



United States  
Environmental Protection  
Agency

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*Errata to:*

# Life Cycle and Cost Assessments of Nutrient Removal Technologies in Wastewater Treatment Plants

Prepared for:

U.S. Environmental Protection Agency  
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EPA 832-R-21-006ES

## ERRATA

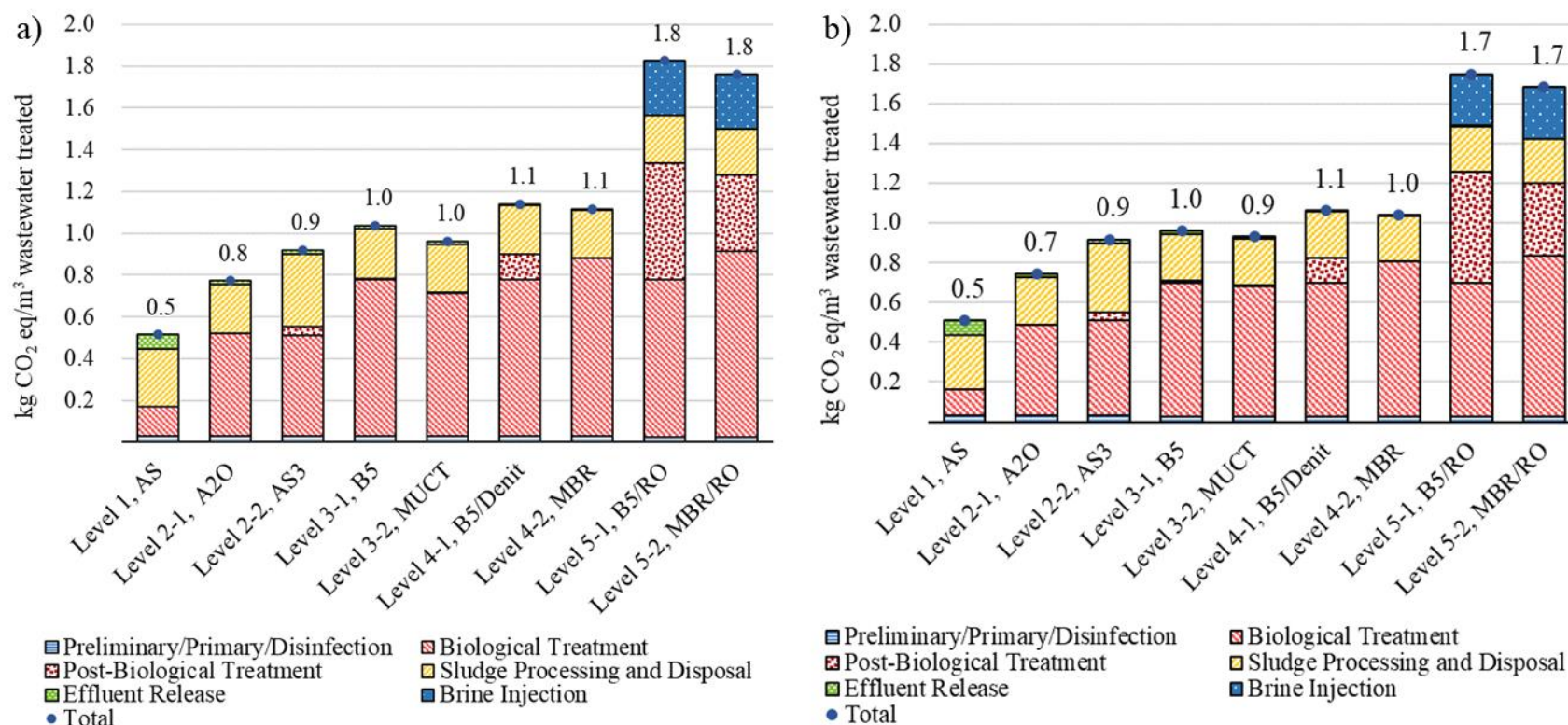
ERG identified an error in Appendix F of the Life Cycle and Cost Assessments of Nutrient Removal Technologies in Wastewater Treatment Plants (EPA 832-R-21-006), dated August 2021. Equation F-3, the equation used to calculate nitrous oxide (N<sub>2</sub>O) emissions from wastewater treatment processes, included an incorrect molecular weight conversion factor of N to N<sub>2</sub>O of 44/14. The correct conversion factor is 44/28.

This error only affects N<sub>2</sub>O emission from biological treatment. The corrected emissions are half as much as those presented in the report, as shown in Table 1 below. Emissions of N<sub>2</sub>O only affect the global warming potential (GWP) impact category but are reflected in all related charts and discussion (Figures 6-5, 8-1 and 9-3 and Tables 8-1 and 8-3). Figure 1 compares the GWP impact of treatment systems before and after correction of the N<sub>2</sub>O conversion factor (Figure 6-5 in the report).

**Table 1. Comparison of N<sub>2</sub>O Emissions from Biological Treatment**

System Configuration Level	N <sub>2</sub> O Emitted by Process (kg N <sub>2</sub> O/yr)	
	Original Estimate <sup>a</sup>	Corrected Estimate
1	6.6E+02	3.3E+02
2-1	2.9E+03	1.5E+03
2-2	3.9E+02	1.9E+02
3-1	7.8E+03	3.9E+03
3-2	3.0E+03	1.5E+03
4-1	8.2E+03	4.1E+03
4-2	7.7E+03	3.9E+03
5-1	7.8E+03	3.9E+03
5-2	7.7E+03	3.9E+03

a – Estimates included in Table F-2 of *Life Cycle and Cost Assessments of Nutrient Removal Technologies in Wastewater Treatment Plants* (EPA 832-R-21-006).



**Figure 1. Comparison of Global Warming Potential Impact prior to (panel a) and following (panel b) correction of the N<sub>2</sub>O conversion factor.**

Because the error affected the calculation of biological treatment emissions, which are included for all systems, it has a limited effect on the comparative results between systems. Correction of the error alters the height of the biological treatment bars of each system. Prior to correction of the error, N<sub>2</sub>O emissions from biological treatment contributed between 0.8% and 15% of total GWP emissions.

- The largest contribution of N<sub>2</sub>O to GWP is observed for treatment levels 3-1, 4-1, and 4-2 (14-15%). Using the updated conversion factor the contribution of N<sub>2</sub>O to GWP drops to between 7 and 8%.
- More moderate contributions are observed for treatment levels 2-1, 3-2, 5-1 and 5-2 (6-8%). Using the updated conversion factor the contribution of N<sub>2</sub>O to GWP drops to between 3 and 4%.
- The smallest contribution of N<sub>2</sub>O to GWP is observed for treatment levels 1 and 2-2 (0.8-3%). Using the updated conversion factor the contribution of N<sub>2</sub>O to GWP drops to between 0.4 and 1.3%.