**RESIDENTIAL LOW IMPACT DEVELOPMENT**

*Prepared by the Pioneer Valley Planning Commission*

**Section 1.0 Stormwater Management Bylaw**

**1.1 Purpose**

The purpose of this bylaw is to protect, maintain and enhance the public health, safety, environment and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff and non-point source pollution associated with new development and redevelopment. Smart site planning and proper management of post-development stormwater runoff will minimize damage to public and private property and infrastructure, safeguard public health, safety, environment and general welfare of the public, protect water and aquatic resources, and promote groundwater recharge to protect surface and groundwater drinking water supplies.

**1.2 Applicability**

This bylaw shall be applicable to all land disturbance uses requiring a Special Permit, Site Plan Approval, and residential uses including single-family detached dwellings creating land disturbances and requiring a Building Permit.

**1.3 Application Procedures**

1. For land disturbance uses requiring a Special Permit, a Stormwater Management Plan should be submitted to the Permit Granting Authority for review and approval.

2. For land disturbance uses requiring Site Plan Approval, an Stormwater Management Plan should be submitted to the Permit Granting Authority for review and approval.

3. For all residential uses not requiring a Special Permit or Site Plan Approval, a residential Stormwater Management Plan identifying post-construction drainage controls for the roof, driveway and any drains, including their locations on a site plan,shall be submitted to the Zoning Code Enforcement Officer on a form provided by the Zoning Code Enforcement Officerpriorto application for a Building Permit. The Zoning Code Enforcement Officer will refer Stormwater Management Plan submittals to the Conservation Commission and Board of Health for review and comment to ensure consistency with this bylaw. For residential uses not requiring a Special Permit or Site Plan Approval, the Zoning Code Enforcement Officerwill have authority to render a final decision as to whether the StormwaterManagement Plan is satisfactory.

4. The Conservation Commission and Board of Healthshall have 30 days to provide comments to the Zoning Code Enforcement Officer. If comments are not received within 30 days, the Zoning Code Enforcement Officermay render a decision without comment.

5. The Zoning Code Enforcement Officer shall render a decision regarding whether the Stormwater Management Plan is consistent with the standards of this bylaw within 45 days of submittal of such plan.

6. If the Stormwater Management Plan is determined to be inconsistent with this bylaw, the project proponent may amend and re-submit the plan at any time, in order to meet the requirements of this bylaw.

**1.4 Stormwater Management Plan Contents**

1. This plan shall be submitted in accordance with the criteria established in this bylaw and must be submitted with the stamp and signature of a Professional Engineer (PE) licensed in the Commonwealth of Massachusetts.

2. The Stormwater Management Plan shall fully describe the project in drawings, narrative and calculations. For uses causing land disturbance and requiring a Special Permit and Site Plan Approval, the StormwaterManagement Plan shall contain the following:

a. Contact Information: Name, address and telephone number of all persons having legal interest in the property, and the parcel number (map and lot) of the property or properties affected;

b. A locus map;

c. Existing site plan;

d. Existing zoning and land use at the site;

e. Proposed land use;

f. Location(s) of existing and proposed easements;

g. Location(s) of existing and proposed utilities;

h. Existing and proposed topography at the site with contours at 2-foot intervals;

i. Existing site hydrology (both groundwater recharge and surface runoff);

j. Description and delineation of existing stormwater conveyances, impoundments, wetlands, drinking water resource areas, swimming beaches or other critical environmental resource areas, on or adjacent to the site into which stormwater flows;

k. Delineation of 100-year flood plains, if applicable;

l. Estimated seasonal high groundwater elevation in areas to be used for stormwater retention, detention or infiltration;

m. Existing and proposed vegetation and ground surfaces with runoff coefficients for each;

n. Drainage area map with pre- and post-construction watershed boundaries, drainage area and stormwater flow paths, including municipal drainage system flows;

o. Recharge area analysis that calculates pre-and post-construction annual groundwater recharge rates on the parcel;

p. A description and drawings of all components of the proposed LID Management system including:

i. Locations, cross sections, and profiles of all brooks streams, drainage swales and their method of stabilization;

ii. Structural details and constructions specifications for the detention, retention or infiltration of water;

iii. Any other information requested by the permit granting authority or the Building Inspector.

q. Hydrologic and hydraulic design calculations for the pre- and post-development conditions for the 2-year, 10-year and 100-year 24 hour storm events. Such calculations shall include:

i. Description of the design storm frequency, intensity and duration;

ii. Time of concentration;

iii. Soil Runoff Curve Number (RCN) based on land use and soil hydrologic group;

iv. Peak runoff rates and total runoff volumes for each watershed area;

v. Information on construction measures used to maintain the infiltration capacity of the soil where any kind of infiltration is proposed;

vi. Infiltration rates, where applicable;

vii. Culvert capacities;

viii. Flow velocities;

ix. Data on the increase in rate and volume of runoff for the specified design storms, and

x. Documentation of sources for all computation methods and field test results.

r. Post-Development downstream analysis if deemed necessary by the granting authority. The permit grantingauthority may request that the applicant evaluate the hydrologic impactsimmediately downstream of the project.

s. Soils Information from test pits performed at the location of proposed Stormwater Management facilities, including but not limited to soil descriptions, depth to seasonal high groundwater, depth to bedrock, and percolation rates. Soils information will be based on site test pits logged by a Massachusetts Registered Soil Evaluator, or a Massachusetts Registered Professional Engineer;

t. Landscaping plan describing the woody and herbaceous vegetative stabilization and management techniques to be used within and adjacent to the stormwater practice.

3. For single-family residential uses creating land disturbance and requiring a building permit, the contents of the Stormwater Management Plan shall include a description of the site hydrology and proposed systems for management of runoff from impervious surfaces including roofs and driveways and the locations of any foundation or curtain drains and their outfalls. The contents of the Stormwater Management Plan shall be submitted on a form provided by the Zoning Code Enforcement Officer.

**1.5 Operation and Maintenance Plan**

1. An Operation and Maintenance Plan (O&M Plan) is required at the time of application for all Special Permit and Site Plan Approval projects rendering 15 percent or more of a site impervious. The maintenance plan shall be designed to ensure compliance with this Bylaw and that the Massachusetts Surface Water Quality Standards, 314, CMR 4.00 are met in all seasons and throughout the life of the system. The Operation and Maintenance Plan shall remain on file with the permit granting authorityand shall be an ongoing requirement. The O&M Plan shall include:

a. The name(s) of the owner(s) for all components of the system;

b. A map showing the location of the systems and facilities including catch basins, manholes/access lids, main, and stormwater devices;

c. Maintenance agreements that specify:

(i) The names and addresses of the person(s) responsible for operation and maintenance;

(ii) The person(s) responsible for financing maintenance and emergency repairs;

(iii) An Inspection and Maintenance Schedule for all LID Management facilities including routine and non-routine maintenance tasks to be performed;

(iv) A list of easements with the purpose and location of each;

(v) The signature(s) of the owner(s).

2. StormwaterManagement Easement(s)

a. Stormwater management easements shall be provided by the property owner(s) as necessary for:

(i) Access for facility inspections and maintenance;

(ii) Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event;

(iii) Direct maintenance access by heavy equipment to structures requiring regular maintenance.

b. The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.

c. Stormwater Management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Building Inspector.

d. Easements shall be recorded with the Hampshire County Registry of Deeds prior to issuance of a Building Permit by the Building Department.

3. Changes to Operation and Maintenance Plans

a. The owner(s) of the Stormwater Management system must notify the permit granting authority of changes in ownership or assignment of financial responsibility.

b. The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this Bylaw by mutual agreement of the permit granting authority and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, and persons with operational responsibility.

4. Stormwater Performance Standards

The following performance standards must be met for the StormwaterManagement Plan to be determined to be in conformance with this bylaw:

a. Open space must be preserved to the maximum extent possible through the use of site planning that identifies important natural resource areas, such as critical recharge areas and species habitat, and seeks to prevent disturbance of these areas by development.

b. Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

c. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent possible. The annual recharge from the post-development site should approximate the annual recharge from the pre-development or existing site conditions based on soil types.

d. Stormwater must be managed to prevent flooding of neighboring and other down gradient properties.

e. Existing vegetation should be preserved to the maximum extent possible and native plant communities must be replicated in post-construction landscaping.

f. Appropriate best management practices to meet the intent of this bylaw include but are not limited to: detention/retention basins, drywells and other infiltration devices equipped with oil/grease pretreatment systems, rain gardens, green roofs, rain barrels, porous pavement, vegetated swales, and constructed wetlands.