume or higher strength than usual, and has the potential to upset or damage the WWTP. This BMP is extremely important for the Permittee and WWTP and will save both time and money when future slug discharges are handled properly.

They are also required to notify the WWTP when any significant abnormality is discovered, in accordance with 40 CFR 403. The intention of this requirement is to protect the WWTP and its infrastructure. It is in the best interest of the Permittee and the WWTP to establish communication practices to follow in the event of a slug discharge or system overflow.

Implementing the BMPs in the general permit and keeping the winemaking facility and waste management system in good working order will help the Permittee comply with the general permit as well as the requirements of the WWTP receiving their discharge. Additionally, reducing the strength and volume of the discharge could likely lower the Permittee's expenses because it is common for WWTPs to charge an industrial user based on the total volume and organic load of their discharge.

Inspections

Inspecting the waste management system on a regular basis will help the Permittee recognize any changes in the system and identify operation and maintenance needs. This is especially true during activities that generate a large amount of wastewater such as crush and racking. Identifying and correcting problems early reduces the impact to the environment and can save the Permittee money by **not** allowing the problem to escalate. Maintaining records of inspections helps the Permittee see trends, make necessary adjustments, and plan for the future. Industry representatives recommended, and Ecology agreed, that conducting inspections at a minimum of two (2) times per year was adequate.

For discharges to WWTPs, the intent of the inspection is to make sure the waste management system is in good working order.

The Winery General Permit requires Permittees to document certain information while inspecting their winemaking facility and waste management system. This information will vary depending on the discharge method used by the Permittee and should be tailored to the specific conditions and waste management strategies used at the winemaking facility.

The purpose of this requirement is to identify within the inspection report the areas of the facility that the Permittee inspected, an assessment of all BMPs, and any major observations. This assessment does **not** have to be written in paragraph form. As long as the Permittee's records identify the items inspected and the observations made, this summary can be in any format.

4.4 Special Condition S4. Land Treatment via Irrigation to Managed Vegetation

Discharge Limits

Wastewater discharges as irrigation to managed vegetation are treated by crop uptake and biological processes in the soil as they flow through the root zone and soil matrix. Some of the wastewater is likely to evaporate while the remainder is utilized by the vegetation. Most of the biological activity occurs near the surface where oxygen is present to support biological oxidation.

The oxygen-demanding organic material (measured as BOD₅), are adsorbed by the soil and then biologically oxidized by the soil bacteria. Dissolved solids like salt do **not** degrade and may either accumulate in soils assimilated by crops or leach from the soil profile into ground waters. The suspended solids (measured as TSS), are filtered by the soil and converted to topsoil. The buffering capacity of the soil can tolerate swings in applied water pH.

An effective land treatment system is established by maintaining healthy vegetation and an aerobic upper soil profile between irrigations. The Permittee must consider multiple factors, such as organic loading, hydraulic loading, drying time, and cycle time. When developing an application strategy for this discharge method, the primary goal should be to:

- Apply the right amount of oxygen-demanding organic material so nutrients are sequestered in the soil matrix.
- Minimize conditions that could mobilize trace metals.
- Minimize the potential for nuisance odors and vector conditions.

The benchmarks were established so that discharges of wastewater are effectively treated in the soil matrix, and that when the wastewater travels past the vadose zone¹ and possibly enters a groundwater aquifer, it will **not** cause or contribute to a violation of the Washington State Water Quality Standards. Group 1 Permittees may choose to comply with the benchmarks in Table 7 of the Winery General Permit (discussed later in this section) or comply with the benchmarks in Table 8 of the Winery General Permit. Group 2 Permittees must comply with the benchmarks in Table 8 of the Winery General Permit.

The benchmarks in Table 8 of the Winery General Permit are as follows.

- pH = 6.0 – 9.0
- Loading rate of BOD₅ = weekly average of 75 lbs/acre/day
- Maximum application frequency = 4 days/week

These benchmarks are based on the protection of groundwater quality. If oxygen-demanding organic material is applied at a rate greater than the soils ability to adsorb it, then soils will fill and become waterlogged, starving roots of oxygen, preventing the uptake of water and nutrients by vegetation, and creating odorous anaerobic conditions.

To prevent irrigation lands being overloaded with oxygen-demanding organic material, Ecology established a benchmark of a weekly average of seventy-five (75) pounds (lbs) of BOD₅ per acre

¹ Vadose zone = the part of Earth between the land surface and the top of the groundwater zone (phreatic zone).

per day (lbs/acre/day). Numerous sources including agencies that regulate similar wastewater discharges to land treatment, used a BOD₅ loading rate of one hundred (100) lbs/acre/day. Considering that wastewater contains mostly soluble BOD₅ (dissolved compounds such as organic acids, sugars, and alcohols), Ecology decided to use a more conservative loading rate of seventy-five (75) lbs of BOD₅ per acre per averaged over a week, which accounts for the days when **no** wastewater is discharged. This allows winemaking facilities to discharge greater volumes and still provides adequate time for the soil to rest and the BOD₅ to break down in the soil. Ecology determined that this groundwater quality-based benchmark is sufficient to prevent overloading systems, causing nuisances, and mobilizing heavy metals.

Discharging wastewater with high levels of dissolved solids like salt to irrigation lands can negatively impact vegetation and soils on the irrigation lands. Soils that have high levels of salts have low infiltration rates and can quickly become waterlogged. Saline water also increases the osmotic stress to plants and prevents them from absorbing water. When salts leach out of soils and enter ground water, they can enter drinking water and surface water and harm humans and aquatic organisms.

Ecology recognizes that dissolved solids negatively impact vegetation, soil, and ground water, and that they should be applied in limited amounts. However, at this time, **not** enough information is available about the levels of TDS in the water used at the winemaking facility, therefore, it is difficult to determine a reasonable benchmark for TDS or FDS for this discharge method. The preliminary draft of the Winery General Permit required Permittees using this discharge method to analyze TDS and FDS concentrations and loadings of their wastewater as well as TDS concentrations of the influent water.

All of this information would help Ecology establish an appropriate benchmark for dissolved solids in future permit cycles. However, Ecology decided that to reduce compliance costs, Permittees would not be required to analyze wastewater samples to determine the TDS and FDS concentration and loading. Instead, Ecology hopes to work with Permittees and the winemaking community to study the impacts of salinity and determine appropriate benchmarks for TDS or FDS for future permit cycles.

The Winery General Permit does **not** include a benchmark for suspended solids (or TSS) for this permit cycle because suspended solids should **not** be over applied if the Permittee is achieving the benchmark for BOD₅. Ecology decided that focusing on the benchmark for BOD₅ would simplify requirements for the Permittee and still provide protection of ground water.

Discharges of wastewater with a high or low water pH could damage the soil and have a greater potential to pollute ground water, therefore, Ecology established a benchmark for water pH at 6.0 – 9.0. This benchmark is close to the Washington State Ground Water Quality Standard (6.5 – 8.5), but **not** quite as stringent. This benchmark also matches the requirements of agencies that also regulate wastewater discharges from winemaking facilities. Ecology determined, based on industry experience, that the buffering capacity of the soil can tolerate swings in applied water pH without having adverse effects on the soil, crop, or ground water.

Because wastewater discharges contain oxygen-demanding organic material and dissolved solids like salt, which have the potential to deplete the oxygen in the soil and create anaerobic conditions, increased periods of rest are needed between applications. Ecology determined that a maximum of four (4) days of wastewater application per week along with one (1) day of rest between applications was adequate to avoid over application and prevent damaging soils.

Ecology did **not** develop benchmarks that varied depending on if the winemaking facility was located in Eastern or Western Washington. The evapotranspiration rate is different west of the Cascades than east of the Cascades, however, developing separate benchmarks could complicate the requirement for Permittees. To avoid this complexity, Ecology established one (1) set of benchmarks that are based on evapotranspiration rates for Eastern Washington.

The benchmarks in Table 7 of the Winery General Permit (included below in **Table 10 – Table 7 of the Winery General Permit**) were developed to create a simpler compliance approach for Group 1 Permittees. Group 1 Permittees may **not** have time and resources to analyze their wastewater to identify the BOD₅ concentration, and then use the concentration to determine how much wastewater they can discharge without exceeding the BOD₅ loading rate. To simplify this requirement, Ecology determined equivalent application rates for Group 1 Permittees.

As shown in Table 10 below, untreated wastewater generated during crush has levels of BOD₅ ranging from 500 milligrams per liter (mg/L) to 12,000 mg/L, and untreated wastewater generated outside of crush has levels of BOD₅ ranging from 300 mg/L to 3,500 mg/L. Ecology determined that using 80% of the maximum values would reasonably represent maximum concentrations discharged by most winemaking facilities. 80% of the maximum values of wastewater generated during crush and outside of crush equals 10,000 mg/L and 2,800 mg/L.

Table 10
Table 7 of the Winery General Permit

Scenario	Time of Year Wastewater is Generated and Discharged	Maximum Application Rate	Maximum Application Frequency ²
1	Wastewater generated during crush discharged during crush ¹	1,600 gals/acre/day	4 days/week
		2,100 gals/acre/day	3 days/week
		3,150 gals/acre/day	2 days/week
		6,300 gals/acre/day	1 day/week
2	Wastewater generated during crush, stored, and discharged after crush ¹	5,650 gals/acre/day	4 days/week
		7,500 gals/acre/day	3 days/week
		11,250 gals/acre/day	2 days/week
		22,500 gals/acre/day	1 day/week
3	Wastewater generated before or after crush discharged during the growing season ¹	5,650 gals/acre/day	4 days/week
		7,500 gals/acre/day	3 days/week
		11,250 gals/acre/day	2 days/week
		22,500 gals/acre/day	1 day/week
1 = See Special Condition S2.C.2 of the Winery General Permit for more requirements related to the discharge of wastewater to irrigation lands.			
2 = Must have one day of rest following each day wastewater is discharged.			

Assuming that discharges of wastewater are untreated and would have high levels of BOD₅, Ecology determined the maximum application rates so as **not** to exceed the BOD₅ loading rate in Table 8 of the Winery General Permit (weekly average of seventy-five (75) lbs of BOD₅ per acre per day). Ecology established maximum application rates for three (3) scenarios so Group 1 Permittees would have compliance options. If the Permittee does **not** exceed the designated maximum application rates, then the irrigation lands will likely **not** be overloaded with oxygen-demanding organic material. See **Appendix B – Technical Calculations**, for more information.

- **Scenario 1**

Wastewater generated during crush (approximately August to October) typically has higher concentrations of oxygen-demanding organic material (BOD₅) than wastewater generated outside of crush. If this wastewater is discharged during crush, it will still have high levels of BOD₅. Applying the high-strength wastewater around the same time it was generated does **not** allow the BOD₅ to break down.

Ecology determined that a maximum application rate of 1,600 gals/acre/day with a maximum application frequency of four (4) days per week, is sufficient to prevent overloading irrigation lands. Permittees that discharge the maximum volume of wastewater allowed (per the application rate) from August through October (approximately forty-eight (48) applications at four (4) days/week), could discharge a total of 76,800 gallons of wastewater per year on each acre of irrigation land. This is in addition to discharges outside of crush and frozen conditions.

Additionally, Ecology included greater maximum application rates for Permittees that choose to discharge wastewater less frequently than four (4) days per week. A Permittee that chooses to discharge wastewater one (1) day per week may discharge up to 6,300 gallons of wastewater per acre per day. A Permittee that discharges 6,300 gallons of wastewater per acre per day at a maximum frequency of one (1) day per week (twelve (12) applications), could discharge a total of 75,600 gallons of wastewater per year on each acre of irrigation land.

- **Scenario 2**

Wastewater generated during crush (approximately August to October) but stored and discharged after crush (during the growing season), has a lower concentration of BOD₅ because bacteria has had more time to break down the organic material. Ecology determined that a maximum application rate of 5,650 gals/acre/day of the reduced-strength wastewater with a maximum application frequency of four (4) applications per week, is sufficient to prevent overloading irrigation lands. Permittees that discharge the maximum volume of wastewater allowed (per the application rate) from April through November (approximately one hundred twenty-eight (128) applications at four (4) days/week), could discharge a total of 723,200 gallons of wastewater per year on each acre of irrigation land.

A Permittee that chooses to discharge wastewater one (1) day per week may discharge up to 22,500 gallons of wastewater per acre per day. A Permittee that discharges 22,500 gallons of wastewater per acre per day at a maximum frequency of one (1) day per week (approximately thirty two (32) applications), could discharge a total of 720,000 gallons of wastewater per year on each acre of irrigation land.

- **Scenario 3**

Wastewater generated before or after crush (approximately November to August) typically has low concentrations of oxygen-demanding organic material (BOD₅) than wastewater generated during crush. This wastewater may be discharged anytime during the growing season (approximately April to November) at a maximum application rate of 5,650 gals/acre/day with a maximum application frequency of four (4) days per week. Permittees that discharge the maximum volume of wastewater allowed (per the application rate) from April through November (approximately one hundred twenty eight (128) applications at four (4) days/week), could discharge a total of 723,200 gallons of wastewater per year on each acre of irrigation land.

Ecology recognizes that some Group 1 Permittees may prefer to treat their wastewater before discharging to irrigation lands, so the Winery General Permit provides Group 1 Permittees the option to choose to comply with the benchmarks in Table 7 or in Table 8 of the Winery General Permit.

Wastewater must **not** be discharged to irrigation lands outside of the growing season because soil microbial activity is greatly reduced by low temperatures, and little treatment will occur. Therefore, discharging wastewater to irrigation lands outside of the growing season does **not** reliably protect ground water. A Permittee that discharges their wastewater as irrigation to managed vegetation must provide adequate storage for the wastewater generated outside the growing season or must use another discharge method during the non-growing season.

Wastewater discharges **not** in compliance with the Winery General Permit could overload irrigation lands, depleting them of oxygen and causing nuisance conditions and damage to crops and landscaping. It can also cause heavy metals like arsenic and iron to mobilize and contaminate groundwater aquifers.

A Permittee that diligently complies with requirements in the Winery General Permit including the benchmarks and prohibited discharges for land treatment systems, is presumed to have wastewater discharges that comply with Washington State Water Quality Standards and **not** overload irrigation lands.

Monitoring Requirements

The monitoring requirements for discharges as land treatment via irrigation to managed vegetation are discussed in section 4.2 Special Condition S2. General Requirements – Monitoring Requirements.

Best Management Practices

An effective wastewater irrigation system uses the physical, chemical, and microbial properties of the soil and vegetation to remove pollutants from the wastewater. The soil bacteria transform nutrients in the wastewater and vegetation remove the transformed nutrients from the soil. The key to a successful wastewater irrigation system is to match the timing and volume of wastewater application with the water and nutrient needs of the vegetation, and have enough irrigation land to accommodate the winemaking facility's volume of wastewater.

A well-managed wastewater irrigation system limits wastewater application to rates that do **not** exceed the hydraulic and treatment capacity of the vegetation or soil and minimizes adverse impacts to groundwater quality by all pollutants. BMPs that help develop and maintain a wastewater irrigation system are critical to the success of this discharge method.

When developing a wastewater irrigation system, a Permittee must consider many factors that affect the treatment of wastewater. The following factors greatly affect how effectively wastewater is treated by the wastewater irrigation system.

- **Soil.** Soil characteristics that affect wastewater treatment and crop growth include the soil chemical properties, permeability and infiltration capacity, soil profile depth, and depth to ground water. The soil must have adequate infiltration capacity and permeability to store irrigation and precipitation and **not** cause irrigation to run off irrigation lands or leach salts and heavy metals past the root zone.

- **Topography.** The topography of irrigation lands affects runoff patterns, how wastewater can be applied to irrigation lands, and the amount of wastewater that can be discharged.
- **Vegetation.** The plant or crop is a critical component of the wastewater irrigation system. It is used to remove nutrients from wastewater, maintain or increase infiltration rates, and reduce soil erosion. When selecting a plant or crop, the nutrient needs and water uptake rates of the plants or crops must be considered. The plant or crop should be suitable for the soil, climate, and strength and volume of the wastewater.
- **Quality and quantity of wastewater and irrigation water.** Wastewater can benefit managed vegetation because the organic material in wastewater improves soil structure, promotes the growth of soil microbes, and helps make nutrients available to plants. But too much nutrients, salts, and suspended solids can have negative impacts to the vegetation and soils. A Permittee must consider the quality and quantity of their wastewater when determining how much wastewater to discharge to their irrigation lands.
- **Timing.** Knowing when to discharge wastewater to the irrigation lands and how much to apply is critical. Applications must be scheduled so the wastewater discharged does **not** overload the irrigation lands, and at a time when the irrigation lands are **not** saturated from precipitation or irrigation water.

A Permittee may greatly benefit from using BMPs that help them:

- Document the necessary components of the wastewater irrigation system.
- Calculate the water requirements of the plant or crop.
- Determine how much wastewater can be discharged and still avoid ponding, runoff, erosion, and groundwater contamination.
- Schedule the application of wastewater irrigation, considering rainfall and supplemental irrigation.
- Monitor soil moisture levels in the root zone.
- Inspect the irrigation lands for signs of overwater or overloading.

The Winery General Permit requires that a Permittee provide storage for wastewater during times when environmental conditions prevent wastewater from being discharged as irrigation to managed vegetation. Examples of environmental conditions that prevent wastewater discharge include when irrigation lands are frozen or snow covered, or during precipitation events that may cause wastewater to pond or run off irrigation lands. Providing storage for wastewater also enables the Permittee to treat the wastewater to reduce the strength or to neutralize the pH of the wastewater. Treating the wastewater before discharging as irrigation to managed vegetation, allows the Permittee to discharge the wastewater at a greater maximum application rate when environmental conditions are suitable.

Inspections

Inspecting the waste management system on a regular basis will help the Permittee recognize any changes in the system and identify operation and maintenance needs. This is especially true during

activities that generate a large amount of wastewater such as crush and racking. Identifying and correcting problems early reduces the impact to the environment and can save the Permittee money by **not** allowing the problem to escalate. Maintaining records of inspections helps the Permittee see trends, make necessary adjustments, and plan for the future. Industry representatives recommended, and Ecology agreed, that conducting inspections at a minimum of two (2) times per year was adequate.

For discharges as irrigation to managed vegetation, the intent of the inspection is to make sure the managed vegetation is healthy and that the irrigation lands are **not** overloaded by organic material, or overwhelmed hydraulically.

The Winery General Permit requires Permittees to document certain information while inspecting their winemaking facility and waste management system. This information will vary depending on the discharge method used by the Permittee and should be tailored to the specific conditions and waste management strategies used at the winemaking facility.

The purpose of this requirement is to identify within the inspection report the areas of the facility that the Permittee inspected, an assessment of all BMPs, and any major observations. This assessment does **not** have to be written in paragraph form. As long as the Permittee's records identify the items inspected and the observations made, this summary can be in any format.

4.5 Special Condition S5. Lagoons and Other Liquid Storage Structures

Discharge Limits

The Winery General Permit does **not** include a benchmark or effluent limitation for a Permittee that discharges to a lagoon or other liquid storage structure.

Monitoring Requirements

The monitoring requirements for discharges to lagoons and other liquid storage structures are discussed in section 4.2 Special Condition S2. General Requirements – Monitoring Requirements.

Best Management Practices

Wastewater discharges to lagoons and other liquid storage structures become problematic when they overtop the structure, damage the structure, and leak out of the structure. BMPs can help the Permittee avoid these negative outcomes and mitigate them if they occur.

Lagoons and other liquid storage structures are typically **not** covered and therefore are exposed to rainwater. A lagoon and other liquid storage structure must allow additional storage for rainwater so that when it rains the wastewater in the lagoon/structure does **not** overtop the structure and possibly leave the winemaking facility as runoff, enter surface water, or damage the lagoon/structure. To prevent wastewater overtopping the structure, a Permittee should:

- Maintain a freeboard consistent with the design or specifications of the lagoon or other liquid storage structure.
- Use a depth gauge that clearly indicates the minimum freeboard required.
- **Not** discharge in excess of the hydraulic capacity of the lagoon or other liquid storage structure.

Lagoons and other liquid storage structures can experience wear and tear from the weather and overuse. A Permittee should use BMPs to ensure the lagoon or structure is in good working order. Examples of BMPs include removing accumulated solids, controlling vegetation around the lagoon or structure, regularly inspecting the lagoon or structure to determine if maintenance is needed, and repairing any damage as soon as possible. Maintenance will prolong the life of a structure and help prevent catastrophic failure. Permittees should also consider the actions necessary to deal with a catastrophic failure of a lagoon to prevent, or minimize to the extent possible, damage to the environment.

New lagoons (lagoons constructed six (6) months after the effective date of the general permit) must be sited, designed, and constructed so they minimize impacts to groundwater quality. The Winery General Permit includes the following BMPs for the siting, design, and construction of future lagoons.

- **Designed to contain wastewater and a 25-year, 24-hour precipitation event.** Lagoons must be sized appropriately to accommodate wastewater generated from current production and possible growth, and contain rainwater that enters the lagoon. Some sources recommended the lagoon be designed to contain a 100-year, 24-hour precipitation event, while other sources recommended a 25-year, 24-hour precipitation event. Ecology determined that a lagoon designed to contain a 25-year, 24-hour precipitation event was sufficient to protect groundwater quality.
- **Have a permeability of less than 10^{-6} centimeters per second.** Lagoons have some degree of permeability whether from natural seepage or a leak. When designing the lagoon, the Permittee should consider material selection and the permeability of the soils in the bottom and sides of the lagoon. After reviewing other state requirements and resources, and discussions with industry professionals, Ecology determined that lagoons designed to have a permeability of less than 10^{-6} centimeters per second was adequate to protect groundwater quality.
- **Lagoon foundation or base.** Lagoons can be large structures that contain great volumes of wastewater. To protect groundwater quality and the safety of people and property around the lagoon, lagoons must have the physical integrity to prevent failure due to settlement, compression, or uplift.

The Winery General Permit does **not** require a Permittee discharging to an existing lagoon to modify the design or construction of the lagoon. It is uncertain how much seepage and leakage is occurring at each lagoon, so the Winery General Permit includes a requirement for a Permittee that discharges to an existing lagoon, to conduct an assessment of the lagoon to determine the permeability of the lagoon.

Inspections

Inspecting the waste management system on a regular basis will help the Permittee recognize any changes in the system and identify operation and maintenance needs. This is especially true during activities that generate a large amount of wastewater such as crush and racking. Identifying and

correcting problems early reduces the impact to the environment and can save the Permittee money by **not** allowing the problem to escalate. Maintaining records of inspections helps the Permittee see trends, make necessary adjustments, and plan for the future. Industry representatives recommended, and Ecology agreed, that conducting inspections at a minimum of two (2) times per year was adequate.

For discharges to a lagoon or other liquid storage structure, the intent of the inspection is to determine if the lagoon or liquid storage structure is structurally sound, if maintenance is needed, if the freeboard is adequate, and if the liquid level is less than it should be.

The Winery General Permit requires Permittees to document certain information while inspecting their winemaking facility and waste management system. This information will vary depending on the discharge method used by the Permittee and should be tailored to the specific conditions and waste management strategies used at the winemaking facility.

The purpose of this requirement is to identify within the inspection report the areas of the facility that the Permittee inspected, an assessment of all BMPs, and any major observations. This assessment does **not** have to be written in paragraph form. As long as the Permittee's records identify the items inspected and the observations made, this summary can be in any format.

Existing Lagoon Assessment

The Winery General Permit requires that a Permittee submit to Ecology an assessment for every lagoon constructed before the effective date of the general permit. Ecology based this requirement on its authority to specify any appropriate reporting requirements to prevent and control waste discharges. (WAC 173-226-090) The assessments will help Ecology determine the likely impacts to groundwater quality from existing lagoons and subsurface infiltration systems. The assessments will also inform future revisions to the general permit like benchmarks, prohibited discharges, and best management practices.

Lagoons can have a synthetic liner, an earthen liner, or no liner. Some lagoons leak, possibly due to a problem in the design or construction or how it is maintained. But all lagoons experience seepage. Seepage is when liquid slowly escapes through small holes in porous material. The rate of seepage depends on many factors including the materials used to construct the lagoon, the design and construction of the lagoon, how the lagoon is maintained, and if there are any preferential flow paths like cracks in the lagoon or liner.

Lagoon construction is variable which leads to variable seepage rates and, therefore, variable impacts to ground water. The current industry standard for lagoon constructions is Appendix 10D of Part 651 of the Agricultural Waste Management Field Handbook from Natural Resources Conservation Services (NRCS). This document, calculations using Darcy's Law, and NRCS staff agree that even lagoons built to this standard have a seepage rate. This seepage rate along with other risk factors, indicate the risk of a discharge to ground water from those covered under the Winery General Permit. In all likelihood, there will be a range of impacts. In order for Ecology to determine this range of impacts, the Winery General Permit requires Permittees to complete a lagoon assessment.

The lagoon assessment will provide Ecology with information to help determine the range of impacts to groundwater quality from lagoons, which will support decision-making in future versions of the general permit.

If Ecology previously conducted an assessment of the Permittee's lagoon and the assessment meets the requirements in the Winery General Permit, the Permittee may use that assessment and does **not** need to conduct a new assessment.

4.6 Special Condition S6. Road Dust Abatement

Discharge Limits

When wastewater is discharged as road dust abatement it is typically discharged to unpaved roads, driveways, or parking areas for the purpose of suppressing dust. Areas used as roads and for vehicles to park are typically compacted either intentionally by equipment to improve the surface or unintentionally by vehicles frequently driving over it. Roads and parking areas do **not** have vegetation and are less permeable due to their compacted soils, therefore they provide minimal treatment to wastewater.

When discharged to road dust abatement areas in excessive amounts, the wastewater can pond on the road or parking area causing nuisance odors and vectors, damage the road or parking area by eroding the soil, and can flow off the road and parking area and enter runoff into ground water or surface water. Discharges of high strength wastewater to ground water or surface water can degrade water quality and harm the people, animals, and plants that use those waterbodies.

Because wastewater discharged as road dust abatement will receive little to **no** treatment after it is discharged, Ecology determined that a conservative average loading rate of ten (10) lbs/acre/day for BOD₅ each week was appropriate to protect ground water quality. The total loading rate per day varies depending on how many days the Permittee discharges wastewater as road dust abatement. However, the total loading for the entire week is seventy (70) lbs of BOD₅, based on the average loading rate of ten (10) lbs/acre/day.

To simplify compliance efforts, Ecology included the maximum volume of wastewater (maximum application rate) that can be applied and **not** exceed the loading rate. Complying with a maximum application rate enables the Permittee to avoid exceeding the loading rate without having to analyze their wastewater to determine the BOD₅ concentration. To determine the maximum application rate, Ecology assumed that discharges of wastewater had high levels of BOD₅; approximately 12,000 mg/L of BOD₅ during crush and 3,500 mg/L of BOD₅ outside of crush. Ecology determined that using 80% of the maximum values would reasonably represent maximum concentrations discharged by most winemaking facilities. 80% of the maximum values of wastewater generated during crush and outside of crush equals 10,000 mg/L and 2,800 mg/L.

Ecology established three (3) scenarios so the Permittee has compliance options.

- **Scenario 1**

Wastewater generated during crush (approximately August to October) typically has higher concentrations of oxygen-demanding organic material (BOD₅) than wastewater generated

outside of crush. If this wastewater is discharged during crush, it will still have high levels of BOD₅. Ecology determined that the maximum application rates and maximum application frequencies in Table 10 of the Winery General Permit of are sufficient to prevent groundwater degradation.

- **Scenario 2**

Wastewater generated during crush (approximately August to October) and stored and discharged after crush (during the growing season), has a lower concentration of BOD₅ because bacteria has had more time to break down the organic material. Ecology determined that the maximum application rates and maximum application frequencies in Table 10 of the Winery General Permit of are sufficient to prevent groundwater degradation.

- **Scenario 3**

Wastewater generated before or after crush (approximately November to August) typically has low concentrations of oxygen-demanding organic material (BOD₅) than wastewater generated during crush. This wastewater may be discharged anytime during the growing season (approximately April to November) at the maximum application rates and maximum application frequencies presented in Table 10 of the Winery General Permit. Ecology determined that the maximum application rates and maximum application frequencies in Table 10 of the Winery General Permit of are sufficient to prevent groundwater degradation.

Table 10 of the Winery General Permit (included in **Table 11 – Table 10 of the Winery General Permit** below) includes the maximum application rates and the maximum application frequencies for each of the three (3) scenarios for a Permittee that discharges wastewater as road dust abatement.

Ecology did **not** develop benchmarks that varied depending on if the winemaking facility was located in Eastern Washington or Western Washington. The evaporation rate is different west of the Cascades than east of the Cascades, however, developing separate benchmarks could complicate the requirement for Permittees. To avoid this complexity, Ecology established one set of benchmarks that are based on evapotranspiration rates for Eastern Washington.

Table 11
Table 10 of the Winery General Permit

Scenario	Time of Year Wastewater is Generated and Discharged	Maximum Application Rate ¹	Maximum Application Frequency
1	Wastewater generated during crush discharged during crush ¹	150 gals/acre/day	7 days/week
		200 gals/acre/day	4 days/week
		300 gals/acre/day	3 days/week
		450 gals/acre/day	2 days/week
		850 gals/acre/day	1 day/week
2	Wastewater generated during crush, stored, and discharged after crush ¹	450 gals/acre/day	7 days/week
		750 gals/acre/day	4 days/week
		1,000 gals/acre/day	3 days/week
		1,500 gals/acre/day	2 days/week
		3,000 gals/acre/day	1 day/week
3	Wastewater generated before or after crush discharged during the growing season ¹	450 gals/acre/day	7 days/week
		750 gals/acre/day	4 days/week
		1,000 gals/acre/day	3 days/week
		1,500 gals/acre/day	2 days/week
		3,000 gals/acre/day	1 day/week
1 = See Special Condition S2.C.2 of the Winery General Permit for more requirements related to the discharge of wastewater as road dust abatement.			

To avoid ponding, runoff, erosion, and nuisances like odors and vectors, wastewater must **not** be discharged to road dust abatement areas that are frozen, covered by snow, saturated, or flooded. Even though little to **no** additional treatment is expected to occur once the wastewater is discharged as road dust abatement, a good practice is to only discharge during the growing season. This will help avoid wastewater discharges to road dust abatement areas that are frozen or snow covered. Additionally, wastewater must **not** be discharged during large precipitation events so as **not** to cause wastewater to pond or flow off the road dust abatement areas.

If the Permittee is unable to effectively control dust using only wastewater, the Permittee could use supplemental water in addition to discharging wastewater as road dust abatement. Based on evaporation rates, the Permittee could use the following volumes.

- **Scenario 1**

If the Permittee applies wastewater that is generated during crush (approximately September – October) as road dust abatement during crush (approximately September – October), the Permittee could apply 11.5 gallons of supplemental water for every one (1) gallon of wastewater (11.5:1).

- **Scenario 2**

If the Permittee applies wastewater that is generated during crush (approximately September – October) as road dust abatement before or after crush (approximately April – November), the Permittee could apply 4.5 gallons of supplemental water for every one (1) gallon of wastewater (4.5:1).

- **Scenario 3**

If the Permittee applies wastewater that is generated before or after crush as road dust abatement before or after crush (approximately April – November), the Permittee could apply 4.5 gallons of supplemental water for every one (1) gallon of wastewater (4.5:1).

Wastewater discharges **not** in compliance with the Winery General Permit could cause nuisance odors and vectors, erode roads and parking areas, and degrade ground water and surface water. A Permittee that diligently complies with requirements in the Winery General Permit including the benchmarks and prohibited discharges for road dust abatement, is presumed to have wastewater discharges that comply with the Washington State Water Quality Standards.

Monitoring Requirements

The monitoring requirements for discharges as road dust abatement are discussed in section 4.2 Special Condition S2. General Requirements – Monitoring Requirements.

Best Management Practices

A Permittee that discharges wastewater as road dust abatement should use BMPs to prevent exceeding the maximum application rates and frequencies identified in the Winery General Permit. Wastewater discharges as road dust abatement should also **not** cause ponding, runoff, erosion, and groundwater contamination.

The following BMPs can assist the Permittee with their application of wastewater as road dust abatement.

- Use an application system that evenly distributes the wastewater.
- Schedule the application of wastewater, considering rainfall and supplemental water used for road dust abatement.
- Inspect the road dust abatement areas for signs of over application.

The Winery General Permit requires that a Permittee provide storage for wastewater during times when environmental conditions prevent wastewater from being discharged as road dust abatement. Examples of environmental conditions that prevent wastewater discharge include when road dust

abatement areas are frozen or snow covered, or during precipitation events that may cause wastewater to pond or run off road dust abatement areas.

Inspections

Inspecting the waste management system on a regular basis will help the Permittee recognize any changes in the system and identify operation and maintenance needs. This is especially true during activities that generate a large amount of wastewater such as crush and racking. Identifying and correcting problems early reduces the impact to the environment and can save the Permittee money by **not** allowing the problem to escalate. Maintaining records of inspections helps the Permittee see trends, make necessary adjustments, and plan for the future. Industry representatives recommended, and Ecology agreed, that conducting inspections at a minimum of two (2) times per year was adequate.

For discharges as road dust abatement, the intent of the inspection is to determine if the wastewater is being applied consistently over the dust abatement area and if any ponding, runoff, or erosion is occurring.

The Winery General Permit requires Permittees to document certain information while inspecting their winemaking facility and waste management system. This information will vary depending on the discharge method used by the Permittee and should be tailored to the specific conditions and waste management strategies used at the winemaking facility.

The purpose of this requirement is to identify within the inspection report the areas of the facility that the Permittee inspected, an assessment of all BMPs, and any major observations. This assessment does **not** have to be written in paragraph form. As long as the Permittee's records identify the items inspected and the observations made, this summary can be in any format.

4.7 Special Condition S7. Subsurface Infiltration Systems

Discharge Limits

Wastewater discharges to subsurface infiltration systems are first treated by a tank or series of tanks and then discharged to a distribution system placed below the ground surface (typically called a drainfield). According to numerous winery representatives, many winemaking facilities in Washington use residential septic systems to treat and discharge their wastewater.

A residential septic system is designed for the average household and can typically treat domestic sewage with a concentration of 250 mg/L of BOD. The type and concentration of organic material found in wastewater (winery process wastewater) differs significantly from domestic sewage. The concentration of organic material is much higher in wastewater (winery process wastewater) than in domestic sewage. Much of this organic material is in a dissolved form and includes organic acids, sugars, and alcohols, whereas domestic sewage typically has much higher percentage of settleable solids.

The septic tank provides an anaerobic environment where solids settle and then receive some treatment from microbes that decompose the organic material. The remaining effluent is then discharged to an adjacent drainfield where soil microbes consume the remaining organic material.

Wastewater discharges that contain high amounts of suspended solids like bentonite and diatomaceous earth can clog drainfields.

Residential septic systems are designed to treat domestic sewage and typically **cannot** handle wastewater that has high amounts of suspended solids and oxygen-demanding organic material. Additionally, winemaking facilities discharge high volumes of wastewater at certain times of the year and can have no discharge at other times. This differs greatly from residences that typically discharge consistent volumes throughout the year.

The high levels of oxygen-demanding organic material and suspended solids coupled with the swings in volume discharged throughout the year, can damage the system and clog the drainfield. Wastewater discharges **not** effectively treated by a subsurface infiltration system can cause nuisances like odors and vectors, damage vegetation, and cause heavy metals like arsenic and iron to mobilize and contaminate groundwater aquifers. Additionally, if both wastewater and domestic sewage are discharged to the subsurface infiltration system and the system fails, domestic sewage could surface and cause public health risks. See **Section 4.7 – Special Condition S7. Domestic Sewage** of this Fact Sheet, for more information related to combined waste streams.

Because it is unknown how many winemaking facilities discharge to residential septic systems or how effectively residential septic systems treat wastewater (winery process wastewater), the Winery General Permit requires Permittees discharging to an existing (constructed before the effective date of the general permit) subsurface infiltration system to conduct an assessment of that system. Ecology determined that requiring an assessment of each existing subsurface infiltration system is an acceptable method to figure out how effectively these systems treat wastewater.

The groundwater quality-based benchmarks were established so that discharges of wastewater are effectively treated by the subsurface infiltration system before travelling through the soil matrix and possibly entering ground water. The benchmarks for Group 2 facilities' discharges to subsurface infiltration systems are as follows.

- TSS = 80 mg/L
- CBOD₅ = 125 mg/L
- pH = 6.0 – 9.0

Group 1 facilities are **not** required to comply with these benchmarks because the volume of wastewater discharged by a Group 1 facility may be significantly less than the volume discharged by a Group 2 facility. Additionally, because it is unknown how effectively these systems treat wastewater, it is difficult to establish benchmarks for this discharge method. Instead, a Permittee that discharges to an existing subsurface infiltration system is required to conduct an assessment of that system. Ecology will use this information to revise the general permit for future permit cycles; this **may** include establishing benchmarks for Group 1 facilities.

To prevent drainfields from getting clogged and the surfacing of wastewater, Ecology established a benchmark of 80 mg/L for suspended solids (TSS). This benchmark matches the requirement of the Washington State Department of Health that discharges to drainfields **not** have a higher concentration of TSS than 80 mg/L.

The benchmark for organic material also comes from the Washington State Department of Health. They require that discharges to septic systems **not** be higher in strength than 125 mg/L of CBOD₅ (carbonaceous biochemical oxygen demand). CBOD is used to measure the concentration of organic material instead of BOD in situations where the nitrification of ammonia may be incomplete, which could cause a false reading of BOD levels. To achieve a more accurate measurement of the amount of organic material in wastewater discharges to subsurface infiltration systems, the Winery General Permit requires the Permittee to monitor CBOD.

Discharges of wastewater with a high or low water pH could damage the soil and have a greater potential to pollute ground water, therefore, Ecology established a benchmark for water pH at 6.0 – 9.0. This benchmark is close to the Washington State Ground Water Quality Standard (6.5 – 8.5), but **not** quite as stringent. Ecology determined, based on industry experience, that the buffering capacity of the soil can tolerate swings in applied water pH without adverse effects on the soil or ground water.

Ecology did **not** include a benchmark for dissolved solids because **not** enough is known about how effectively subsurface infiltration systems treat dissolved solids. The Winery General Permit will be revised for the next permit cycle based on information reported to Ecology by Permittees; future versions of the general permit may include a benchmark for dissolved solids.

Wastewater discharges **not** in compliance with the Winery General Permit could damage the subsurface infiltration system, cause nuisance conditions and damage to vegetation, contaminate groundwater aquifers with heavy metals and high levels of salts, and create health risks for people from surfacing domestic sewage.

A Permittee that diligently complies with requirements in the Winery General Permit including the benchmarks and prohibited discharges for subsurface infiltration systems, is presumed to have wastewater discharges that comply with Washington State Water Quality Standards.

Monitoring Requirements

The monitoring requirements for discharges to subsurface infiltration systems are discussed in section 4.2 Special Condition S2. General Requirements – Monitoring Requirements.

Best Management Practices

Wastewater discharges **not** effectively treated by subsurface infiltration systems could cause nuisances, damage vegetation, contaminate ground water with heavy metals and salt, and, if commingled with domestic sewage, could negatively impact public health.

To prevent wear and tear and increase the effectiveness of the subsurface infiltration system, use BMPs to reduce the concentration of the following pollutants in the wastewater.

- **Suspended solids.** Suspended solids like bentonite and diatomaceous earth can plug the small pore spaces between soil particles in the drainfield impacting their permeability and causing them to fail. Using BMPs to reduce the amount of these products used at the winemaking

facility and using filters to remove them from the wastewater before it is discharged to the waste management system, will prevent drainfield failure.

- **Gross solids.** Gross solids like pomace and lees can clog components of the waste management system and significantly increases the strength of the wastewater. Wastewater with high levels of organic material deplete the soil of oxygen which reduces the amount of treatment provided by the drainfield and can produce nuisance odors and vectors (if the wastewater surfaces), and leach heavy metals into ground water. BMPs that remove gross solids and lower the organic material in wastewater will help avoid creating anaerobic conditions and compromising soil microbial activity.
- **Salts.** High levels of salt cause a decline in soil structure because the soils become less stable and more erodible. Saline water can also cause clay particles to bond together and reduce infiltration rates, decreasing the effectiveness of the drainfield. Additionally, high levels of salt in the soil profile can be leached into ground water. BMPs used to reduce the amount of salt that enters the waste management system will protect the drainfield and prevent salts being leached into groundwater aquifers.

One of the BMPs required by the Winery General Permit for a Permittee that discharges wastewater to a subsurface infiltration system is for the Permittee to comply with the Underground Injection Control Program (Chapter 173-218 WAC). According to Chapter 173-218 WAC, any subsurface infiltration system, regardless of the size of the system that receives non-sanitary waste fluids (industrial or commercial) is considered a Class V injection well and must be registered. Visit the following website for more information.

<http://www.ecy.wa.gov/programs/wq/grndwtr/uic/>

The tanks used to separate and treat the wastewater before being discharged to the drainfield are an important component in the subsurface infiltration system and must be maintained to ensure optimal treatment of the wastewater. The Winery General Permit requires that the tanks be cleaned when the sludge or scum layer reach various levels within the tank. Based on conversations with industry professionals and reviews of guidance from other state agencies, Ecology determined that this BMP is appropriate to maintain subsurface infiltration systems and protect groundwater quality.

New subsurface infiltration systems (constructed six (6) months after the effective date of the general permit) must be sited, designed, and constructed so they minimize impacts to groundwater quality. The Winery General Permit includes the following BMPs for the siting, design, and construction of future subsurface infiltration systems.

- **Quality and quantity of wastewater.** When designing the subsurface infiltration system, the Permittee should consider the volume of wastewater generated at different times throughout the year and the variability of the strength of the wastewater throughout the year. The organic material in wastewater can benefit soils and vegetation but too much organic material and nutrients can have negative impacts. Additionally, the system must also be sized appropriately to accommodate **not** only the wastewater discharged to it, but also any precipitation and stormwater directed to it.

- **Treatment tanks.** The treatment tanks in the subsurface infiltration system must have adequate retention time and storage capacity. When designing the system, consider what structural components will be used to treat the wastewater such as filters, aerators, and settling tanks. Locate tanks and inspection risers so they are easily accessible to inspect solid levels, pump out solids, and clean/replace effluent filters.
- **Drainfields.** One of the primary factors in determining the best location for drainfields is the properties of the soil. The soil conditions to consider include soil profile depth, soil chemistry, texture, permeability, layers that could restrict water flow, and the depth to ground water. The soil must have adequate infiltration capacity and permeability to handle the volume and rate of the wastewater discharge and precipitation and **not** cause wastewater to surface. Drainfields should be sized to accommodate the organic loading and the hydraulic loading of the wastewater.
- **Location restrictions.** The Winery General Permit includes location restrictions for new subsurface infiltration systems to prevent discharges to surface waters, potable water supply wells, and wellhead sanitary control areas. Additionally, the Winery General Permit requires that a Permittee notify their drinking water utility if the subsurface infiltration system will be located within a wellhead protection area because there could be additional local (e.g. county) requirements. The Washington State Department of Health oversees the protection of wellhead sanitary control areas and wellhead protection areas. For more information, visit their website, included below, or contact a staff of the Washington State Department of Health. (WAC 246-272B)
<http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/SourceWater/SourceWaterProtection>

The Winery General Permit does **not** require a Permittee discharging to an existing subsurface infiltration system (including residential septic systems) to modify the design or construction of the system. Because it is unknown how effectively these systems treat wastewater, the Winery General Permit requires Permittees discharging to an existing subsurface infiltration system to conduct an assessment of that system (see **Section 4.9 – Special Condition S9. Reporting** of this Fact Sheet, for more information). Ecology decided that requiring an assessment of each existing subsurface infiltration system is an acceptable method to determine how effectively these systems treat wastewater.

Inspections

Inspecting the waste management system on a regular basis will help the Permittee recognize any changes in the system and identify operation and maintenance needs. This is especially true during activities that generate a large amount of wastewater such as crush and racking. Identifying and correcting problems early reduces the impact to the environment and can save the Permittee money by **not** allowing the problem to escalate. Maintaining records of inspections helps the Permittee see trends, make necessary adjustments, and plan for the future. Industry representatives recommended, and Ecology agreed, that conducting inspections at a minimum of two (2) times per year was adequate.

For discharges to a subsurface infiltration system, the intent of the inspection is to determine if the system is overloaded in some way. During the inspection, look in the tanks to see if solids have accumulated to the point that the tank needs to be emptied, check if filters need to be cleaned, and look at the drainfield to see if any wastewater has surfaced.

The Winery General Permit requires Permittees to document certain information while inspecting their winemaking facility and waste management system. This information will vary depending on the discharge method used by the Permittee and should be tailored to the specific conditions and waste management strategies used at the winemaking facility.

The purpose of this requirement is to identify within the inspection report the areas of the facility that the Permittee inspected, an assessment of all BMPs, and any major observations. This assessment does **not** have to be written in paragraph form. As long as the Permittee's records identify the items inspected and the observations made, this summary can be in any format.

Existing Subsurface Infiltration System Assessment

The Winery General Permit requires that a Permittee submit to Ecology an assessment for every lagoon or subsurface infiltration system constructed before the effective date of the general permit. Ecology based this requirement on its authority to specify any appropriate reporting requirements to prevent and control waste discharges. (WAC 173-226-090) The assessments will help Ecology determine the likely impacts to groundwater quality from existing lagoons and subsurface infiltration systems. The assessments will also inform future revisions to the general permit like benchmarks, prohibited discharges, and best management practices.

Representatives of the Washington winemaking industry say that it is common for winemaking facilities in Washington, especially small producers, to discharge wastewater to onsite residential septic systems. These systems were designed to treat domestic sewage and may **not** effectively treat the volumes or strengths typical of wastewater (winery process wastewater) discharges.

Because it is unknown how effectively wastewater is treated by onsite residential septic systems, a Permittee is required to conduct an assessment of the system and submit the assessment to Ecology. The assessment will determine how effectively these systems treat wastewater and how likely they are to impact groundwater quality. Ecology based this requirement on its authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges. (WAC 173-226-090)

The Winery General Permit requires the Permittee to document certain information about their subsurface infiltration system. Some of this information can be based on observations made by the Permittee. Information that the Permittee might **not** know such as depth to ground water, can be obtained from the engineer that designed the system or the county office that permitted the installation of the system.

4.8 Special Condition S8. Infiltration Basins

Discharge Limits

Discharges of wastewater to an infiltration basin must first be treated and **not** exceed the effluent limitations before being discharged to the infiltration basin. Numerous winery representatives requested the Winery General Permit include a discharge method like this where wastewater is allowed to infiltrate through the soil matrix and recharge ground water. They view their wastewater as a resource, **not** to be discarded. Many winemaking facilities are eager to perform whatever pretreatment is necessary so they can use this discharge method. Additionally, multiple companies make prepackaged treatment systems that effectively treat wastewater to achieve stringent effluent limitations.

Untreated wastewater discharges have high oxygen-demanding organic material, high salinity, high amounts of suspended solids, and extreme ranges in water pH. Consequences of discharging untreated wastewater to the environment include causing nuisances like odors and vectors, overloading soil with organic material and high levels of salt, destroying crops and vegetation, contaminating ground water with heavy metals, and killing aquatic organisms by depleting oxygen. To avoid these consequences, Ecology established the following effluent limitations for **both** Group 1 and Group 2 Permittees.

- pH = 6.5 – 8.5
- BOD₅ = 100 mg/L
- TDS = 500 mg/L
- Nitrate = 10 mg/L
- Chloride = 250 mg/L
- Sulfate = 250 mg/L

The Winery General Permit requires wastewater to be treated to meet the Water Quality Standards for Groundwaters of the State of Washington for pH, TDS, Nitrate, Chloride, and Sulfate. The Water Quality Standards for Groundwaters of the State of Washington do **not** include a limit for oxygen demanding material, such as BOD₅. *Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems*, Department of Ecology Publication #93-36, states that wastewater discharges with a BOD₅ concentration of 200 mg/L is sufficient for protecting ground water. The Winery General Permit requires that wastewater discharges for this discharge method meet an effluent limit of 100 mg/L of BOD₅, which is twice as stringent as the abovementioned report. Ecology decided this conservative approach for discharges to infiltration basins was adequate to protect groundwater quality.

A Permittee that diligently complies with the requirements in the Winery General Permit including the benchmarks and prohibited discharges for discharges to infiltration basins, is presumed to have wastewater discharges that comply with Washington State Water Quality Standards.

Monitoring Requirements

The monitoring requirements for discharges to infiltration basins are discussed in section 4.2 Special Condition S2. General Requirements – Monitoring Requirements.

Best Management Practices

To comply with the effluent limitations established in the Winery General Permit, Permittees must treat the wastewater before it is discharged to an infiltration basin. However, the Winery General Permit does **not** specify how the wastewater should be treated. Ecology recognizes that winemaking facilities vary across the Washington winemaking industry including how they manage their wastewater, and decided it best that Permittees choose how to treat their wastewater. The Winery General Permit requires that, to meet the effluent limitations in Special Condition S8.A.1, Permittees do the following.

- Treat the wastewater prior to discharge to the infiltration basin.
- Operate and maintain the waste management system to treat the wastewater.

BMPs should also focus on controlling the volume of wastewater. Infiltration basins should be operated and maintained to accommodate wastewater flows, precipitation, and any stormwater flows directed to the basin. If wastewater discharges overtop an infiltration basin they could possibly damage the structure or anything in the vicinity of the basin.

An infiltration basin is typically **not** covered and therefore exposed to rainwater. An infiltration basin must allow additional storage for rainwater so that when it rains the wastewater in the basin does **not** overtop the structure and possibly leave the winemaking facility as runoff, enter a surface waterbody, or damage the infiltration basin. To prevent wastewater overtopping the structure, a Permittee must maintain a minimum freeboard, consistent with the design or specifications of the infiltration basin, and use a depth gauge that clearly indicates the minimum freeboard required.

Infiltration basins can experience wear and tear from weather and overuse. A Permittee should use BMPs to ensure the basin is in good working order. Examples of BMPs include controlling vegetation around the basin, regularly inspecting the basin to determine if maintenance is needed, and repairing any damage as soon as possible.

Infiltration basins can be large structures that contain great volumes of wastewater. To protect the safety of people and property around the infiltration basin, basins must have the physical integrity to prevent failure due to settlement, compression, or uplift. Additionally, because infiltration basins are exposed to rainfall they must be sized appropriately to accommodate wastewater discharges, precipitation, and stormwater flows directed to it.

Inspections

Inspecting the waste management system on a regular basis will help the Permittee recognize any changes in the system and identify operation and maintenance needs. This is especially true during activities that generate a large amount of wastewater such as crush and racking. Identifying and correcting problems early reduces the impact to the environment and can save the Permittee money by **not** allowing the problem to escalate. Maintaining records of inspections helps the Permittee see trends, make necessary adjustments, and plan for the future. Industry representatives recommended, and Ecology agreed, that conducting inspections at a minimum of two (2) times per year was adequate.

For discharges to an infiltration basin, the intent of the inspection is to determine if the structure is sound, if maintenance is needed, and if the freeboard is adequate.

The Winery General Permit requires Permittees to document certain information while inspecting their winemaking facility and waste management system. This information will vary depending on the discharge method used by the Permittee and should be tailored to the specific conditions and waste management strategies used at the winemaking facility.

The purpose of this requirement is to identify within the inspection report the areas of the facility that the Permittee inspected, an assessment of all BMPs, and any major observations. This assessment does **not** have to be written in paragraph form. As long as the Permittee's records identify the items inspected and the observations made, this summary can be in any format.

4.9 Special Condition S9. Residual Solid Winery Waste Management

Discharge Limits

A Permittee may store residual solid winery waste at the winemaking facility before it is used or disposed of. These stored materials can be sources of contamination either by waste liquids leaking from them or by being exposed to rainfall. The Permittee is required to manage their residual solid winery waste so that leachate does **not** enter state ground or surface water.

Best Management Practices

The requirement to collect all residual solid winery waste and dispose of it in accordance with local, state, and federal regulations, is based on section 080 of Chapter 90.48 RCW. The requirement pertains to any waste collected as a result of wastewater management at a permitted winemaking facility.

Removing residual solids that collect as a result winemaking is an excellent BMP that has multiple benefits. Solids like lees have a concentration of oxygen-demanding organic material that can make high-strength wastewater which might need to be treated before discharge, depending on the discharge method that is used. Solids can also be problematic for components in the waste management system like pumps, hoses, valves, and nozzles.

The following are examples of BMPs that could greatly reduce the amount of solids in wastewater and can lower the strength of the wastewater.

- Using screens and strainers to capture gross solids and lees.
- Using filters to remove fine solids.
- Collecting first rinses before they enter the waste management system.
- Remove the collected waste from tanks after racking.

Using BMPs to reduce the solids that enter the waste management system will reduce the amount of treatment needed, protect components of the waste management system, and aid the Permittee's efforts to protect groundwater quality.

4.10 Special Condition S10. Winery Pollution Prevention Plan

Section 035 of Chapter 90.48 RCW requires the use of all known available and reasonable treatment (or AKART) methods to prevent and control pollution of waters of the state. Ecology determined that the development of a Winery Pollution Prevention Plan (WPPP) and implementation of adequate BMPs in accordance with the general permit constitutes AKART.

The Winery Pollution Prevention Plan is one of the strongest compliance tools the Permittee has, both for complying with the Winery General Permit and for demonstrating their compliance with the general permit. For this reason, the Winery General Permit **not** only requires that the Permittee develop the WPPP, it also requires that the Permittee submit it to Ecology. Ecology does **not** review WPPPs for formal approval or denial. The Winery General Permit specifies the required elements of the WPPP. Its development and implementation is the responsibility of the Permittee. Permittees are **not** required to hire a professional to develop the WPPP.

The WPPP is a vital element of the Winery General Permit because it is a site-specific document used by the Permittee to document compliance efforts. Developing the WPPP requires that Permittees assess their facility and existing waste management practices and document their findings. Permittees must also develop strategies to comply with the general permit as well as identify resources needed and create compliance schedules.

The WPPP must be a “living” document that the Permittee continuously reviews and revises as necessary to ensure that discharges of wastewater do **not** degrade water quality. It should be developed and maintained so that it is useful to the Permittee and the people that work at the winemaking facility. Pollution prevention requires vigilance and staff participation if it is to be effective. Like maintaining safety at the site, the WPPP is more effective when it becomes part of the daily routine at the winemaking facility. The WPPP must be retained on site and available for review by Ecology.

The Winery General Permit requires that the WPPP include certain information about the winemaking facility, the waste management system, BMPs, schedules, and waste management practices. The following are examples of the required information and Ecology’s rationale for each.

- **Facility overview**

Examples of information that should be provided in this section include a description of the facility and waste management system, general production volumes, volumes and characteristics of wastewater discharges, schedules, major activities that generate wastewater, spill procedures, and contact information. The annual and monthly totals indicate the winemaking facility’s size and water efficiency and are one (1) indicator used to determine the possible impact to groundwater quality. The list of activities and what month the activity occurred indicates when activities occurred at the winemaking facility that generate wastewater. The list should include only the activities that generate a significant amount of wastewater and is **not** intended to be an exhaustive list. This information will help Ecology better understand how and when wastewater is generated at a Permitted winemaking facility.

This section must also include a list or description of filtering agents (such as diatomaceous earth or bentonite) used in the winemaking process or chemicals used to clean or maintain the winemaking facility. This is to better understand the characteristics of the wastewater, to determine the potential impacts to groundwater quality, and to identify mitigation measures to reduce those impacts.

A schematic diagram must also be included that shows the components of the waste management system from the water that enters the facility to the final discharge point. The WPPP must contain this information so that Ecology staff, especially inspectors, understand the processes and activities that affect the generation and management of wastewater at the winemaking facility.

The Winery General Permit also requires that all Permittees except those that discharge to a WWTP, include information about existing site conditions at the winemaking facility such as depth to ground water, total acreage, existing vegetation, soil type, and drainage patterns. This information is useful because it provides details about how water moves on and through the land surrounding the winemaking facility. This information can be obtained from local agencies that regulate development and construction, or from an engineer involved in the construction or installation of a structure, utilities, or treatment system, for example, a building, lagoon, or septic system.

- **Information about omitted or alternative BMPs**

This information will help Ecology better understand which BMPs do **not** work and why, and identify more effective BMPs. This information could help improve the Winemaking General Permit in future permit cycles.

- **Confirmation that the Permittee reviewed the WPPP**

The WPPP is intended to be a living document that accurately reflects the winemaking facility and current waste management practices, activities, and BMPs. The Winery General Permit requires that the Permittee review the WPPP at least once per year and update it if it does **not** accurately reflect the facility and practices.

- **Information about adaptive management actions**

The Winery General Permit requires a Permittee to implement adaptive management actions if a benchmark was exceeded. A Permittee must include a summary of the adaptive management action in the WPPP. Including this information in the WPPP is one way for a Permittee to demonstrate they complied with this requirement.

- **Basic information about wastewater discharges as irrigation to managed vegetation**

A Permittee that uses the discharge method involving discharging wastewater as irrigation to managed vegetation, is required to include certain information about that discharge method in their WPPP. This information indicates how and when wastewater is discharged via this discharge method and is one (1) indicator used to determine the possible impacts to groundwater quality.

- **Storage/discharge operations**

Examples of information that should be provided in this section include a description of discharge practices under normal and non-routine conditions, a description of how benchmarks will be adhered to, a description of pretreatment methods, instructions for the operation and maintenance of the storage/discharge methods used at the facility, and BMP records. This section must also include specific information about the design, use, and maintenance of each storage/discharge method used at the winemaking facility. The WPPP must contain this information so that Ecology staff, especially inspectors, understand how wastewater is stored and discharged at the winemaking facility.

- **Map**

The WPPP must include a map of the winemaking facility that clearly identifies important aspects of the facility such as property boundary lines, buildings, roadways, drains, structures related to the storage and discharge of wastewater, and sensitive areas like surface waterbodies and wellhead protection areas. The map should be drawn to scale or include relative, or approximate, distances between significant structures and features of the waste management system. This can help Permittees and Ecology inspectors track spills and determine their discharge quantities. Ecology does **not** intend for Permittees to hire surveyors to determine distances or to create the scaled map. The WPPP must contain this information so that Ecology staff, especially inspectors, know the location of wastewater generation, storage, management, and discharges. Permittees may use maps required by other agencies or for other purposes as long as they meet the requirements of the Winery General Permit.

- **Sampling plan**

Examples of information that should be provided in this section include contact information of the person responsible for conducting sampling, sampling locations, procedures for sample collection and handling, a list of the required pollutants for analysis and instructions for each, and the results of all samples analyzed. The WPPP must contain this information so that the Permittee knows how to comply with the sampling requirements of the Winery General Permit. Storing this helpful information in one place will aid the Permittee when conducting the required wastewater sample analysis.

- **Exported wastewater**

This section must include information about every time wastewater is hauled off site to a treatment facility, and **not** discharged through an approved discharged method. Examples of the information that must be provided include the date of the export, the destination of the wastewater, contact information for the entity that hauled the wastewater, and contact information for the entity that is treating and disposing of the wastewater. The WPPP must contain this information so the Permittee has record of every time wastewater is hauled to an offsite treatment facility. This does **not** refer to winemaking facilities that discharge wastewater to a WWTP through the sanitary sewer system.

- **Adaptive management actions**

This section must include information about every time a benchmark is exceeded. Examples of the information that must be provided include the benchmark that was exceeded, a

description of the cause of the exceedance, a description of the adaptive management action taken, and a timeline of events. The WPPP must contain this information so the Permittee has record of every exceedance, how the exceedance was corrected, and how it will be avoided in the future.

- **Recordkeeping**

The Permittee is required to maintain on site all documents necessary to demonstrate compliance with the Winery General Permit. The Permittee is **not** required to store all documents in the WPPP, however, they may. The WPPP is a convenient location for compliance documents because they will be in one place and can be easily found by employees and regulators. The WPPP is **not** required to be a physical document such as a binder, but may be stored electronically. Even though **not** all documents must be stored in the WPPP, there are some that must be in the WPPP. Examples of these documents include a copy of the Permittee's application for coverage (also called a Notice of Intent of NOI) and sampling, inspection, and training records.

4.11 Special Condition S11. Domestic Sewage

Domestic sewage is used water from residences and institutions that carries bodily wastes (primarily feces and urine), washing water, food preparation wastes, laundry wastes, and other waste products of normal living. Domestic sewage is a primary source of pathogens (disease-causing microorganisms) and putrescible organic material which can pose a direct threat to public health if **not** treated appropriately. According to the EPA, exposure to untreated domestic sewage causes illness for approximately seven (7) million people each year, 7% of which become severely or fatally ill.

Domestic sewage is treated by a series of physical, chemical, and biological processes to remove the contaminants and make it environmentally safe. In many cities, domestic sewage is treated at a wastewater treatment plant and then discharged to land (ground water) or to surface waterbodies like rivers or oceans. About 25% of the population in North America uses onsite sanitary septic systems to treat their domestic sewage.

Because many winemaking facilities are located next to vineyards away from cities and wastewater treatment plants, they have onsite sanitary septic systems that treat their domestic sewage. Some of these facilities do **not** have systems designed to treat their wastewater separate from their domestic sewage so these waste streams are commingled and treated together.

Treating commingled waste streams can be problematic because waste streams vary in strength, pollutants, and volumes, and each has its own set of treatment challenges. Human waste contains human pathogens that require a higher level of disinfection than industrial process wastewater and could require a higher assurance against failure.

Because of these treatment challenges, new facilities and existing facilities that discharge wastewater to any of the following discharge methods must **not** commingle their wastewater with domestic sewage. In other words, wastewater (winery process wastewater) must **not** contact domestic sewage before it is treated. Domestic sewage discharged via any of these discharge

methods will **not** receive the appropriate treatment, specifically disinfection, and could cause a threat to public health.

- Discharges of wastewater as irrigation to managed vegetation.
- Discharges of wastewater to a lagoon or aboveground liquid storage structure.
- Discharges of wastewater as road dust abatement.
- Discharges of wastewater to an infiltration basin.

Numerous winemaking facilities in Washington currently discharge wastewater (winery process wastewater) to an onsite sanitary septic system that also treats their domestic sewage. Ecology recognizes that requiring these winemaking facilities to separate their waste streams could cause a financial hardship and, therefore, is **not** requiring these waste streams to be separated during this permit cycle. However, the Winery General Permit **does** require that Permittees discharging to an existing subsurface infiltration system conduct an assessment of that system. Ecology determined that requiring an assessment of each existing subsurface infiltration system is an acceptable method to figure out how effectively these systems treat wastewater and determine if these waste streams should be separated in the future.

New winemaking facilities may discharge wastewater (winery process wastewater) and domestic sewage to the same subsurface infiltration system as long as it is designed to treat both waste streams and the jurisdictional health department is consulted.

4.12 Special Condition S12. Recordkeeping

Collecting data, documenting waste management practices, and recording efforts are excellent ways to **not** only track progress but to also demonstrate everything that has been done to comply with the Winery General Permit and to protect groundwater quality.

The recordkeeping requirements in the Winery General Permit are based on state authorities, which allow Ecology to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges. (RCW 90.48, WAC 173-226-090 and WAC 173-226-180) Keeping records provides practical measures that allow the Permittee, public, and Ecology to assess compliance with the requirements of the general permit.

General Recordkeeping Requirements

Permittees must keep all records and documents required by the general permit for five (5) years. If there is any unresolved litigation regarding the discharge of pollutants by the Permittee, they must extend the period of record retention through the course of the litigation. (WAC 173-226-190)

Ecology Access to Records

Members of the public are welcome to request copies of records from Ecology, including copies of the WPPP. A member of the public may request a copy of a Permittee's initial WPPP from Ecology, but this version is likely to become out of date soon after submittal to Ecology. The Winery General Permit provides the following three (3) options for public access to the most current version of a Permittee's records, including their WPPP.

1. The Permittee may send the WPPP directly to the requester.
2. The Permittee may allow the requester to view the WPPP at an agreed upon location.
3. The Permittee may send the WPPP to Ecology so that Ecology can provide the document to the requester.

This condition does **not** require the Permittee to provide the requester with access to their operation nor does it authorize the requester to enter the Permittee's operation.

Reports and records that are required to be submitted to Ecology are available from Ecology either through the public facing permit database (PARIS) once uploaded or upon public disclosure request.

4.13 Special Condition S13. Reporting

Section 090 of Chapter 173-226 WAC provides Ecology the authority to specify any appropriate reporting requirements to prevent and control waste discharges. The following is a brief discussion of the reporting requirements of the Winery General Permit.

Discharge Monitoring Reports

The Winery General Permit requires that a Permittee submit monitoring data to Ecology on a regular basis, approximately forty (40) calendar days after the last day in each DMR collection period. Permittees in Group 1 and Group 2 have four (4) DMR collection periods each year.

Each DMR collection period will include 3 months of monitoring wastewater flow. Depending on the discharge method used by the Permittee, each DMR collection period could include one (1) month of sampling wastewater

The monitoring data must include wastewater flow information and the results of the required wastewater discharge sample analysis (as applicable). This information is used to:

- Determine possible impacts to ground water.
- Determine compliance with the Winery General Permit.
- Inform future revisions to the general permit.

Additionally, if a Permittee conducts wastewater monitoring/sampling more frequently than required or analyzes a parameter **not** required, then the results must be reported to Ecology. The intent of this requirement is to have all valid data used in any calculation and reporting. This requirement originates in 40 CFR 122.41(l)(4)(ii) and is addressed in WAC 173-226-090.

Winery Pollution Prevention Plan

The Winery General Permit requires Permittees to submit the WPPP to Ecology by the end of the second year after they receive permit coverage. This provides Ecology with baseline information for determining permit compliance and helps assess the state of the industry for future permit cycles. It also ensures that the WPPP's are completed within the specified time frame. Ecology reviews WPPPs for completeness. Permittees are **not** required to submit revised versions of the WPPP to Ecology unless directed by Ecology to do so.

Additional Reporting

Ecology may require the Permittee to report additional information as Ecology deems necessary. (WAC 173-226-090) In addition to monitoring results and the WPPP, the Winery General Permit also requires the Permittee report the following information.

Reporting Noncompliance and Spills

Section 180 of Chapter 173-226 WAC authorizes Ecology to establish permit conditions as necessary to achieve compliance with water quality standards, discharge limits, and other permit requirements. The Winery General Permit requires that Permittees report instances of noncompliance to Ecology within twenty-four (24) hours of becoming aware of an instance of noncompliance (e.g., unauthorized discharge) and follow up with a written report within five (5) days. This type of reporting provides practical measures that allow the Permittee, the public, and Ecology to assess noncompliance with the requirements of the general permit and potential impacts to waters of the state.

The Winery General Permit requires that Permittees report to Ecology in the event of a spill of oil or hazardous materials, in accordance with RCW 90.56.280 and WAC 173-303-145. The Permittee must be prepared to mitigate for any potential hazardous spills and, in the event of a spill, perform the necessary cleanup. This requirement is intended to provide protection to the public and the environment by notifying regulating authorities.

How to Submit Documents to Ecology

Ecology is transitioning to an online system for permit administration. All information and reports required by the Winery General Permit must be submitted electronically.

The online system is expected to save time and resources for Permittees and Ecology (e.g., eliminating paperwork, data entry workload, database errors) while improving compliance and protection of water quality. It will also enhance transparency and public accountability, and provide a more consistent reporting framework for all Permittees.

If a Permittee is unable to submit information or reports electronically (for example, they do **not** have access to the internet), they must submit an Electronic Reporting Waiver form to Ecology. The Electronic Reporting Waiver allows a paper submittal option for certain small businesses that may **not** be able to use the online system.

Confidential Business Information

By law, information that is required to be submitted to Ecology by a permit is available to the public. This is necessary because it allows the public to determine if a facility is in compliance with its permit. Certain exceptions apply.

Confidential business information may be requested for certain types of information under RCW 43.21A.160. Confidentiality does **not** extend to discharges or to information which would be detrimental to the public interest if withheld.

The information gathered to comply with the Winery General Permit is necessary to determine compliance with permit conditions. It is also related to the management of the wastewater generated by a facility covered by the general permit. Withholding such information would be detrimental to the public interest. Because of this, the information required to be submitted to Ecology by either the general permit or included in the permit application, is **not** confidential business information.

4.14 Special Condition S14. Applying for Permit Coverage

Section 200 of Chapter 173-226 WAC explains the application process to obtain coverage under a general permit as well as public notice requirements, SEPA compliance, and the effective date of coverage.

There are some differences in application requirements for new facilities versus existing facilities. A new facility is a facility that begins activities that result in a discharge, or a potential discharge to waters of the state, on or **after** the effective date of this general permit. An existing facility is a facility that begins activities that result in a discharge, or a potential discharge to waters of the state, **before** the effective date of this general permit. A change in the ownership of an existing winemaking facility does **not** make it a new facility.

New Facility

The Winery General Permit requires the owner/operator of a new facility to submit their application for coverage at least sixty (60) days before discharging to waters of the state (RCW 90.48.170). Permit applicants who build a facility and begin operation after the issuance date of the general permit must provide notice to the public by publishing their permit application in a newspaper of general circulation (WAC 173-226-130). Ecology must receive the complete application for permit coverage on or before the second date of publication. Ecology considers a newspaper of general circulation to be a major newspaper publication for a region.

The public has the opportunity to comment on the applicability of the general permit and the application for coverage under the general permit during the thirty (30) days after publication of the second public notice (public comment period). Ecology will consider comments received about the applicability or non-applicability of the general permit to the proposed activity. If Ecology does **not** receive any substantive comments, permit coverage may be issued on the 38th day (at the earliest) following receipt of a complete application. According to section 190 of Chapter 173-226 WAC, the public has the right to appeal coverage decisions.

In addition, the owner/operator of a new facility must demonstrate compliance with SEPA as part of project authorization and approval before permit coverage can be authorized. (Chapter 43.21C RCW, Chapter 197-11 WAC) The SEPA process identifies and analyzes environmental impacts from governmental decisions, including those decisions related to new construction and the retrofit of existing facilities. Since the applicant is required to have permit coverage before they are authorized to discharge wastewater from an operating site, applicants should allow more time than sixty (60) days prior to discharging wastewater from the facility.

An official who has signature authority for the entity apply for coverage under the general permit must sign all documents. (WAC 173-226-200)

Existing Facility

The Winery General Permit requires the owner/operator of an existing facility to apply for permit coverage within ninety (90) days following the effective date of the general permit. (WAC 173-226-200)

State law exempts the issuance, reissuance, or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are **no** less stringent than federal and state rules and regulations (RCW 43.21C.0383 and WAC 197-11-855). This exemption applies only to existing discharges, **not** to new discharges.

In addition, the owner/operator of an existing facility that applies for coverage under the Winery General Permit within the timeframe established in Special Condition 1B of the general permit does **not** need to provide public notice of their permit application. Public notice requirements are satisfied by the development and issuance of the Winery General Permit.

However, WAC 173-226-130 requires the owner/operator of a facility under permit that are increasing or altering their discharge, to notify the public of their intent in a newspaper of general circulation within the geographical area of the change in discharge. Therefore, the owner/operator of an existing facility is subject to the public notice requirement if they increase or alter their discharge.

An official who has signature authority for the entity apply for coverage under the general permit must sign all documents. (WAC 173-226-200)

4.15 Special Condition S15. Permit Administration

Modification of Permit Coverage

In order to implement the general permit, Ecology needs to be aware of the types of discharges at the permitted winemaking facility. If a Permittee wants to implement a significant process change, they must apply to modify their permit coverage by submitting a new application for coverage to Ecology. Permit modification also requires SEPA compliance. An additional SEPA review may be necessary if the proposed change falls outside of the scope of the initial SEPA evaluation.

A significant process change is any modification of the facility that would change the characteristics of the discharge, including changing the volume and type or concentrations of pollutants, or include for coverage a new activity that was **not** previously covered. Examples of a significant process change that could impact the quality or quantity of the waste discharge include:

- Adding, removing, or revising authorized activities listed in the application for coverage.
- Adding, removing, or revising a discharge to ground water or to a WWTP.
- Adding a new type of storage or discharge method.
- Changing the land where wastewater is applied.
- Changing the volume of wastewater discharged by 25% or more than the volume indicated on the application for coverage.

How to Renew Permit Coverage

General permits are typically revised every five (5) years. In order to continue their coverage under the revised general permit, Permittees must submit a renewal application to Ecology at least one hundred eighty (180) days before the current version of the general permit expires (WAC 173-226-220). Coverage under an expired general permit for Permittees who fail to submit a timely and sufficient application will expire on the expiration date of the general permit. Ecology will consider any Permittee that does **not** reapply for coverage as a new applicant.

How to Transfer Permit Coverage

Section 210 of Chapter 173-226 WAC explains the process for transferring permit coverage from one party to another party. Transfer of permit coverage may occur when the ownership of a winemaking facility covered by the general permit is transferred to the new owner. The old owner and the new owner must sign and submit a Transfer of Coverage Form to Ecology. Once the signed Transfer of Coverage Form is submitted to Ecology, the new owner becomes the Permittee and accepts all responsibility to comply with the terms and conditions of the general permit as well as liability and permit fees. The Permittee must pay the permit fees assessed by Ecology, as established by Chapter 173-224 WAC and RCW 90.48.465(1), unless coverage is terminated or revoked.

How to Terminate Permit Coverage

Section 160 of Chapter 90.48 RCW requires the owner/operator of a commercial or industrial facility to have a permit if they discharge waste materials to waters of the state. The owner/operator of a facility with coverage under the Winery General Permit must comply with the terms and conditions of the general permit unless they terminate or transfers coverage to a new Permittee. In order to terminate coverage, the Permittee must demonstrate that they **no** longer have a discharge and submit a completed Notice of Termination form to Ecology. Requiring a demonstration that there is **no** longer a discharge ensures that facilities that discharge remain covered under permit (WAC 173-226-230).

4.16 General Conditions

General Conditions in the Winery General Permit are based directly on state law and regulations that have been standardized for general permits issued by Ecology.

5.0 PUBLIC INVOLVEMENT

5.1 Public Comment Periods

Ecology offers two periods for the public to provide comment on the draft Winery General Permit. The first was the informal public comment period that began on April 11, 2017, and ended at 11:59 p.m. on June 11, 2017. The second opportunity for the public to provide comments began on November 1, 2017, when Ecology released the formal draft of the Winery General Permit, and will end at 11:59 p.m. on February 14, 2018.

During the formal public comment period, the public may provide comments in the following ways.

- At one (1) of the four (4) **public hearings**. More information about the public hearings are included in Section 5.2 (below).
- **Online via the e-Comment form:** <http://ws.ecology.commentinput.com/?id=A5JiF>
- **Mail**, addressed to: Stacey Callaway
Water Quality Program
Department of Ecology
PO Box 47696
Olympia, WA 98504-7696

In order for Ecology to adequately address comments, please include the following information with each comment.

- The specific permit language used in the requirement subject to the comment. Include the page number(s) and, where indicated, section reference (e.g., S1.A.1).
- A brief, concise comment including the basis for the comment, and in particular the administrative, legal, technical, or other basis for the concern.
- Suggested permit language or a conceptual alternative to address the concern.

Ecology is required to provide the following documents to the public for review before issuing a final general permit. (WAC 173-226-130)

- Draft General Permit
- Fact Sheet
- Application for coverage (Notice of Intent or NOI)
- Economic Impact Analysis (EIA)

The documents listed above are available for review during this formal public comment period at Ecology headquarters and regional offices, and on Ecology's website (www.ecology.wa.gov/winerypermit). The public has approximately one-hundred (100) days to review and provide comments. Once the public comment period closes, Ecology will summarize and respond to comments received during the public comment period and will include the responses and the comments in **Appendix D – Response to Comments** in this Fact Sheet. Public comments may cause Ecology to revise requirements in the general permit.

5.2 Public Workshops and Hearings

Ecology will host public workshops and public hearings on the formal draft of the Winery General Permit. The public workshops for the formal draft of the Winery General Permit provide Ecology an opportunity to explain the revisions made to the preliminary draft in response to public comment and to answer questions. Each workshop will immediately be followed by a public hearing. The public hearings provide an opportunity for the public to formally comment on the formal draft of the Winery General Permit the associated Fact Sheet, and the Economic Impact Analysis.

Ecology will host four (4) public workshops and public hearings; two (2) will be offered via webinar, one (1) will be held in western Washington, and one (1) will be held in eastern Washington. Information about the workshops and hearings is included below.

Wednesday January 24, 2018 at 10:30 a.m.

Ecology is offering this hearing via webinar². To join the webinar, click on the following link for more information and instructions.

[Register for the morning webinar](#)

Wednesday January 24, 2018 at 6:00 p.m.

Ecology is offering this hearing via webinar¹. To join the webinar, click on the following link for more information and instructions.

[Register for the evening webinar](#)

Tuesday January 30, 2018 at 10:30 a.m.

Benton County PUD - Prosser
250 Gap Rd
Prosser, WA 99336

Friday February 2, 2018 at 1:30 p.m.

South Bellevue Community Center
14509 SE Newport Way
Bellevue, WA 98006

5.3 Issuance of the Final General Permit

The final decision on permit issuance will be made after Ecology receives and considers all public comments. If public comments cause a substantial change in the permit conditions from the original draft permit, another public notice of draft and comment period may ensue. Ecology expects to issue the general permit in the summer of 2018.

Ecology will append the final Fact Sheet for the general permit with a summary of a response to comments on the formal draft of the Winery General Permit (Appendix D). Parties submitting comments will receive a notice on how to obtain copies of the final general permit and Ecology's response to comments.

² Webinars are an online meeting forum that you can attend from any computer using internet access.

6.0 GENERAL PERMIT TIMELINE

Ecology expects to issue the Winery General Permit in the summer of 2018. However, the effective date of the Winery General Permit is July 2019, a full year after the issuance date. This delay is due to the anticipated adjustment of the permit fees in Chapter 173-224 WAC. The permit fees for the Winery General Permit were first adopted in November of 2015. Feedback from stakeholders indicated that the fee categories did **not** accurately represent the winemaking industry so Ecology decided to adjust the fees the next time Chapter 173-224 WAC was revised. This rule revision occurred in early 2017 but did **not** allow enough time for representatives of the winemaking industry to provide input to Ecology. Ecology’s solution was to delay the fee adjustment until 2019 when Chapter 173-224 WAC would be revised.

Table 12 – Overview of the Winery General Permit Timeline provides a rough overview of when certain permit conditions take effect. This table does **not** include all permit conditions and may need to be adjusted depending on when the owner/operator of a winemaking facility receives permit coverage. The timeline is subject to change if the Winery General Permit is **not** issued at the currently planned time of the summer of 2018.

Table 12
Overview of the Winery General Permit Timeline

Timeframe		Action
2018	Summer	Issuance of the Winery General Permit
		Individuals required to apply for coverage MAY apply
2019	July	Winery General Permit is effective
		Individuals required to apply for coverage MUST apply
	October	Application deadline for individuals required to apply for coverage
		Set up the WQWebDMR account
		Monitor wastewater volumes, analyze samples, submit data to Ecology, until permit coverage is terminated
2020		Continue to submit monitoring data to Ecology
2021		Continue to submit monitoring data to Ecology
		Submit the WPPP to Ecology
		Comply with benchmarks (as appropriate), until your permit coverage is terminated.
		Existing facilities discharging to a lagoon or subsurface infiltration system, submit their assessment to Ecology

Timeframe		Action
2022		Continue to submit monitoring data to Ecology
2023		Continue to submit monitoring data to Ecology
	December	Deadline to reapply to continue coverage under the Winery General Permit
2024		Continue to submit monitoring data to Ecology

The timeline in Table 12 more closely represents the compliance timeline for an existing facility. Some of the requirements in the Winery General Permit take effect once a new facility receives permit coverage, whereas an existing facility is given a grace period to prepare and make adjustments to their practices and facility before the requirement takes effect. This grace period along with the delayed effective date of the Winery General Permit should provide ample time for existing facilities to prepare for compliance.

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7.0 OVERVIEW OF REQUIRED INFORMATION

Table 13 – Information Required by the Winery General Permit provide an overview of the information required by the Winery General Permit and reasons why the information is needed. This is intended to be an overview and **not** an exhaustive list.

Table 13
Information Required by the Winery General Permit

Requirement	Submit to Ecology?	Retain on Site?	Reason for the Requirement
Application for coverage	Yes	Yes	Applicant to submit information about their winemaking facility and their compliance strategy.
Adaptive management actions	Yes	Yes	Permittees to document exceedances of benchmarks and their actions to correct the problem.
Flow monitoring	Yes	Yes	Permittees to track the amount of wastewater they discharge. Ecology to verify group determination. Ecology to verify compliance with benchmarks (loading rates).
Monitoring device calibrations	No	Yes	Permittees to verify and demonstrate that devices are working correctly.
Sample analysis	Yes	Yes	Permittees know the characteristics of the wastewater. Ecology to verify compliance with benchmarks.
Laboratory information	No	Yes	Permittees to demonstrate that the laboratory and analysis requirements are being met.
Inspection records	No	Yes	Permittees to determine if wastewater is being managed in compliance with the general permit.

Department of Ecology
Fact Sheet for the Winery General Permit

Requirement	Submit to Ecology?	Retain on Site?	Reason for the Requirement
Training records	No	Yes	Permittees to demonstrate that necessary staff are informed about proper waste management practices.
Best management practices	No	Yes	Permittees to track practices and tools they use to properly manage their waste.
Winery Pollution Prevention Plan	Yes	Yes	Permittees to demonstrate compliance with the general permit. Permittees to store compliance documents. Permittees to inform waste management practices and decisions. Ecology to verify it was developed and to learn about Permittee’s waste management practices. Ecology to learn about the Permittee’s waste management practices.
Exported winery waste	No	Yes	Permittees to track the export of residual solid winery waste.
Reporting to WWTPs	No	Yes	Permittees to know how to contact their WWTP in case of an emergency.
Spills reporting	No	Yes	Permittees to know who to contact in the event of a spill.
Lagoon Assessment	Yes	Yes	Ecology and Permittees to know if lagoons leak. This will inform future permit revisions.
Subsurface infiltration system assessment	Yes	Yes	Ecology and Permittees to know if existing subsurface infiltration systems effectively treat wastewater. This will inform future permit revisions.

8.0 ECONOMIC IMPACT ANALYSIS

The Economic Impact Analysis will be included for the issuance of the Winery General Permit.

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APPENDIX A

General Permit Applicability Flow Diagram

Use this flow diagram to determine if you must apply for coverage under the Winery General Permit

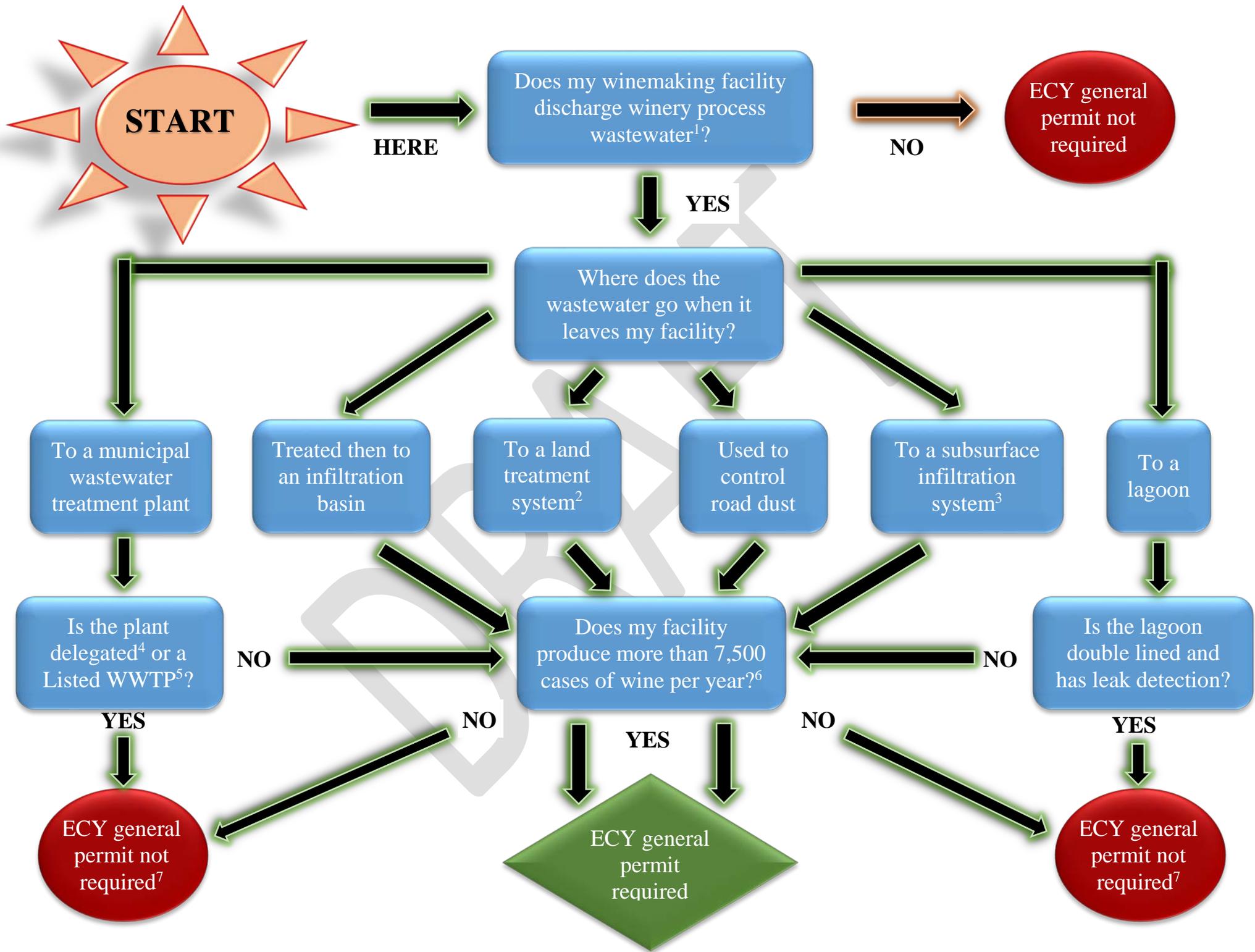
Directions

1. Start at the orange sun in the upper left-hand corner of the diagram.
2. Answer the question, “Does my winemaking facility discharge winery process wastewater?”.
 - a. If your winemaking facility does **not** discharge winery process wastewater, you do **not** need to apply for coverage under the Winery General Permit.
 - b. If your winemaking facility discharges winery process wastewater, go to bullet 3.
3. Answer the question, “Where does the wastewater go when it leaves my facility?”.
 - a. If the wastewater is discharged to a municipal wastewater treatment plant, go to bullet 3.a.i.
 - i. Answer the question, “Is the wastewater treatment plant delegated or a Listed WWTP?”. A list of Washington’s delegated municipal wastewater treatment plants is available on Ecology’s webpage:
(<http://www.ecy.wa.gov/programs/wq/permits/winery/faqs.html>). The names of the Listed WWTPs are included in the Winery General Permit.
 - A. If wastewater is discharged to a delegated municipal wastewater treatment plant, you do **not** need to apply for coverage under the Winery General Permit.
 - B. If wastewater is discharged to a Listed WWTP, you do **not** need to apply for coverage under the Winery General Permit.
 - C. If wastewater is discharged to a wastewater treatment plant that is **not** delegated and is **not** a Listed WWTP, go to bullet 4.
 - b. If the wastewater is treated and then discharged to an infiltration basin, go to bullet 4.
 - c. If the wastewater is discharged to a land treatment system, go to bullet 4.
 - d. If the wastewater is used to control road dust, go to bullet 4.
 - e. If the wastewater is discharged to a subsurface infiltration system, go to bullet 4.
 - f. If the wastewater is discharged to a lagoon, go to bullet 3.f.i.
 - i. Answer the question, “Is the lagoon double lined and has leak detection?”.
 - A. If wastewater is discharged to a lagoon that is double lined and has leak detection, you do **not** need to apply for coverage under the Winery General Permit.
 - B. If wastewater is discharged to a lagoon that is **not** double lined and does **not** have leak detection, go to bullet 4.
 4. Answer the question, “Does my facility produce more than 7,500 cases of wine per year?”.
 - a. If your facility does **not** produce more than 7,500 cases of wine per year, you do **not** need to apply for coverage under the Winery General Permit.

- b. If your facility produces more than 7,500 cases of wine per year, you are required to apply for coverage under the Winery General Permit.

Notes

1. Winery process wastewater = Also referred to as “wastewater”. It is the waste generated during the processing of wine. Wastewater is primarily generated during the cleaning of winemaking equipment and facilities. Examples include bottle and barrel rinse water, equipment/floor wash water, lees, and byproducts of the winemaking process. Winery waste does **not** include waste produced by agricultural operations associated with the growing of fruit or domestic sewage.
2. Land treatment system = Also referred to as “discharged as irrigation to managed vegetation”. It is the controlled application of wastewater to irrigation lands for treatment. Irrigation to managed vegetation includes discharging to crops, landscaped areas, or other vegetated areas as long as the vegetation is healthy and maintained.
3. Subsurface infiltration system = An onsite system that treats wastewater (winery process wastewater) before discharging it to a drainfield where additional treatment occurs. The subsurface infiltration system includes the system that treats the wastewater and the drainfield. A subsurface infiltration system constructed before the effective date of the general permit may be designed to treat wastewater (winery process wastewater) or may **not** be (an example is a septic system designed to treat domestic sewage).
4. Delegated = A municipal wastewater treatment plant which has been granted permitting approval by Ecology because they administer a pretreatment program that meets the criteria established in 40 CFR, parts 403.8 and 403.9. Permittees that discharge to a delegated municipal wastewater treatment plant do **not** need a permit from Ecology for those discharges, but will be permitted by the actual municipal wastewater treatment plant.
5. Listed WWTP = A wastewater treatment plant (WWTP) that was approved from Ecology so that winemaking facilities that discharge to it are not required to be covered by the Winery General Permit.
6. A winemaking facility may not be required to apply for coverage under the Winery General Permit if they produce less than 7,500 cases of wine/juice per year (17,835 gallons of wine/juice per year) or discharge less than 53,505 gallons of winery process wastewater per year.
7. If Ecology determines that a winemaking facility is a Significant Contributor of Pollutants or a Significant Industrial User, then Ecology may require them to apply for coverage under the Winery General Permit.



APPENDIX B

Technical Calculations

Equations

$$\text{Loading (lbs)} = \text{Concentration(mg/L)} \times \text{Volume (million gallons)} \times 8.34 \left(\frac{\text{lbs}}{\text{gallon}} \right)$$

Example Calculation

Example flow and number of days discharged during Quarter 3.

Month	Total Monthly Flow (gallons)	# Days Discharged
July	50,000	10
August	40,000	10
September	125,000	15
Quarterly Total =	215,000	35

1. Assume the BOD₅ concentration for the sample collected that quarter was 1,000 mg/L.

$$\text{Total BOD loading} = (215,000 \text{ gallons}) \times (1,000 \left(\frac{\text{mg}}{\text{L}} \right)) \times (8.34 \left(\frac{\text{lbs}}{\text{gallon}} \right)) \times (1/1,000,000)$$

$$\text{Total BOD loading} = 1,769.45 \text{ lbs of BOD}$$

2. Assume the facility has one irrigation field of 10 acres. The lbs/acre/day loading is calculated as follows.

$$\text{BOD quarterly average loading} = \frac{(1,769.45 \text{ lbs})}{(10 \text{ acres})} / (35 \text{ days of discharge})$$

$$\text{BOD quarterly average loading} = 5.1 \frac{\text{lbs}}{\text{acre}} / \text{day}$$

3. The BOD quarterly average loading will be compared against the weekly average benchmark in the Winery General Permit to determine compliance.

Calculations for Table 7 and Table 10 in the Winery General Permit are included in the following pages.

**Table 7 of the Winery General Permit
 Calculations (Land Treatment)**

Based on a weekly average load of: 75.0 pounds of BOD per acre per day
 25.9 pounds of TOC per acre per day
 -or- a total weekly load of: 525.0 pounds of BOD per week
 181.0 pounds of TOC per week

Wastewater generated during crush discharged during crush:

Assume BOD concentration of: 10,000 milligram per liter (mg/L)
 TOC concentration of: 3,448 mg/L
 # of irrigation acres: 1 acre
 Volume: 6,295 total gallons per acre per week

Maximum Application Rate (gallons per application)	Maximum Application Frequency (number per week)	
6,295	1	(total gallons/1)
3,147	2	(total gallons/2)
2,098	3	(total gallons/3)
1,574	4	(total gallons/4)

Wastewater generated before or after crush:

Assume BOD concentration of: 2,800 milligram per liter (mg/L)
 TOC concentration of: 966 mg/L
 # of irrigation acres: 1 acre
 Volume: 22,482 total gallons per acre per week

Maximum Application Rate (gallons per application)	Maximum Application Frequency (number per week)	
22,482	1	(total gallons/1)
11,241	2	(total gallons/2)
7,494	3	(total gallons/3)
5,621	4	(total gallons/4)

**Table 10 of the Winery General Permit
 Calculations (Road Dust Abatement)**

Based on a weekly average load of: 10.0 pounds of BOD per acre per day
 3.4 pounds of TOC per acre per day
 -or- a total weekly load of: 70.0 pounds of BOD per week
 24.1 pounds of TOC per week

Wastewater generated during crush discharged during crush:

Assume BOD concentration of: 10,000 milligram per liter (mg/L)
 TOC concentration of: 3,448 mg/L
 # of irrigation acres: 1 acre
 Volume: 839 total gallons per acre per week

Maximum Application Rate (gallons per application)	Maximum Application Frequency (number per week)	
839	1	(total gallons/1)
420	2	(total gallons/2)
280	3	(total gallons/3)
210	4	(total gallons/4)
120	7	(total gallons/7)

Wastewater generated before or after crush:

Assume BOD concentration of: 2,800 milligram per liter (mg/L)
 TOC concentration of: 966 mg/L
 # of irrigation acres: 1 acre
 Volume: 2,998 total gallons per acre per week

Maximum Application Rate (gallons per application)	Maximum Application Frequency (number per week)	
2,998	1	(total gallons/1)
1,499	2	(total gallons/2)
999	3	(total gallons/3)
749	4	(total gallons/4)
428	7	(total gallons/7)

APPENDIX C

Bibliography

General

1. Chapman, Jeanette, Phillip Baker, and Sabina Wills. Winery Wastewater Handbook. Broadview, South Australia: Winetitles Pty Ltd, 2001. [Classification: 11]
2. Chapman, Dr. Jeanette, Eco Management Services Pty Ltd, Land Energy Pty Ltd, ARUP Water. Water Quality Risk Assessment Study of Winery and Ancillary Developments in the Mount Lofty Ranges Watershed. Blackwood, South Australia: Eco Management Services Pty Ltd, 2003. [Classification: 11]
3. Day, Peter, et al. Winery Wastewater Management & Recycling. Adelaide, South Australia: Grape and Wine Research and Development Corporation, 2011. [Classification: 11]
4. Doran, Michael D. Wastewater and Wastewater Treatment Very Basics. Michael Doran Techknowledge, LLC. https://ay14-15.moodle.wisc.edu/prod/pluginfile.php/172679/mod_resource/content/4/WastewaterVeryBasics.pdf. Web. October 2008. [Classification: 11]
5. EPA Guidelines for Wineries and Distilleries. Adelaide, South Australia: Environment Protection Authority, 2004. [Classification: 11]
6. Goode, Jamie. How Wine is Made. Wine Anorak. <http://www.wineanorak.com/howwineismade.htm>. Web. October 16, 2016. [Classification: 11]
7. Guidance Manual for Developing Best Management Practices (BMPs). United State Environmental Protection Agency. 1993. [Classification: 11]
8. Kennedy/Jenks Consultants. The Wine Institute Comprehensive Guide to Sustainable Management of Winery Water and Associated Energy. California: Kennedy/Jenks Consultants, 2008. [Classification: 11]
9. Kiley, Christie. Winemaking: A Quick Overview of the Process & Equipment. Wine Cooler Direct. <http://learn.winecoolerdirect.com/winemaking-overview/>. June 27, 2014. Web. October 6, 2016. [Classification: 11]
10. Morris, Justin R. Considerations for Starting a Winery. Fayetteville, Arkansas: Division of Agriculture, University of Arkansas System, 2008. [Classification: 11]
11. Oakley Water Strategies, Napa Sanitation District. Winery Waste Management – Technical Memorandum. Napa, California: Oakley Water Strategies, 2009. [Classification: 11]

12. Primer for Municipal Wastewater Treatment Systems. Washington DC: United States Environmental Protection Agency, 2004. [Classification: 11]
13. Stamp, Chris. The Dollars and Sense of Starting a Small Winery. Ohio Wine Producers Association. http://www.ohiowines.org/winery_starter_kit.shtml. Web. August 26, 2016. [Classification: 11]
14. United States Internal Revenue Service. The Wine Industry Audit Technique Guide. Washington DC: United States Internal Revenue Service; March 2011. [Classification: 11]
15. Winemaking Definitions. Winemaker Magazine. <https://winemakermag.com/winemaking-definitions>. Web. April 15, 2016. [Classification: 11]
16. Zoecklein, Dr. Bruce. Winery Wastewater. Blacksburg, Virginia: Wine/Enology Grape Chemistry Group at VA Tech, 2010. [Classification: 11]

Washington Wine Industry

17. Becker, Paul. Schanno Family Plants the First Wine Grapes in the Yakima Valley Near Union Gap in 1869. Historylink. <http://www.historylink.org/File/5275>. February 23, 2003. Web. September 16, 2016. [Classification: 11]
18. Blecha, Paul. Associated Vintners – Washington’s Academic Winemakers. HistoryLink. <http://www.historylink.org/File/11206>. April 5, 2016. Web. September 16, 2016. [Classification: 11]
19. Domestic Winery Report Detail Information (2015-2010). Washington: Washington State Liquor and Cannabis Board, July 26, 2016 and September 2017. [Classification: 11]
20. HDR Engineering. Economic Growth in the Washington Wine Industry for the Port of Kennewick. HDR Engineering. September 27, 2013. [Classification: 11]
21. Mefford, Chris, Spencer Cohen, Diana Haring, Yolando Ho, Michaela Jellicoe, Bryan Lobel, Alison Peters, and Eric Viola. Economic & Fiscal Impacts of Wine & Wine Grapes in Washington State. Seattle, Washington: Community Attributes Inc., 2015. [Classification: 11]
22. Regions & AVAs of Washington. Washington State Wine Commission. <https://www.washingtonwine.org/wine/facts-and-stats/regions-and-avas>. Web. 2016. [Classification: 11]
23. Stats and Facts, Washington State Wine Fast Facts. Washington State Wine Commission. <https://www.washingtonwine.org/wine/facts-and-stats/state-facts>. Web. October 5, 2016. [Classification: 11]
24. Sullivan, Sean. Washington Wine Report. Washington Winery Map from Puget Sound Business Journal. www.wawinereport.com/2011/04/washington-winery-map-from-puget-sound.html. Web. April 20, 2011. [Classification: 11]

25. Washington Wine Quick Facts. Washington Association of Wine Grape Growers. [www.wawgg.org/files/documents/PRESS_KIT_\(2\).pdf](http://www.wawgg.org/files/documents/PRESS_KIT_(2).pdf). Web. April 1, 2016. [Classification: 11]
26. Washington Wineries, Wines and Wine Country. Wines Northwest. <http://www.winesnw.com/wahome.html>. April 13, 2016. [Classification: 11]
27. Wine Industry Metrics. Wines & Vines. <https://www.winesandvines.com/template.cfm?section=widc&wideDomain=wineries>. January 13, 2017. Web. February 8, 2017. [Classification: 11]
28. Wine Producers and Blenders. Department of the Treasury Alcohol and Tobacco Tax and Trade Bureau. <https://www.ttb.gov/foia/xls/frl-wine-producers-and-blenders-wa.htm>. May 1, 2016. Web. May 4, 2016. [Classification: 11]
29. Winerywise and Washington Wine Industry Foundation. 2015 Winery Wastewater Survey. Washington: Winerywise. 2015. [Classification: 11]

Washington State Regulations

30. Accreditation of Environmental Laboratories – Chapter 173-50 WAC. Washington: Washington State Department of Ecology, 2010 (last update). [Classification: 7]
31. Alcoholic Beverage Control – Chapter 66 RCW. Washington: Washington State Legislature. [Classification:5]
32. Department of Ecology – Chapter 43.21A RCW. Washington: Washington State Legislature, 2013 (last update). [Classification: 5]
33. Large On-Site Sewage System Regulations – Chapter 246-272B WAC. Washington: Washington State Department of Health, 2011 (last update). [Classification: 7]
34. On-Site Sewage Systems – Chapter 246-272A WAC. Washington: Washington State Department of Health, 2010 (last update). [Classification:7]
35. Public Records Act – Chapter 42.56 RCW. Washington: Washington State Legislature, 2016 (last update). [Classification:5]
36. Solid Waste Handling Standards – Chapter 173-350 WAC. Washington: Washington State Department of Ecology, 2013 (last update). [Classification: 7]
37. Submission of Plans and Reports for Construction of Wastewater Facilities – Chapter 173-240 WAC. Washington: Washington State Department of Ecology, 2000 (last update). [Classification: 7]
38. Underground Injection Control Program – Chapter 173-218 WAC. Washington: Washington State Department of Ecology, 2008 (last update). [Classification: 7]

39. Waste Discharge General Permit Program – Chapter 173-226 WAC. Washington: Washington State Department of Ecology, 2002 (last update). [Classification: 7]
40. Wastewater Discharge Permit Fees – Chapter 173-224 WAC. Washington: Washington State Department of Ecology, 2015 (last update). [Classification: 7]
41. Water Pollution Control – Chapter 90.48 RCW. Washington: Washington State Legislature, 2012 (last update). [Classification: 5]
42. Water Quality Standards for Groundwaters of the State of Washington – Chapter 173-200 WAC. Washington: Washington State Department of Ecology, 1990 (last update). [Classification: 7]
43. Water Resources Act of 1971 – Chapter 90.54 RCW. Washington: Washington State Legislature, 2007 (last update). [Classification: 5]
44. Wylie, Sharon (House Representative), Condotta, Cary (House Representative). House Bill 1040. Washington: Washington State House of Representatives; December 13, 2016. [Classification:5]

Other State Regulations and Permits

45. General Waste Discharge Requirements Order No. R3-2008-0018 for Discharges of Winery Waste and Categorical Waiver of Waste Discharge Requirements and Waiver of Requirement to Submit Report of Waste Discharge for Certain Small Wineries. Central Coast Region, California: California Regional Water Quality Control Board – Central Coast Region, 2008. [Classification: 7]
46. General Water Pollution Control Facilities Permit. Oregon: Department of Environmental Quality, 2007. [Classification: 7]
47. Order No. R1-2002-0012 General Waste Discharge Requirements for Discharges of Winery Waste to Land. North Coast Region, California: California Regional Water Quality Control Board – North Coast Region, 2002. [Classification: 7]
48. Order No. R1-2016-0002 General Waste Discharge Requirements for Discharges of Wine, Beverage and Food Processor Waste to Land in the North Coast Region. North Coast Region, California: California Regional Water Quality Control Board – North Coast Region, 2016. [Classification: 7]

Ground Water

49. Dent-White, Diane T., and Donna Lynch. Ground Water in Washington State. Washington: Washington State Department of Ecology and Washington State Interagency Ground Water Committee, 1997. [Classification: 1]

50. Harter, Thomas. Groundwater Quality and Groundwater Pollution. California: University of California Division of Agriculture and Natural Resources, 2003. [Classification: 11]
51. Van Gilder, Rachel. 6 Families Settle Suit Against Birds Eye Foods. Wood TV8. <http://woodtv.com/2014/02/13/6-families-suit-against-birds-eye-foods-settled/>. February 13, 2014. Web. February 14, 2017. [Classification: 11]
52. Wastewater from Food Plants Getting into Wells. Eyewitness News ABC7NY. New York: <http://abc7ny.com/archive/6975002/>. August 20, 2009. Web. February 14, 2017. [Classification: 11]

Wastewater Characteristics

53. Basics of Wastewater Treatment. Barnstable County Department of Health and Environment. <http://www.barnstablecountyhealth.org/resources/publications/compendium-of-information-on-alternative-onsite-septic-system-technology/basics-of-wastewater-treatment>. Web. September 16, 2016. [Classification: 11]
54. Benefield, Laura A. Wastewater Quality Strength Content. Washington: Washington State Department of Health. 2002. [Classification: 11]
55. Brand, Travis. The Importance of pH in Wastewater Treatment. Advanced Chemical Systems. <http://advancedchemsys.com/importance-ph-wastewater-treatment/>. August 2008. Web. February 2017. [Classification: 11]
56. Buelow, Maya C., Kerri Steenwert, Lucas C. R. Silva, and Sanjai J. Parikh. Characterization of Winery Wastewater for Reuse in California. Am J Enol Vitic, 2015. [Classification: 11]
57. Conductivity, Salinity & Total Dissolved Solids. Fundamentals of Environmental Measurements. <http://www.fondriest.com/environmental-measurements/parameters/water-quality/conductivity-salinity-tds/>. Web. February 23, 2017. [Classification: 11]
58. Craig, Robert. Q&A: Doing the Math from Vine to Bottle. The Craig. http://robertcraigwine.typepad.com/the_craig/2009/09/q-a-doing-the-math-from-vine-to-bottle.html. September 15, 2009. Web. August 26, 2016. [Classification: 11]
59. Distilled Spirits Conversion Tables. U.S. Department of the Treasury, Alcohol and Tobacco Tax and Trade Bureau. <http://www.ttb.gov/spirits/convtbl.shtml>. 2012. Web. April 12, 2016. [Classification: 11]
60. Gerling, Chris. Conversion Factors: From Vineyard to Bottle. Cornell University Viticulture and Enology. <https://grapesandwine.cals.cornell.edu/newsletters/appellation-cornell/2011-newsletters/issue-8/conversion-factors-vineyard-bottle>. 2011. Web. August 26, 2016. [Classification: 11]
61. Groundwater Information Sheet Salinity. State Water Resources Control Board Division of Water Quality Gama Program. California. 2016. [Classification: 11]

62. Heavy Metal Removal from Industrial Wastewater. Digital Analysis. http://www.phadjustment.com/TArticles/Heavy_Metal_Reduction.html. 2016. Web. February 2017. [Classification: 11]
63. Marone, Vincent. Effects of Raw Sewage. SI Restoration. <http://www.si-restoration.com/effects-raw-sewage/>. December 6, 2013. Web. February 28, 2017. [Classification: 11]
64. Perdue, Lewis. Experienced Voices Address Water-To-Wine Issue. Wine Industry Insight. <http://wineindustryinsight.com/?p=1484>. March 16, 2009. Web. December 27, 2016. [Classification: 11]
65. Quayle, Wendy. Evaluation of Organic Matter Concentration in Winery Wastewater: A Case Study from Australia. Griffith NSW, Australia: CSIRO Land and Water, Griffith Laboratory Research; 2009. [Classification: 11]
66. Smith, Matt. Winemaker Math. Kendall Jackson Blog. <http://blogkj.com/winemaker-math/>. March 29, 2011. Web. August 26, 2016. [Classification: 11]
67. Stanfield, Jim. Wine by the Numbers. Unwined. <http://www.unwinedva.com/Kissing-Frogs.html&blogarticle=Wine-by-numbers>. August 28, 2014. Web. August 26, 2016. [Classification: 11]
68. Total Suspended Solids. State of Michigan. www.michigan.gov/documents/deq/wb-npdes-TotalSuspendedSolids_247238_7.pdf. Web. February 23, 2017. [Classification: 11]
69. Vinifera, Dr. Ask Dr. Vinny. Wine Spectator. <http://www.winespectator.com/drvinny/show/id/5350>. Web. August 26, 2016. [Classification: 11]
70. Weber, Ed, Donna Hirschfeld, and Rhonda Smith. How Much Wine Can a Small Vineyard Produce? UC Davis Extension Small Vineyard Series. 2016. [Classification: 11]
71. Where do the Salts Go? The Potential Effects and Management of Salt Accumulation in South-Central Arizona. United States Geological Survey. <https://pubs.usgs.gov/fs/fs-170-98/>. Web. February 23, 2017. [Classification: 11]
72. Winewatch. Winewatch Fact Sheet 1 Winery Wastewater Composition and Potential Environmental Impacts of Wastewater Disposal from Small Wineries. Australia: Curtin University, Margaret River Wine Industry Association, Cape to Cape Catchments Group, GeoCatch with the Shires of Busselton and Augusta-Margaret River. 2009. [Classification: 11]

WWTPs

73. Knight, D.J., and Department of Ecology's Pretreatment Work Group. Guidance Manual for Developing Local Discharge Limits. Washington: Washington State Department of Ecology; June 2011. [Classification: 2]
74. United States Environmental Protection Agency Office of Water. Industrial User Permitting Guidance Manual. Washington DC: United States Environmental Protection Agency; September 1989. [Classification: 11]
75. United States Environmental Protection Agency Office of Water Enforcement and Permits. Guidance Manual for POTW Pretreatment Program Development. Washington DC: United States Environmental Protection Agency; October 1983. [Classification: 11]

Irrigation to Managed Vegetation (Land Treatment)

76. Brown and Caldwell. Manual of Good Practice for Land Application of Food Processing/Rinse Water. Davis, California: Kennedy/Jenks Consultants; March 14, 2007. [Classification: 11]
77. Canessa, Peter, and Ronald E. Hermanson. Irrigation Management Practices to Protect Ground Water and Surface Water Quality State of Washington. Washington: Washington State Department of Ecology and US Environmental Protection Agency Region 10; 1994. [Classification: 10]
78. Fipps, Guy. Irrigation Water Quality Standards and Salinity Management Strategies. Texas: Texas A&M Agrilife Extension; April 2003. [Classification: 11]
79. Lehmann, J., and G. Schroth. Trees, Crops and Soil Fertility Chapter 7 Nutrient Leaching. Wallingford; CABI Publishing; 2003. [Classification: 11]
80. Order R5-2014-0059 Waste Discharge Requirements for Hughson Nut, Inc. California: California Regional Water Quality Control Board Central Valley Region; 2014. [Classification: 7]
81. Pour, Bijan N. Guidelines for Land Application of Industrial Wastewaters. Portland, Oregon: Department of Environmental Quality, Water Quality Division; December 1992. [Classification: 11]
82. Sheikh, Dr. Bahman. Reuse of Agricultural Wastewater. California Agricultural Water Stewardship Initiative. http://agwaterstewards.org/practices/reuse_of_agricultural_wastewater/. Web; September 16, 2016. [Classification: 11]
83. State of Georgia Department of Natural Resources Environmental Protection Division Watershed Protection Branch. Guidelines for Slow-Rate Land Treatment of Wastewater Via Spray Irrigation. Atlanta, Georgia: State of Georgia Department of Natural Resources Environmental Protection Division; July 2010. [Classification: 11]

84. State of Michigan Department of Environmental Quality Water Resources Division Groundwater Program. Guidance for the Design of Land Treatment Systems Utilized at Wineries. Michigan: State of Michigan Department of Environmental Quality; December 2015. [Classification: 11]
85. United States Department of Agriculture Natural Resources Conservation Services. Chapter 6 Role of Plants in Manure Management of Part 651 Agricultural Waste Management Field Handbook. NP: United States Department of Agriculture Natural Resources Conservation Services; August 2012. [Classification: 11]
86. United States Department of Agriculture Soil Conservation Service. National Engineering Handbook Section 15 Irrigation Chapter 1 Soil-Plant-Water Relationships. NP: United States Department of Agriculture; December 1991. [Classification: 11]
87. United States Environmental Protection Agency Technology Transfer Program. Pollution Abatement in the Fruit and Vegetable Industry Wastewater Treatment. Washington DC: CH2M Hill, Inc.; July 1977. [Classification: 11]
88. Washington State Department of Ecology. Guidance on Land Treatment of Nutrients in Wastewater, with Emphasis on Nitrogen. Washington: Washington State Department of Ecology; November 2004. [Classification: 10]
89. Washington State Department of Ecology, Water Quality Program. Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems. Olympia, Washington: Washington State Department of Ecology; May 1993. [Classification: 10]
90. Waste Discharge Requirements Order R5-2014-0045 for O'Neill Beverages Company. California: California Regional Water Quality Control Board Central Valley Region; 2014. [Classification:7]

Lagoons and Other Storage Structures

91. A Performance Comparison of Liners for Wastewater Lagoons. North America: CETCO; December 2000. [Classification: 11]
92. Giroud, J.P., and R. Bonaparte. Leakage through Liners Constructed with Geomembranes – Part I. Geomembrane Liners. Boynton Beach, Florida: GeoServices Inc. Consulting Engineers; September 23, 1988. [Classification: 11]
93. Kimsey, Melanie. Construction of Dairy Lagoons Below the Seasonal High Ground Water Table. Olympia, Washington: Washington State Department of Ecology Water; January 18, 2002. [Classification: 2]
94. National Small Flows Clearinghouse. Pipeline Small Community Wastewater Issues Explained to the Public Lagoon Systems Can Provide Low-Cost Wastewater Treatment. Morgantown, West Virginia: West Virginia University National Small Flows Clearinghouse; Spring 1997. [Classification: 11]

95. Pennsylvania Department of Environmental Protection. Design and Construction Standards for Centralized Impoundment Dams. Pennsylvania: Pennsylvania Department of Environmental Protection; December 2013. [Classification: 11]
96. Thiel, R., and J.P. Giroud. Important Considerations for Leakage Control of Exposed Geomembrane-Lined Ponds. Sardinia: Thirteenth International Waste Management and Landfill Symposium; 2011. [Classification: 11]
97. United States Department of Agriculture Natural Resources Conservation Services. Chapter 10 Agricultural Waste Management System Component Design of Part 651 Agricultural Waste Management Field Handbook. NP: United States Department of Agriculture Natural Resources Conservation Services; August 2012. [Classification: 11]
98. Wastewater and Evaporation Lagoon Construction. South Australia: Environment Protection Authority; March 2004. [Classification: 11]
99. Wastewater Lagoon Construction. South Australia: Environment Protection Authority; November 2014. [Classification: 11]
100. Winewatch. Winewatch: Fact Sheet 5 Ponds for Percolation/Evaporation and Storage of Wastewater from Small Wineries. Australia: Curtin University, Margaret River Wine Industry Association, Cape to Cape Catchments Group, GeoCatch with the Shires of Busselton and Augusta-Margaret River. http://research.wineaustralia.com/wp-content/uploads/2012/08/Budget_Ponds_WA.pdf. December 2009. Web. April 13, 2016. [Classification: 11]

Subsurface Infiltration Systems

101. ATS Ad Hoc Group. On-Site Wastewater Management in Connecticut: The Role of Advanced Treatment Systems (ATS). Litchfield Connecticut: Rivers Alliance of Connecticut; October 3, 2011. <http://www.riversalliance.org/ats/atmain.htm>. Web. February 9, 2017. [Classification: 11]
102. Benefield, Laura A. Wastewater Quality Strength Content. Washington: Washington State Department of Health. 2002. [Classification: 11]
103. Eliasson, John. Septic Tank Effluent Values. Washington: Washington State Department of Health. February 1, 2004. [Classification: 11]
104. Florida Health and Rehabilitative Services Broward County Public Health Unit. A Guide to the Proper Operation and Maintenance of a Septic Tank System. Broward County, Florida: Broward County Public Health Unit Environmental Engineering Section. <https://www.broward.org/EnvironmentAndGrowth/EnvironmentalProgramsResources/Publications/Documents/YouYourSepticTank.pdf>. May 5, 2005. Web. September 16, 2016. [Classification: 11]

105. InspectApedia. Septic System Design Basics – Septic System Design: Choosing Septic Tank Size, Absorption System Size, Basic Design Notes. InspectApedia. http://inspectapedia.com/septic/Septic_System_Design_Basics.php. 2015. Web. September 29, 2016. [Classification: 11]
106. Interagency Resource for Achieving Cooperation (IRAC). Non-Residential Septic Tank Systems: Information for Business Users and Property Owners. Washington: King County Local Hazardous Waste Management Program; Winter 2004. [Classification: 11]
107. New York State Department of Environmental Conservation (NYSDEC) Water and Materials Management Requirements. Frequently Asked Q & A Regarding Wineries, Cideries, Breweries. New York State Empire State Development. https://cdn.esd.ny.gov/nysbeveragebiz/Data/072013_FAQS_BWSC.pdf. Web. February 26, 2014. [Classification: 11]
108. Santa Barbara County Public Health Department Environmental Health Services. Onsite Wastewater Treatment Systems. Santa Barbara, California: Santa Barbara County Public Health Department Environmental Health Services; July 21, 2015. [Classification: 11]
109. Texas Commission on Environmental Quality Environmental Assistance Division. Wineries: Am I Regulated? Texas Commission on Environmental Quality. <https://www.tceq.texas.gov/publications/rg/rg-532.html/view>. January 2016. Web. May 10, 2016. [Classification: 11]
110. University of Minnesota Water Resources Center Onsite Sewage Treatment Program. Taking Care of Your Septic System Management Basics. Minnesota: University of Minnesota Onsite Sewage Treatment Program. <https://septic.umn.edu/>. Web. September 16, 2016. [Classification: 11]
111. Washington State Department of Ecology. Septic Systems. Washington: Washington State Department of Ecology. <http://www.ecy.wa.gov/programs/wq/wqguide/septic.html>. Web. February 28, 2017. [Classification: 10]
112. Washington State Department of Health Division of Environmental Health. Do-It-Yourself Septic System Inspection Field Guide (Gravity System). Washington: Jones Advertising. <http://www.doh.wa.gov/Portals/1/Documents/Pubs/337-122.pdf>. Web. September 29, 2016. [Classification: 11]
113. Washington State Department of Health Division of Environmental Health Office of Shellfish and Water Protection. Recommended Standards and Guidance for Performance, Application, Design, and Operation & Maintenance. Washington: Washington State Department of Health; July 2012. [Classification: 11]
114. Winewatch. Winery Wastewater Management by Small Wineries A Summary of Learnings and Recommendations from the Winewatch Wastewater Project. Australia: Curtin University, Margaret River Wine Industry Association, Cape to Cape Catchments Group, GeoCatch with the Shires of Busselton and Augusta-Margaret River. <http://www.gwrdc.com.au/wp->

[content/uploads/2012/08/SmallWineriesWA_Summary_Winewatch.pdf](#). August 2012.
Web. February 25, 2015. [Classification: 11]

115. Winewatch. Winewatch: Fact Sheet 4 Subsurface Disposal of Winery Wastewater for Small Wineries. Australia: Curtin University, Margaret River Wine Industry Association, Cape to Cape Catchments Group, GeoCatch with the Shires of Busselton and Augusta-Margaret River. http://research.wineaustralia.com/wp-content/uploads/2012/08/WA_Leachfields.pdf. December 2009. Web. February 25, 2015. [Classification: 11]

Infiltration Basins

116. Washington State Department of Ecology, Water Quality Program. Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems. Olympia, Washington: Washington State Department of Ecology; May 1993. [Classification: 10]

Economics

References will be included for the issuance of the Winery General Permit.

APPENDIX D
Response to Comments

The response to comments will be included for the issuance of the Winery General Permit.

DRAFT