Community Health Center
Sandwich, MA
Nitrogen Loading Calculations
PROPOSED CONDITIONS
Revised 10/2/2024

INPUT FACTORS

Number of Residential units	
Wastewater Design Flow	1,465
Wastewater N-conc. in effluent (mg/L)	11
Lawn/Landscape area (square feet)	5,000
Lawn/Landscape N- conc. (lbs/ft^2)[1]	3 lbs/1000 ft^2
Pavement (square feet)	22,871
Natural Area (square feet)	5,851
Road runoff N-conc. (mg/L)[1]	1.5
Roof area (square feet)	6,681
Roof runoff N-conc. (mg/L)[1]	0.75
Total recharge area (acres)	1.01
Recharge rate for pervious area (in/yr)[1]	19
Recharge rate for impervious area (in/yr)[1]	40

[1] From Cape Cod Commission Water Resources Technical Bulletin, Appendix A

INPUT	CALCULATIONS	RESULTS
Sewage (gal/day)		CALCULATED LOADING (LBS/YR)
1,465	x N-conc (mg/L) x 3.785 L/gal x 365 days/yr ÷ 454000 mg/lb	49.0
Lawn/Landscape area (sq ft)		
5,000	x 0.000216 lb N/sq ft (3 lbs./1000 ft^2) x 25% leaching	3.8
Pavement area (sq ft)		
22,871	x (40 in/yr ÷ 12 in/ft) x 7.48 gal/ft^3 x N-conc (mg/L) x 3.785 L/gal ÷ 454000 mg/lb x 75% (25% reduction for LID)	5.3
Roof area (sq ft)		
6,681	x (40 in/yr ÷ 12 in/ft) x 7.48 gal/ft^3 x N-conc (mg/L) x 3.785 L/gal ÷ 454000 mg/lb	1.0
	TOTAL NITROGEN LOADING (LBS/YR)	59.2
		TOTAL RECHARGE (MG/YR)
Recharge from sewage (gal/day)		
1,465	x 365 days/yr : 1,000,000 gal/million gal	0.53
Total pervious area (sq ft)		
14,279	x (19 in/yr /12 in/ft) x 7.48 gal/cu ft : 1,000,000 gal/million gal	0.17
Total impervious area (sq ft)		
29,552	x (40 in/yr /12 in/ft) x 7.48 gal/cu ft : 1,000,000 gal/million gal	0.74
Total recharge area, pervious + impervious (acres)		
1.0		
	TOTAL RECHARGE (MGAL/YR)	1.44
TOTAL NITROGEN LOAD/TOTAL RECHARGE X 454,000 MG/LB : 3,785,000 L/MGAL		
	=RECHARGE NITROGEN CONCENTRATION (mg/L or ppm)	4.93

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