

Town of Bourne - Water Resources Nitrogen Loading and Mitigation Worksheet

See Cape Cod Commission Technical Bulletin 91-001 for further details: https://capecodcommission.org/resource-library/the-run-dep/commision/learn/Website_Resources/regulatory/NitrogenLoadTechBulletin.pdf



Facility Address: 68 Elgin Road
 Preparer's Name: Bracken Engineering, Inc.
 Date: 01-09-2023
 Watershed: Pocasset Harbor

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Bourne Health Department
 24 Perry Avenue
 Buzzards Bay MA 02532

Project Nitrogen Load

Wastewater

Project Title-5 wastewater flows:	330.0	gpd	(a)
Actual wastewater flows:	175.0	* 175 gpd per dwelling unit	(b)
Average wastewater flows:	252.5	gpd	(a)+(b) +2= (A)

* Title-5 flows prescribed by 1891-001 for commercial uses

Place V: In applicable box:
 Yes
 No
 Will the project be connected to sewer? Yes
 No
 Is project Title-5 wastewater flow 10,000 gpd or greater? Yes
 No

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: MicroFast
DEP-approved I/A System (25-ppm-N)	x	0.034542	
DEP-approved I/A System (19-ppm-N)	x	0.026252	
DEP-approved Enhanced I/A (12-ppm-N)	x	0.016580	

Wastewater nitrogen load (Title-5 flows) = 8.66 kg-N/yr (B)
 Wastewater nitrogen load (Actual flows) = 4.59 kg-N/yr (C)

Stormwater Runoff

Recharge rate for Bourne (inches; for natural areas from Technical Bulletin 91-001): 21 (RECH)

Project site area: 0.417 acres (D)
 Project site wetland area: 0.000 acres (E)
 Project site upland area: 0.417 acres (F)
 Pervious unpaved upland: 0.299 acres (G)

Factor may be adjusted for employment of LID → Paved area: 2.058 s.f. (H)
 LID = low impact development x 1.4158E-04 = 0.29137987 kg-N/yr (I)
 Roof area: 3.087 s.f. (J)
 x 7.0792E-05 = 0.2185 kg-N/yr (K)

Fertilizer

Previous unpaved upland - roof area = 4.494 s.f.
 Managed turf/lawn area x 3.4019E-04 = 1.529 kg-N/yr (L)

Total Nitrogen Load

Total project nitrogen load (Title-5 flows): 10.70 kg-N/yr (M) = (B)+(I)+(K)+(L)
 Total project nitrogen load (Actual flows): 6.63 kg-N/yr (N) = (C)+(I)+(K)+(L)
 Nitrogen load per acre (Average): 20.79 kg-N/yr/acre (O) = (M)+(N) +2+(F)

Nitrogen Loading Concentration

Project nitrogen loading concentration (Title-5 flows):	6.75	ppm-N	(P) =	(a)+723.76 + (G)x(RECH)+9.7286 + (H)+10.594 + (K)+0.75
Project nitrogen loading concentration (Actual flows):	4.83	ppm-N	(Q) =	(b)+723.76 + (G)x(RECH)+9.7286 + (H)+10.594 + (K)+0.75
Project nitrogen loading concentration (Average):	5.79	ppm-N	(R) =	(P)+(Q) +2

Resource/ Impact Based Criteria

Marine Water Recharge Areas / Coastal Embayments

2. Yes No
 Is the project located in any of the following watersheds: Butternik Bay Basins, Phineys Harbor / Back River / Eel Pond, Pocasset River Basin, Pocasset Harbor / Hen Cove / Red Brook Harbor, Megansett / Squeague Harbors** ?
 (If 'No', then go to line 3)

Name of Watershed (from Regional Policy Plan Data Viewer):

Pocasset Harbor

Critical Nitrogen-loading limit** : 0.000 kg-N/year/acre (S)

Does project's nitrogen load (O) exceed the critical nitrogen load (S) ?
 (If 'No', then go to line 3) Excess project nitrogen load to be mitigated: 8.67 kg-N/yr (T) = LESSER OF (O)-(S) x(F) AND (O)-(O1) x(F)

**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

3. Yes No
 Does the project's nitrogen loading concentration in groundwater (R) exceed the greater of 5 ppm ?
 (If 'Yes', the project will need to provide an alternative strategy for meeting these thresholds by using another worksheet)

Potential Public Water Supply Areas

4. Yes No
 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 ?
 (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 Protection Areas

5. Yes No
 Is project in a Wellhead Protection Area (WHPA): Zone I, Zone II, or WPA ?

Does the project's nitrogen loading concentration (R) exceed the greater of 5 ppm ?
 (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)

Fresh Water Recharge Areas

6. Yes No
 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 (FVRA) 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

7. Yes No
 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.