APPENDIX 1

**AGRONOMIC RATE GUIDANCE**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

**SAN FRANCISCO BAY REGION**

For the General Waste Discharge Requirements for

Discharges of Winery Waste to Land Within the San Francisco Bay Region

Order No. R2-2017-XXXX

This document is intended to provide general guidance on approaches and methods for determining agronomic rates of wastewater application to land. It is not to be construed as an endorsement of any particular method or an exhaustive list of options.

**General**

This guidance is intended for Dischargers who apply treated wastewater to land via subsurface or land surface irrigation at an agronomic rate in accordance with the General Waste Discharge Requirements for Discharges of Winery Waste to Land Within the San Francisco Bay Region

Order No. R2-2017-XXXX.

Definitions of agronomic rates include:

1. The land application of irrigation water and nutrients at rates of application in accordance with a plan for nutrient management that will enhance soil productivity and provide the crop or forage growth with needed nutrients for optimum health and growth.[[1]](#footnote-1)
2. Rate at which a viable crop can be maintained and there is minimal leaching of chemical downwards below the root zone. Crops should be maintained for maximum nutrient uptake when used for wastewater treatment.[[2]](#footnote-2)
3. Specific rate of effluent applied that provides the precise amount of water and nutrient loading, which selected grasses/crops require without having any excess water or nutrient percolate beyond the root zone.[[3]](#footnote-3)

**Goal and Role of Agronomic Rate**

Land treatment is the application of pre-treated wastewater to land at a controlled rated in a designed and engineered setting. A goal of a land treatment system is to provide supplemental wastewater treatment in order to meet the San Francisco Bay Basin Water Quality Control Plan groundwater water quality objectives.[[4]](#footnote-4) Using agronomic rates ensures that the nutrients in winery processing wastewater and solids discharged to land are used efficiently by vegetation or crops. Goals of applying wastewater to land via land surface and subsurface irrigation at agronomic rates include:

1. Nutrient uptake by the crop is maximized and leaching below the root zone to the uppermost aquifer is minimized, and
2. The land treatment system provides maximum treatment when the application rate does not exceed the agronomic rate.

A nutrient balance for vegetation or crops can be used to determine the agronomic nutrient application rate. The nutrient balance includes three components needed to calculate an application rate:

1. nutrients the crops require,
2. nutrients available to the crops from prior nutrient applications, and
3. nutrients available from the winery processing solids and wastewater.

**Suggested Best Management Practices**

A direct method for the Discharger to accomplish an **agronomic rate** is to:

1. Know the amount of water and nutrients required by the vegetation/grass/crop.
2. Determine the soil moisture and any residual nutrient loading in the soil plus the nutrient value of the effluent.
3. Record the soil moisture, the soil’s residual nutrient loading and the nutrient value of the effluent.
4. Apply the difference between what is needed and what is available in the soil.

**Supplemental Resources**

The following publications contain additional information on determining agronomic rates:

1. U.S. Environmental Protection Agency. Appendix I – Agronomic Nutrient Application Rate.

Although this resource was designed for concentrated animal feeding operations, a methodology on performing a nutrient balance is included in the publication.

Accessible online at <https://www3.epa.gov/npdes/pubs/cafo_manure_guidance_appendixi.pdf>

1. Colorado Department of Public Health and Environment. Guide for Determining Agronomic Rates for the Use of Reclaimed Domestic Wastewater.

Accessible online at

<https://www.colorado.gov/pacific/sites/default/files/WQP21_0.PDF>

1. Hermanson, R., Pan, W., Perillo, C., Stevens, R., and Stockle, C. Washington State University. Nitrogen Use by Crops and the Fate of Nitrogen in the Soil and Vadose Zone. A Literature Search.

Accessible online at <https://fortress.wa.gov/ecy/publications/documents/0010015.pdf>

1. Oldham, Larry. Nutrient Management Guidelines for Agronomic Crops Grown in Mississippi. Chapter: Best Management Practices for Nutrients in Agronomic Crop Production. Mississippi State University Department of Plant and Soil Sciences.

Accessible online at

[https://www.deq.state.ms.us/mdeq.nsf/pdf/NPS\_Nutr\_Manage\_Guidelines\_Agronomics\_MS/$File/Nutr\_Manage\_Guidelines\_Agronomics\_MS.pdf?OpenElement](https://www.deq.state.ms.us/mdeq.nsf/pdf/NPS_Nutr_Manage_Guidelines_Agronomics_MS/%24File/Nutr_Manage_Guidelines_Agronomics_MS.pdf?OpenElement)

1. Source: Central Valley Regional Water Quality Control Board Order No. R5-2013-0122. Waste Discharge Requirements General Order for Existing Milk Cow Dairies. Attachment E Definitions. Accessible online at <http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0122.pdf>. [↑](#footnote-ref-1)
2. Source: Washington State Department of Ecology. (February 2006). Guidance on Land Treatment of Nutrients in Wastewater, with Emphasis on Nitrogen. [↑](#footnote-ref-2)
3. Source: Colorado Department of Public Health and Environmental. Guide for Determinig Agronomic Rates for the Use of Reclaimed Domestic Wastewater. [↑](#footnote-ref-3)
4. The ground water quality objectives in the San Francisco Bay Basin Water Quality Control Plan is accessible online at http://www.waterboards.ca.gov/sanfranciscobay/water\_issues/programs/planningtmdls/basinplan/web/bp\_ch3.shtml. [↑](#footnote-ref-4)