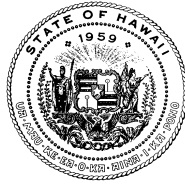


JOSH GREEN, M.D.
GOVERNOR OF HAWAII
KE KIA'ĀINA O KA MOKU'ĀINA 'O HAWAII



KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
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**STATE OF HAWAII
DEPARTMENT OF HEALTH
KA 'OIHANA OLAKINO**
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

R2R BG NSF ANSI 40 & 245
_Scale-up Concur wRestrictions

May 10, 2023

Mr. Paul Strum
Executive Director and Restoration Ecologist
Ridge to Reefs Inc.
7566 Main Street Suite 106
Sykesville, MD 21784
Email: paul@ridgetoreefs.org

Dear Mr. Strum:

Subject: Ridge to Reefs (R2R) BioReactor Garden (BG)
Model Design Unit – 600 GPD Wastewater Treatment System
Specific Performance Evaluation Report Regarding Provisions of
NSF/ANSI Standard 40 – Residential Wastewater Treatment and
NSF/ANSI Standard 245 Residential Wastewater Treatment Systems - Nitrogen
Reduction, Conducted by University of Hawaii at Manoa,
Water Resources Research Center, WRRC SR-2022-04, January 26, 2022
and Supplement Evaluation dated March 13, 2023 [Scale-Up conformity assessment
of BG Model Units 800 GPD and 1,000 GPD Design Flow]

The Department of Health (Department) acknowledges receipt of the subject Performance Evaluation Report for the Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit – 600 gallons per day (GPD) design flow prepared by the University of Hawaii at Manoa, Water Resources Research Center, WRRC SR-2022-04, document of January 26, 2022, transmitted by email dated January 28, 2022, and the additional information and Operations and Maintenance Manual for R2R BG, Model 600 GPD design flow unit transmitted by email of April 4, 2022. The Department also acknowledges the receipt of the supplement Evaluation of R2R BG Unit for NSF/ANSI Standard 40 and Standard 245 evaluation and Scale-Up of the 600 GPD design flow unit for scale-up conformity assessment of the R2R BG Model Units of 800 GPD and 1,000 GPD design flow prepared by Dr. Roger Babcock, Jr, PhD, PE dated March 13, 2023. As requested, the Department reviewed the subject evaluation for scale-up approval as an equivalent NSF/ANSI aerobic treatment unit as provided under Hawaii Administrative Rules (HAR), Section 11-62-35(a), Other Individual Wastewater Systems (IWS).

The Department reviewed the Specific Performance Evaluation Report of January 26, 2022 and additional information of April 4, 2022, and supplement Evaluation of the R2R BG unit document of March 13, 2023, and concurs with the conclusions made by Dr. Babcock and the University of

Hawaii at Manoa, Water Resources Research Center in the supplement evaluation that the Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit(s) of 800 GPD and 1,000 GPD design flow has met the scale-up requirements and by analysis and evaluation fulfilled requirements of both the NSF/ANSI Standard 40 and NSF/ANSI Standard 245 under certain limited conditions.

The Department approves the Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit(s) of 600 GPD, 800 GPD, and 1,000 GPD design flow wastewater treatment systems as an equivalent NSF Standard 40 and NSF Standard 245 aerobic treatment unit that may be used in the State of Hawaii with the following restrictions:

1. The Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit(s) of 600 GPD, 800 GPD, and 1,000 GPD design flow shall not be approved for use by the Department in areas where rainfall events associated with 25-year, 24-hour rainfall exceeds nine (9) inches.
2. The design plan for an IWS application(s) for the Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit(s) of 600 GPD, 800 GPD, and 1,000 GPD design flow shall specify the vegetation and/or plants that will be utilized as part of the bioreactor garden system and the required maintenance that will be applied toward ensuring the proper Operation and Maintenance of the system, as appropriate.
3. Security fencing, other appropriate secured enclosure and/or control practices shall be provided around the perimeter of the Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit(s) of 600 GPD, 800 GPD, and 1,000 GPD design flow to control public accessibility and toward ensuring the system is not a hazard or potential hazard to public health, safety, and welfare.

The above use restrictions for the use of the Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit(s) of 600 GPD, 800 GPD, 1,000 GPD design flow are being imposed as the following items were not accurately documented/addressed as part of the performance review under HAR, Section 11-62-35(a) conducted by the University of Hawaii at Manoa, Water Resources Research Center, WRRRC SR-2022-04, document of January 26, 2022, and the additional information and Operations and Maintenance Manual for R2R BG Model Unit transmitted by email of April 4, 2022. Accordingly, an updated comprehensive Design and Operations and Maintenance (O & M) Manual for the R2R BG Model Units 600 GPD, 800 GPD, and 1,000 GPD design flows is required to be provided to the Department and, as a minimum, appropriately address the following BG Model Unit design issues/concerns in order for the Department to be able to consider reducing the above use restrictions.

1. System design provisions and/or review addressing the ability of the BG model unit(s) to prevent all rainfall events from entering and/or contain all rainfall events entering the system to not result in spills or overflows to occur due to rainfall and/or rainfall run-on into the unit.
2. Performance review of the wastewater treatment system during expected and extreme rainfall events and ability to satisfy the requirements of the NSF/ANSI Standard 40 and Standard 245 protocols under these circumstances. Also, as cited by Dr. Roger

Babcock in the supplement Evaluation of March 13, 2023, include design restriction provisions to not allow the location of BG units in areas that are within a geographical sump and/or drainageway, etc., where rainfall runoff or run-on into the BG units may overtop the 4-inch x 6-inch wooden perimeter border and enter the BG units.

3. Include all other appropriate Design and O & M provisions that have been established for the R2R BG unit that has not been compiled under a comprehensive Design and O & M Manual document.
4. An Owner's Manual for the operation and maintenance of the wastewater treatment system was not included and evaluated as part of the bioreactor garden system performance evaluation by the University of Hawaii at Manoa, Water Resources Research Center. The comprehensive Design and O & M Manual shall include, as an attachment, an appropriately prepared Owner's Operations and Maintenance manual for the owner and licensed operator of the BG unit to use for the system.

The Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit – 600 gallons per day (GPD) design flow may be used under certain limited conditions, upon conforming to the above listed use restrictions requirements, to serve a dwelling unit not to exceed three (3) bedrooms or a non-residential building not to exceed 600 GPD.

The Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit – 800 gallons per day (GPD) design flow may be used under certain limited conditions, upon conforming to the above listed use restrictions requirements, to serve a dwelling unit not to exceed three (4) bedrooms or a non-residential building not to exceed 800 GPD.

The Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit – 1,000 gallons per day (GPD) design flow may be used under certain limited conditions, upon conforming to the above listed use restrictions requirements, to serve a dwelling unit not to exceed three (5) bedrooms or a non-residential building not to exceed 1,000 GPD.

The design and construction of all wastewater systems, including the incorporation of the Ridge to Reefs (R2R) BioReactor Garden (BG), Model Design Unit(s) of 600 GPD, 800 GPD, and 1,000 GPD design flow, must conform to applicable provisions of the Hawaii Administrative Rules (HAR), Chapter 11-62, "Wastewater Systems."

Should you have any questions please contact Mr. Mark Tomomitsu of our office at (808) 586-4294.

Sincerely,



SINA PRUDER, P.E., CHIEF
Wastewater Branch

MST:ct

c: Roger Babcock, UH-WRRC (via email rbabcock@hawaii.edu)