27 Park Street - Cape Cod Hospital - Project 2022

Water Resources Nitrogen Loading and Mitigation Worksheet

See Technical Bulletin 91-001 for further details: http://www.capecodcommission.org/regulatory/NitrogenLoadTechbulletin.pdf

Project Nitrogen Load — *Wastewater* — *Proposed development*

1.

Project Title-5 wastewater flows: 58800.0 gpd (a)
Actual wastewater flows: 58800.0 * (b)
Average wastewater flows: 58800.0 gpd (a)+(b) ÷2= (A)
* Title-5 flows prescribed by TB91-001 for commercial uses

Place √ in applicable box:

Yes	No	
X		Will the project be connected to sewer ?
X		Is project Title-5 wastewater flow 10,000 gpd or greater ?

(If 'Yes', then the project must be reviewed for consistency with Additional Methods under Objective WR1)

Place √ in applicable box and multiply unsewered wastewater flow by applicable conversion factor:

☐	Standard Title-5 System (35-ppm-N)	x 0.048359	} Type of system: _____
☐	DEP-approved I/A System (25-ppm-N)	x 0.034542	
☐	DEP-approved I/A System (19-ppm-N)	x 0.026252	
☐	Groundwater Discharge (10-ppm-N)	x 0.013817	

Wastewater nitrogen load **(Title-5 flows)** = 0.00 kg-N/yr (B)

Wastewater nitrogen load **(Actual flows)** = 0.00 kg-N/yr (C)

Stormwater Runoff

Town: ___ Barnstable

Recharge rate for town (inches; for natural areas from Technical Bulletin 91-001): 18 (RECH)

Project site area: 17.424 acres (D)

Project site wetland area: 0.000 acres (E)

Project site upland area: 17.424 acres (F)

Pervious unpaved upland: 2.784 acres (G)

0 % using LID — Paved area: 333,870 s.f. (H)

Factor may be adjusted for employment of LID → x 1.4158E-04

= 47.2706501 kg-N/yr (I)

Roof area: 303,850 s.f. (J)

x 7.0792E-05

= 21.5101 kg-N/yr (K)

Fertilizer

Managed turf: 121,200 s.f.

x 3.4019E-04

= 41.232 kg-N/yr (L)

Total Nitrogen Load

Total project nitrogen load **(Title-5 flows)**: 110.01 kg-N/yr (M)= (B)+(I)+(K)+(L)

Total project nitrogen load **(Actual flows)**: 110.01 kg-N/yr (N)= (C)+(I)+(K)+(L)

Nitrogen load **(Average)**: 110.01 kg-N/yr (O)= (M)+(N) ÷2

Nitrogen Loading Concentration

Project nitrogen loading concentration **(Title-5 flows)**: 0.75 ppm-N (P)= $\frac{(M)}{(a)\div 723.76 + (G)x(RECH)\div 9.7286 + (H)\div 10{,}594 + (K)\div 0.75}$

Project nitrogen loading concentration **(Actual flows)**: 0.75 ppm-N (Q)= $\frac{(N)}{(b)\div 723.76 + (G)x(RECH)\div 9.7286 + (H)\div 10{,}594 + (K)\div 0.75}$

Project nitrogen loading concentration **(Average)**: 0.75 ppm-N (R)= (P)+(Q) ÷2

next page –>

Existing (if redevelopment)

Calculate (A') through (P') as w/ (A) through (P):

Title-5 wastewater flows: 58800.0 gpd
Actual wastewater flows: 58800.0 *
Ave. wastewater flows: 58800.0 gpd (A')

Place √ in applicable box:

Yes	No	
X		Is existing development on sewer ? {If 'Yes', then go to line 2.}

☐	Standard Title-5 System	
☐	DEP-approved I/A System (commercial)	
☐	DEP-approved I/A System (residential)	
☐	Wastewater Treatment Facility (GWDP)	

0 — 0.00 kg-N/yr (B')

0 — 0.00 kg-N/yr (C')

wastewater offsets

Project site area: 17.424 acres (D)

Project site wetland area: 0.000 acres (E)

Project site upland area: 17.424 acres (F)

Pervious unpaved upland: 3.003 acres (G')

Paved area: 350,655 s.f. (H')

Paving runoff offset: 49.6471 kg-N/yr (I')

Roof area: 277,535 s.f. (J')

Roof runoff offset: 19.6473 kg-N/yr (K')

Managed turf: 130,800 s.f.

Fertilizer offset: 44.497 kg-N/yr (L')

Existing nitrogen load (Title-5 flows): 113.79 kg-N/yr (M')

Existing nitrogen load (Actual flows): 113.79 kg-N/yr (N')

Nitrogen offset: 113.79 kg-N/yr (O')

85.34382783

Existing nitrogen loading concentrations:

Title-5 flows: 0.78 ppm-N (P')

Actual flows: 0.78 ppm-N (Q')

Average: 0.78 ppm-N (R')

Resource/ Impact Based Criteria

Marine Water Recharge Areas

Yes [X] No [ ]

2. Is the project in Marine Water Recharge Area (MWRA) with a nitrogen-loading limit OR in a MWRA that discharges to coastal waters with documented impaired water quality** ?
(If 'No', then go to line 3.)

Name of Marine Water Recharge Area sub-embayment (*from RPP Data Viewer*):
Hyannis Inner Harbor

Nitrogen-loading limit** : 0.000 kg-N/yr (S)

[ ] [X] Does project's nitrogen load (O) exceed the existing load (O') AND the critical nitrogen load (S) ?
(If 'No', then go to line 3.)

Project nitrogen load to be mitigated: 0.00 kg-N/yr (T)= LESSER OF (O)-(S) x(F) AND (O)-(O') x(F)
x $8,290 /kg/yr
= $ 0 (U)

[ ] Place √ in box if applicant intends to make this payment (S)
(If not checked, then the project must provide an alternative strategy for meeting its nitrogen load requirement pursuant to Objective WR3)

** *When a nitrogen-loading limit has been determined through either a Total Maximum Daily Load (TMDL), a Massachusetts Estuaries Project-accepted technical report, or specified by a Commission-approved comprehensive wastewater management plan pursuant to Objective WR3, or if impaired water quality has been documented for the receiving coastal waters, the nitrogen loading limit shall be 0 kg-N/yr per acre pursuant to Objective WR3.*

Groundwater Quality

Yes [ ] No [X]

3. Does the project's nitrogen loading concentration in groundwater (R) exceed the greater of 5 ppm *or* the existing concentration (R') ?
(If 'Yes' and the project is not located in an Impaired Area, the project will need to provide an alternative strategy for meeting Objective WR1)

Potential Public Water Supply Areas

Yes [ ] No [X]

4. Is project in a Potential Public Water Supply Area (PPWSA) ?
(If 'No', then go to line 5.)

[ ] [ ] Does the project's nitrogen loading concentration (R) exceed the greater of 1 ppm *or* the existing concentration (R') ?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR1)

[ ] [ ] Does the project use, treat, generate, store or dispose of hazardous materials in excess of the greater of a) household quantities or b) existing quantities ?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR1)

Wellhead ProtectionAreas

Yes [ ] No [X]

5. Is project in a Wellhead Protection Area (WHPA) ?
(If 'No', then go to line 6.)

[ ] [ ] Does the project's nitrogen loading concentration (R) exceed the greater of 5 ppm *or* the existing concentration (R') ?
(If 'Yes' and the project is not located in an Impaired Area, the project must provide an alternative strategy for meeting Objective WR1)

[ ] [ ] Does the project use, treat, generate, store or dispose of hazardous materials in excess of the greater of a) household quantities or b) existing quantities ?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR1)

Fresh Water Recharge Areas

Yes [ ] No [X]

6. Is project wastewater disposed of within 300 feet of a stream or fresh surface water body?
(If 'No', then go to line 7.)

[ ] [ ] Is the project located in a freshwater recharge area (FWRA) hydraulically upgradient of a stream or fresh surface water body?
(If 'Yes', the project must provide an alternative strategy for meeting Objective WR2)

Other Potential Impacts

Yes [ ] No [X]

7. Will the project withdraw more than 20,000 gallons of water per day ?
(If 'Yes', then the project must provide documentation demonstrating that there will not be significant impacts to water levels, surface waters and wetlands)

8. ***The project must demonstrate compliance with Objective WR4, including use of Low Impact Development to mitigate impacts of stormwater runoff and O & M plans for maintaining stormwater infrastructure and landscaping.***