



TOWN OF BELLINGHAM

CONSERVATION COMMISSION
MUNICIPAL CENTER
10 MECHANIC STREET
BELLINGHAM, MA 02019

SUBMITTAL STANDARDS

APPLICANTS FOR DEVELOPMENT PROJECTS FOR:

- * SUBDIVISIONS
- * COMMERCIAL
- * INDUSTRIAL PROJECTS
- * TRANSPORTATION PROJECTS

For the protection of resource areas and for flood prevention required under the MA Wetlands Protection Act and the Bellingham Wetlands Bylaw, the Bellingham Conservation Commission has established the submittal standards which follow, for evaluating and mitigating development impacts.

Impacts to all resource areas regulated under the Bylaw including the buffer zone must be clearly quantified by an attachment to the Notice of Intent filing. The narrative should also include procedures to be implemented to minimize, avoid and, if required, mitigate said impacts.

Any application submitted to the Conservation Commission shall not be deemed complete until such time that a Notice of Intent for work proposed is filed under the state Wetlands Protection Act and Bellingham Wetlands Bylaw including the criteria listed above, appropriate fees and supporting documentation/plans.

A. STORMWATER MANAGEMENT

A development application shall include information to assess protection of resource areas and flood mitigation. A stormwater management evaluation shall be provided consistent with the DEP Stormwater Management Handbook, the Bellingham Stormwater Management and Erosion Control Handbook, the Bellingham Wetlands Regulations, and the following:

Stormwater management designs shall meet the following criteria:

- i. Outside the Water Resource District, 2-foot minimum separation shall be provided between the stormwater management location¹ bottom and estimated seasonal high groundwater. Within the Water Resource District, 4-foot minimum separation shall be provided between the stormwater management location bottom and estimated seasonal high groundwater.

¹ Stormwater management locations are those where stormwater is retained, detained or infiltrated, e.g. subsurface or surface basins or infiltration systems, water quality swales, drywells, etc.



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Where seasonal high groundwater is not observable by redoximorphic features, the Frimpter method shall be used at each test location. The effects of groundwater mounding shall also be considered in meeting the minimum separation requirements.

- ii. A minimum of three test pits shall be provided within each stormwater management location. Soils data from NRCS soils mapping shall be verified by witnessed, on-site soil and groundwater examinations, and soil types characterized accordingly.
- iii. For areas storing stormwater for retention or detention, a minimum 1-foot freeboard shall be provided between the 100-year flood elevation and the emergency overflow elevation.
- iv. Emergency spillways shall be sized for the 100-year peak basin inflow rate, while providing a 6-inch freeboard to the dike crest.
- v. Any basin outlet less than a 4-inch orifice or a 2-inch slot shall be considered plugged for purposes of flood routing calculations.
- vi. Surface basins shall also be sized assuming frozen ground conditions within the basins – no infiltration – during a 25-year storm event.
- vii. Pipe and basin sizing shall utilize the latest hydrologic data from Cornell University (or other current, accepted hydrological data) to determine the volumes of the 2, 10, 25 and 100-year storm for comparison of pre and post development runoff.
- viii. Within the Water Resource District, vegetative pretreatment or equivalently-effective system shall be utilized for all impervious area stormwater runoff prior to discharge.
- ix. There shall be no increase in stormwater runoff rate for any of the above-specified storm events. There shall be no increase in runoff volume from a development for up to the 25-year storm.
- x. Other aspects of the stormwater management shall comply with the requirements of the DEP Stormwater Management Handbook (Volumes 1-3, latest edition).

B. HYDROGEOLOGIC ASSESSMENT STANDARDS

Except as noted in Paragraph 3.0, a development application shall include a hydrogeologic assessment of nutrient impacts to groundwater and surface waters. The assessment shall consistent with the following:

- 1.0 BASE MAP – Should include:
 - 1.1 Existing surface water bodies and wetlands
 - 1.2 Location of existing wells and septic systems within 100 feet of the proposed project property bounds.
 - 1.3 Existing and planned land surface elevations
 - 1.4 Groundwater contours at minimum two (2) foot intervals



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1.5 Detailed description of proposed project, including:

- a) location of planned septic systems
- b) water supply wells
- c) residential dwellings
- d) lawn areas
- e) paved areas

2.0 BACKGROUND INFORMATION – Should include:

2.1 Existing condition of ground and surface water quality, including physical characteristics and water chemistry. Measurements shall specifically include concentrations of total phosphorus if in the recharge zone of freshwater pond; and nitrate-nitrogen if in a zone of contribution to a private or public water supply well.

2.2 Subsurface geology

2.3 Surface drainage patterns

3.0 ANALYSIS OF DEVELOPMENT IMPACT

The analysis of the impact of the development will vary depending on its location in relation to sensitive water resources within the Town. One of three categories will apply. They are: 1) a Water Resource District; 2) Zone II protection areas to public drinking water supplies, per MA GIS designation of a Zone II; 3) the watershed of a surface water body. The standards for Large Projects do not apply, unless specifically required by the Commission, to subdivisions with upland in excess of 80,000 square feet per buildable lot or developments of less than 2 acres.

3.1 Areas within a Water Resource District or Zone II Protection Areas to Public Drinking Water Supplies

Hydrogeologic analysis should include:

The existing condition of the water supply, including well location, aquifer characteristics, well construction, quantity and quality of water pumped by the well.

A calculation of the total nitrogen loading from the proposed development (in pounds per year) and the predicted nitrogen concentration in ground water underneath the development (in mg/l) using loading rates provided in Table 3-1 below, added to the average predevelopment nitrogen concentration.

If the results of the post-development nitrogen loading analysis predicts exceedance of a nitrogen concentration of 5 mg/l at the downgradient property



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line, then applicant must indicate nitrogen reduction measures for the proposed development that will reduce the nitrogen loading so the predicted concentration is 5 mg/l or less at the downgradient property boundary.

Table 3-1

Nitrogen Loading Analysis Parameters SOURCE	CONCENTRATION	LOADING RATE	FLOW/ RECHARGE
Sewage	40 mg N/liter	(6.72 lbs N/person/yr) (165 gallons/dwelling)	55 gallons/person/day
Fertilizer (Lawns)		(0.9 lbs N/1000 sq. ft./yr.)	18 in./year
Pavement Runoff	2.0 mg N/liter	(.42 lbs N/1000 sq.ft./yr.)	40 in./yr
Roof Runoff	0.75 mg N/liter	(0.15 lbs N/1000 sq.ft./yr.)	40 in./yr
Precipitation	0.05 mg N/liter	(0.005 lbs N/1000 sq.ft./yr.)	17 in./year

3.2 Contributing Areas to Fresh Water Lakes or Ponds

Analysis should include:

A map showing the boundaries of the contributing area to the development site based on ground water flow and/or surface water runoff. A calculation of the total existing and proposed phosphorus loadings (in pounds per year) using loading rates provided in Table 3-2 below.

There shall be no increase in phosphorus load from existing undeveloped conditions on any site. This can be accomplished by infiltrative measures and/or phosphorus trading (reduction at existing sites) within the same subwatershed). For site redevelopment areas, phosphorus loading shall be reduced by 65 percent from the existing conditions.



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TABLE 3-2
Watershed Phosphorus Loading Model

Build-out Conditions QUANTITY	SOURCE LOADING	LOADING LBS/YR.	PERSISTENCE	
GROUNDWATER				
Septic Systems	*	9.6 lbs/unit/yr	0.20	**
Lawns	*	0.91 lbs/5000 sq.ft/yr	0.19	**
Agricult.Fields (acres)	*	0.5 lbs/acre/yr	0.24	**
Feedlots (acres)	*	227 lbs/acre/yr	0.24	**
Forested (acres)	*	0.2 lbs/acre/yr	0.37	**
Road Drainage (acres)	*	0.92 lbs/acre/yr	0.00	**
TOTAL (Loading to Stream/Pond)			***	
STORMWATER RUNOFF				
Lawns	*	0.91 lbs/5000 sq.ft/yr	0.31	**
Agricult.Fields (acres)	*	0.5 lbs/acre/yr	0.40	**
Feedlots (acres)	*	227 lbs/acre/yr	0.40	**
Forested (acres)	*	0.2 lbs/acre/yr	0.63	**
Impervious Areas (acres)	*	1.8 lbs/acre/yr	1.00	**
TOTAL (Loading to Stream/Pond)			***	
TOTAL LOADING			*****	

* quantity of

** quantity times unit loading times persistence, measured in pounds per year

*** Column total

**** Sum of groundwater and stormwater flows

NOTE: Number of acres times 43,560 square feet times runoff/recharge in ft/yr times 7.48 gallons per cubic foot equal gallons per year. Convert to liters and convert pounds per year to milligrams to get MG/L concentration.

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