

**Town of Natick
Stormwater Management and Erosion Control Bylaw
REGULATIONS**

PART I. GENERAL PROVISIONS

- A. These Regulations were adopted for implementation of the Stormwater Management and Erosion Control Bylaw (the Bylaw) of the Town of Natick by the Natick Conservation Commission by majority vote on May 21, 2020, and filed with the Town Clerk on June 23, 2020.

- B. The purpose, definitions, authority, applicability, exempt activities, action and appeal process, and other details included in Article 79A of the Town of Natick Bylaws (Fall Town Meeting 2019) apply to the administration of these Regulations. Terms used that are not specifically defined in the Bylaw or these Regulations will be as defined in the most recently amended Massachusetts Department of Environmental Protection's (MassDEP) Massachusetts Stormwater Handbook.

PART II. MINOR STORMWATER AND EROSION CONTROL PERMIT

The Minor Stormwater and Erosion Control Permit (Minor Permit) is designed for new development and redevelopment projects meeting the permit thresholds outlined in the Stormwater Management and Erosion Control Bylaw (the Bylaw), Section 4.C "Permit Thresholds". Minor Permits are reviewed and approved or denied administratively.

- A. The application submitted to the Conservation Commission for a Minor Permit must include:
 - 1) one original hard copy and one digital copy of a completed Application Form with signatures of all property owners and the signature of the applicant if different;
 - 2) one original hard copy and one digital copy of a Stormwater Management Plan which will include erosion and sedimentation control elements, low impact development elements, and an Operation and Maintenance Plan as specified in PART II.E and IV of these Regulations; and
 - 3) Payment of the application, compliance, and professional review fees which may include the creation of an escrow account in accordance with Section 7.B of the Bylaw.

- B. Elements related to stormwater management, erosion and sediment control, and low impact development may be combined onto one Minor Permit Stormwater Management Plan which includes one plan sheet (as appropriate) and a narrative.

- C. Performance Standards: The Performance Standards in the most recently amended Massachusetts Stormwater Handbook in addition to the design principles included in Appendix A of these regulations must be followed to the greatest extent practicable for a Minor Permit.

- D. The Minor Permit Stormwater Management Plan must fully describe the project in drawings and a narrative. It must contain sufficient information to describe the proposed Land Disturbing Activity, pertinent conditions of the Site and adjacent areas, and elements related to stormwater management, erosion and sediment control, and low impact

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development. The Applicant must submit such material as is necessary to show that the proposed Land Disturbing Activity will comply with the design principles and contain the information listed below.

E. A Minor Permit Stormwater Management Plan may be prepared by drafting or hand sketching the following minimum required elements:

1) General Information

- a. Title;
- b. Date;
- c. Name and address of record owner and if applicable the name, address, and telephone number of the engineer or surveyor preparing the plan;
- d. When prepared by a professional, plans must be stamped by a Registered Professional Engineer (P.E.), Professional Land Surveyor (PLS), or other recognized professional.

2) Existing and Proposed Conditions

- a. Contours at intervals no greater than two (2) feet;
- b. Surveyed property lines, all existing easements, rights-of-way, and other encumbrances, the size of the entire parcel, and the delineation and size of the land area to be disturbed;
- c. Locations of existing buildings, impervious surfaces, walls, etc.;
- d. Location and extent of natural features including bodies of water, wetlands, vegetation, wildlife habitat, etc. Existing trees in the work area over 6 inches in diameter at breast height (dbh) proposed to be removed must be labeled;
- e. Location of existing and proposed utilities, septic systems and private wells within 100 feet of work area;
- f. Existing soils (type, hydrologic group, erodibility) and the volume and nature of imported soil materials, as appropriate;
- g. Locations of soil tests including test pits, borings, groundwater determinations, and percolation tests with the soil logs and percolation testing results, and/or other soil testing procedures, if applicable;
- h. Existing streets showing drainage and driveway locations and curb cuts within 50 feet of work area;
- i. Proposed grading plan for work area;
- j. Calculations of total land area to be disturbed and if applicable, volume of soil to be disturbed;
- k. Proposed improvements including location of buildings or other structures and impervious surfaces. This must include, at a minimum, building footprints, decks, garages, sheds, sewage disposal systems, roof drainage and storm drainage structures, as applicable, and all areas of proposed impervious surfaces including tennis courts, swimming pools, patios, and driveways, etc. in the work area.
- l. Locations of all construction phase and permanent erosion and sediment control measures, Best Management Practices (BMPs), soil stabilization measures, and material storage;
- m. Location of all proposed drainage and stormwater measures;
- n. For engineered systems designed to provide drainage or stormwater management including, but not limited to, culverts, drainage outfalls, catch basins, and pervious

pavement provide an appropriate plan detail and hydrologic calculation.

- 3) A project narrative that describes the above including a description of:
 - a. Existing conditions;
 - b. The proposed project and conditions;
 - c. Proposed construction schedule/phasing;
 - d. A description of how and where stormwater will be controlled;
 - e. Erosion and sedimentation controls implemented;
 - f. Operation and Maintenance Plan as described in Part IV of these regulations;
 - g. How the project meets the MassDEP Stormwater Standards and design principles included in Appendix A of these regulations to the greatest extent practicable.

PART III. MAJOR STORMWATER AND EROSION CONTROL PERMIT

The Major Stormwater and Erosion Control Permit (Major Permit) is designed for new development and redevelopment projects meeting the permit thresholds outlined in the Stormwater Management and Erosion Control Bylaw (the Bylaw), Section 4.C "Permit Thresholds". Major Permits are reviewed and approved or denied by the Conservation Commission through a public hearing.

- A. The application submitted to the Conservation Commission for a Major Permit must include:
 - 1) one original hard copy and one digital copy of a completed Application Form with signatures of all property owners and the signature of the applicant if different;
 - 2) a list of abutters within 100 feet of the project site, certified by the Assessor's Office;
 - 3) one original hard copy and one digital copy each of the Erosion and Sedimentation Control Plan, Stormwater Management Plan, and Operation and Maintenance Plan as specified in PART III.D, III.E, and IV of these Regulations;
 - 4) payment of the application, compliance, and professional review fees which may include the creation of an escrow account in accordance with Section 7.B of the Bylaw; and
 - 5) certification of delivery of completed applications to the Department of Public Works and the Board of Health for their review and comment.
- B. Performance Standards: The Performance Standards of the most recently amended Massachusetts Stormwater Handbook in addition to the design principles included in Appendix A of these regulations must be met for a Major Permit.
- C. Public Hearing: All Major Permits require a public hearing through the Conservation Commission. Refer to Section 7 of the Bylaw for timeframe and public notice requirements. The Applicant is responsible for notifying abutters within 100 feet of the project site (including abutters to abutters and abutters opposite a waterway or any private or public street or way). Proof of abutter notification is required to be provided to the Conservation Commission at the beginning of the public hearing.

D. Erosion and Sedimentation Control Plan

The Major Permit Erosion and Sedimentation Control Plan must contain sufficient

information to describe the nature and purpose of the proposed Land Disturbing Activity, pertinent conditions of the Site and the adjacent areas, and proposed Erosion and Sedimentation controls to be used pre-construction and during construction.

The Erosion and Sedimentation Control Plan must fully describe the project in drawings and narrative. It must include the following minimum required elements:

- 1) General Information
 - a. Title;
 - b. Original plan date including space for revision dates;
 - c. Name and address of record owner and if applicable the name, address and telephone number of the engineer or surveyor preparing the plan;
 - d. North arrow;
 - e. Abutters' names;
 - f. Scale no greater than 1"=40';
 - g. Legend identifying line types and symbols used in plan set;
 - h. Locus map (scale no greater than 1"=200');
 - i. Plans and calculations must be stamped by a Registered Professional Engineer (P.E.) or Professional Land Surveyor (PLS).

- 2) Existing and Proposed Conditions
 - a. Contours at intervals no greater than two (2) feet with spot elevations provided when needed;
 - b. Surveyed property lines, all existing easements, rights-of-way, and other encumbrances, the size of the entire parcel, and the delineation and size of the land area to be disturbed;
 - c. Locations of existing buildings, impervious surfaces, walls, etc.;
 - d. Location and extent of natural features including:
 - i. Watercourses and water bodies, wetland resource areas, riparian zones and all floodplain information, including the 100-year and 500-year flood elevation based upon the most recent Flood Insurance Rate Map, or as calculated by a professional engineer for areas not assessed on these maps;
 - ii. Existing vegetation of various kinds including tree lines, shrub layer, ground cover, herbaceous vegetation. Existing trees in the work area over 6 inches in diameter at breast height (dbh) proposed to be removed must be labeled;
 - iii. Areas of exposed ledge or boulders greater than 1 cubic yard;
 - iv. Habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened or of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools, Potential Vernal Pools, and Priority Habitats of Rare Species within five hundred (500) feet of the work area if applicable.
 - e. Location of existing and proposed utilities, septic systems and private wells within 100 feet of work area;
 - f. Calculations of total land area to be disturbed and if applicable, volume of soil to be disturbed;
 - g. Existing soils (type, hydrologic group, erodibility) and the volume and nature of imported soil materials, as appropriate;
 - h. Locations of soil tests including test pits, borings, groundwater determinations,

and percolation tests with the soil logs and percolation testing results, and/or other soil testing procedures, if applicable;

- i. Existing streets showing drainage and driveway locations and curb cuts within 50 feet of work area;
 - j. Proposed grading plan for work area;
 - k. Proposed improvements including location of buildings or other structures and impervious surfaces. This must include, at a minimum, building footprints, decks, garages, sheds, sewage disposal systems, roof drainage and storm drainage structures, as applicable, and all areas of proposed impervious surfaces including tennis courts, swimming pools, patios, and driveways, etc. in the work area;
 - l. Location of erosion and sediment control measures and BMPs;
 - m. Location of temporary seeding, vegetative controls, and other soil stabilization measures;
 - n. Location of construction and waste material storage including:
 - i. Convenient locations for waste receptacles and a schedule for regular removal
 - ii. Wash-down areas for vehicles selected to prevent contamination of stormwater
 - iii. Covered storage areas for chemicals, paints, solvents, fertilizers and other toxic materials
 - iv. Adequately maintained sanitary facilities
 - v. Areas designated and used for equipment storage, maintenance and repair
- 3) A project narrative that describes the above including a description of:
- a. Existing conditions;
 - b. The proposed project and conditions;
 - c. Proposed construction schedule/phasing;
 - d. Details of erosion and sedimentation controls implemented and their operation and maintenance;
 - e. Details of soil stabilization measures;
 - f. Construction and waste materials expected to be stored on-site including storage practices, spill prevention and response;
 - g. How the project meets the Erosion and Sedimentation Control design principles included in Appendix A of these regulations.

E. Stormwater Management Plan

The Major Permit Stormwater Management Plan must contain sufficient information to describe proposed Best Management Practices (BMPs) for the permanent management and treatment of Stormwater. The Major Stormwater Management Plan must demonstrate Low Impact Development (LID) techniques.

It must contain sufficient information for the Conservation Commission to evaluate the site planning process, anticipated environmental impacts of the Land Disturbing Activity, and the effectiveness and acceptability of the measures proposed by the Applicant to maintain ecological and hydrological functions of the Site. The goal is to reduce adverse impacts from Stormwater. The Plan must be designed to meet the MassDEP Stormwater Standards set forth in the most recently amended version of the Massachusetts Stormwater Handbook.

The Stormwater Management Plan must fully describe the project in drawings and narrative. It must include the following minimum required elements:

1) General Information

- a. Title;
- b. Original plan date including space for revision dates;
- c. Name and address of record owner and if applicable the name, address and telephone number of the engineer or surveyor preparing the plan;
- d. North arrow;
- e. Abutters' names;
- f. Scale no greater than 1"=40';
- g. Legend identifying line types and symbols used in plan set;
- h. Locus map (scale no greater than 1"=200');
- i. Plans and calculations must be stamped by a Registered Professional Engineer (P.E.) or Professional Land Surveyor (PLS).

2) Existing and Proposed Conditions

- a. Elements of the Major Permit Erosion and Sedimentation Control Plan (Part III.D.2.a – f. of these regulations) must be included on this plan as a basemap;
- b. Calculations of total existing and proposed impervious and pervious area;
- c. Soils map including hydrologic soil group designations;
- d. Soils information from test pits performed at the location of proposed LID 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;
- e. The existing site hydrology;
- f. A description & delineation of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which stormwater flows;
- g. A drainage area map showing pre and post construction sub watershed and watershed boundaries, drainage area and stormwater flow paths, with calculations of proposed land disturbance within each subwatershed and areas of soil to be disturbed in each watershed throughout the duration of the proposed land disturbance activity;
- h. A description and drawings of all components of the proposed drainage system and LID Management system including:
 - i. Locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization;
 - ii. All measures for the detention, retention or infiltration of water;
 - iii. Description of non-structural BMPs;
 - iv. All measures for the protection of water quality;
 - v. The structural details for all components of the proposed drainage systems and LID Management facilities;
 - vi. Notes on drawings specifying materials to be used, construction specifications, and post-development hydrology with supporting calculations.
- i. Hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the 2, 10, 25, and 100-year design storms;

- j. Location of any permanent erosion and sediment control measures and BMPs;
 - k. Location of permanent seeding, vegetative controls, and other soil stabilization measures.
- 3) A project narrative that describes the above including a description of:
- a. Existing and proposed conditions related to stormwater management;
 - b. Timing, schedules, and sequence of development including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization;
 - c. Alternatives analysis demonstrating how LID practices were considered and integrated to the maximum extent practicable throughout the site planning process. The narrative will include any site and financial constraints that limit application of the LID design principles listed in Appendix A of these regulations;
 - d. Operation and Maintenance Plan as described in Part IV of these regulations;
 - e. How the project meets the Performance Standards of the most recently amended Massachusetts Stormwater Handbook in addition to the design principles included in Appendix A of these regulations

PART IV. OPERATION AND MAINTENANCE PLANS and AGREEMENTS

Operation and Maintenance Plans (O&M Plan) for the permanent Stormwater management system is required at the time of application for all Major Permits. An O&M Plan may be required for Minor Permits based on the complexity of the proposed project and stormwater system and will be determined by the Designated Agent.

- A. The O&M Plan must be designed to ensure compliance with the Stormwater Management and Erosion Control Bylaw. The Massachusetts Surface Water Quality Standards contained in 314 CMR 4.00 or any successor regulations must be met in all seasons and throughout the life of the system. The O&M Plan must include any LID practices implemented into the design and construction of the site. The O&M Plan must include any requirements deemed necessary by the Conservation Commission or Designated Agent. The Conservation Commission or Designated Agent must determine what maintenance option is appropriate in a given situation. The Conservation Commission or Designated Agent will consider natural features, proximity of Site to water bodies and Wetlands, extent of Impervious Surfaces, the size of the Site, the types of Stormwater management structures, BMPs, and the potential need for ongoing maintenance when making this decision.
- B. Upon approval, the O&M Plan must be recorded at the Commonwealth of Massachusetts Middlesex South Registry of Deeds by the Permittee, must run with the land, must remain on file with the Conservation Commission, and must be an ongoing requirement. Any changes to the O&M Plan requires notification to the Conservation Commission and rerecording. The Conservation Commission or Designated Agent may require property owner to submit a certification as to annual compliance with the O&M Plan on a case by case basis.
- C. The O&M Plan must include:
 - 1) The name(s) of the owner(s) for all components of the system;
 - 2) Statement committing to notifying the Conservation Commission of any changes to the O&M Plan;
 - 3) Maintenance agreements that specify:

- a. The names and addresses of the person(s) responsible for operation and maintenance
 - b. The person(s) responsible for financing maintenance and emergency repairs.
 - c. A Maintenance Schedule for all drainage structures, including swales and ponds.
 - d. A list of easements with the purpose and location of each.
 - e. The signature(s) of the owner(s).
- 4) The approved Stormwater Management Plan sheet which demonstrates the stormwater system.

D. Stormwater Management Easement(s)

- 1) Stormwater management easements must be provided by the property owner(s) as areas are necessary for:
- a. access for facility inspections and maintenance,
 - b. preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event; and
 - c. direct maintenance access by heavy equipment to structures requiring regular cleanout maintenance.
- 2) The purpose of each easement must be specified in the maintenance agreement signed by the property owner.
- 3) Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Conservation Commission.
- 4) Easements must be recorded with the South Middlesex Registry of Deeds prior to issuance of a Certificate of Compliance by the Conservation Commission.

PART V. INSPECTIONS

All Major Permits require the following inspections. Minor Permit inspections will be determined by the Designated Agent and will be dependent on the proposed project's scale and complexity.

A. Pre-Construction

- 1) The Conservation Commission or Designated Agent requires a pre-construction meeting prior to the commencement of any land-disturbing activity. The Applicant's technical representative, the general contractor or any other person with authority to make changes to the project, must meet with the Conservation Commission or Designated Agent to review the permitted plans and proposed implementation.
- 2) The Applicant must notify the Conservation Commission or Designated Agent three (3) business days (Saturdays, Sundays, and legal holidays excluded) prior to the commencement of construction.
- 3) A copy of the approved and signed plans and permits for a Minor or Major Permit must be kept on the construction site at all times.

B. Construction Inspections

- 1) The Permittee shall notify the Conservation Commission or Designated Agent at least three (3) business days (Saturdays, Sundays and legal holidays excluded) before each of the following events with the purposes of scheduling construction inspections:
 - a. Erosion and Sedimentation control and tree protection measures are in place and stabilized. Purpose of inspection is to assess overall effectiveness of protecting resources;
 - b. Site Clearing and rough Grading have been substantially completed;
 - c. Pre-bed: rough final grading/soil bedding prior to placement of any underground recharge or stormwater conveyance structure. Purpose of inspection is to ensure adequate separation of the stormwater system from ground water and presence of approved soil type;
 - d. Bury Inspection: prior to backfilling of any underground recharge or stormwater conveyance structure. Purpose of inspection is to ensure installation is correct per approved plans;
 - e. Final grading has been substantially completed.
- 2) The Conservation Commission or Designated Agent may require, throughout construction, the submission of periodic inspections and reporting by the Applicant as dictated by site conditions.

C. Final Inspection

After the project has been completed and the stormwater management system has been constructed, all Applicants are required to submit "as built" plans for any stormwater management facilities or practices. The Conservation Commission or Designated Agent must conduct a final inspection to confirm its "as-built" features and other permit conditions, including final landscaping and site stabilization. See Part VII of these regulations for more information.

D. Permittee Inspections

Throughout the duration of construction, the Permittee or the Permittee's agent must conduct and document inspections of all erosion and sedimentation control measures as specified in the Minor or Major Permit, but at a minimum once per week and prior to and following anticipated storm events. The purpose of these inspections will be to determine the overall effectiveness of the Erosion and Sedimentation Control plan, and the need for maintenance or additional control measures. The Permittee or the Permittee's agent must retain documentation of these inspections through internal reporting.

If issues related to the erosion and sedimentation controls arise, the Permittee or the Permittee's agent may be required to submit reports to the Conservation Commission or Designated Agent in a frequency and format determined by the Conservation Commission or Designated Agent. The Conservation Commission or Designated Agent may require that an Environmental Site Monitor, approved by the Conservation Commission or Designated Agent, be retained by the Applicant to conduct such inspections and prepare and submit such reports to the Conservation Commission or Designated Agent.

E. Access Permission

To the extent permitted by law, or if authorized by the Owner or other party in control of the property, the Conservation Commission, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under the By-Law and these Regulations and may make or cause to be made such examinations, surveys or sampling as the Conservation Commission or Designated Agent deems reasonably necessary to determine compliance with the permit.

PART VI. PLAN AMENDMENTS

The Permittee or Permittee's Agent must inform the Designated Agent, in writing, of any drainage change or alteration in the stormwater system authorized in a Minor or Major Permit before any change or alteration is made. If the Designated Agent determines that the change or alteration is significant, the Designated Agent may require that an amended Application be filed.

PART VII. CERTIFICATE of STORMWATER and EROSION CONTROL PERMIT COMPLIANCE (SW COC)

- A. No SW COC is required for work approved under a Minor Permit.
- B. It is the responsibility of the Applicant to request, in writing, the issuance of a SW COC from the Conservation Commission within one (1) year of completion of the work approved under a Major Permit.
- C. The Applicant must submit as-built plans detailing the management systems, structures and devices as installed, and percent of impervious and pervious area on-site. With the exception of single family dwellings, as-built plans must be stamped by a Registered Professional Engineer indicating that the constructed facility(s) have been constructed in accordance with, and meet the requirements of, the Major Permit, including compliance with performance standards and Best Management Practices (BMPs).
- D. After receipt of the as-built plans, the Conservation Commission or Designated Agent must inspect the stormwater management system to confirm its "as-built" features. A system will be deemed inadequate if errors in the infiltrative capability, the maximum groundwater elevation, failure to properly define or construct flow paths, or erosive discharges are found. If the system is found to be inadequate by virtue of physical evidence of operational failure, even though it was built as called for in the Major Permit, the Conservation Commission has the right to require corrections or improvements to the "as-built" system before issuing a SW COC.
- E. The Conservation Commission must issue a SW COC upon written request of the Permittee and upon finding that the permit has been complied with permit conditions.

PART VIII. FEE SCHEDULE

The following fee schedule includes minimum fees for Minor and Major Permits. The Conservation Commission may require higher fees if deemed necessary for proper review of an application or to ensure compliance. Fees for professional review will be established in accordance with G.L. c. 44§53G.

| Permit Type | Application Fee |
|--------------------|---|
| Minor Permit | \$100 plus \$.005/SF of total work area |
| Major Permit | \$250 plus \$.005/SF of total work area |

PART IX. SURETY

- A. As a condition of the Stormwater and Erosion Control Permit, and before the start of the Land-Disturbing Activity, the Conservation Commission may require the Permittee to post a surety bond, irrevocable letter of credit, cash, or other acceptable. The form of the bond shall be approved by town counsel, and be in an amount deemed sufficient by the Conservation Commission to ensure that the work will be completed in accordance with the permit. If the project is phased, the Conservation Commission may release part of the bond, as a proportion of the completed phase(s), but in no event will any bond be fully released until the Conservation Commission has received the final report as required by Section 11 of Article 79A of the Natick General Bylaws (Final Reports for Stormwater and Erosion Control Permits) and issued a Certificate of Compliance pursuant to Section 13.
- B. Satisfactory implementation of the Stormwater and Erosion Control Permit conditions prior to the start of any construction activity and the satisfactory completion of the work authorized shall be determined by the Conservation Commission with input from the Conservation Agent. The Conservation Commission reserves the right to determine the form and amount of the security however in general, the applicant shall provide the following security:
- 1) \$10,000 minimum surety bond, irrevocable letter of credit, cash, or other acceptable security for projects disturbing up to one acre of area or creating a minimum of 5,000 sq.ft of impervious area.
 - 2) An additional \$10,000 shall be required for each additional acre of disturbance
 - 3) An additional amount sufficient in the opinion of the Conservation Commission to secure performance of the construction of the stormwater management system as shown on the plan.
 - a. At the sole expense of the Applicant, as part of the Application, a Professional Engineer (PE) licensed in the Commonwealth of Massachusetts shall provide a cost estimate for the construction of the stormwater management system.
 - b. The cost estimate shall include, but not be limited to, the components for the stormwater management system as shown on the plans such as: P
 - Paved areas
 - Catch Basins
 - Manholes
 - Pipes
 - Other conveyances (swales, etc)

- Surface detention basins & outlet control structures
 - Underground detention basins
 - Roof drywells
 - Water quality structures
 - Other BMPs
- 4). Surety bonds, irrevocable letters of credit or other non-cash forms of security shall be valid for the estimated length of the permitted project.
- C. Projects requiring a performance guarantee under the Town of Natick Subdivision Rules and Regulations shall meet the minimum requirements for the requirements of the Subdivision Rules & Regulations in addition to these Regulations.
- D. If the project is phased, the Conservation Commission may release part of the bond as each phase is completed in compliance with the Stormwater and Erosion Control Permit but the bond may not be fully released until one (1) year after the date of the issuance of a Certificate of Compliance.
- 1) Release of all, or a portion, of the surety by the Conservation Commission shall not constitute or imply release of sureties required by other boards, commissions, or departments for the project. Nor shall release of sureties by other boards, commissions, or departments constitute or imply release of the surety required by the Conservation Commission.
- E. After the system has been constructed and before the surety for the development has been released, the applicant shall submit an “as-built” plan detailing the actual system as installed. The consulting engineer for the Board shall inspect the system to confirm its as-built features. This engineer shall also evaluate the effectiveness of the system in an actual storm. If the system is found to be inadequate by virtue of physical evidence of operational failure, even though it was built as called for in the Plan, it shall be corrected by the applicant before the Certificate of Compliance is released and the surety is released. If the applicant fails to act the Conservation Commission may use the surety bond to complete the work.

Appendix A

Design Principles

For Minor Stormwater and Erosion Control Permits, the Standards included in the Massachusetts Department of Environmental Protection's Massachusetts Stormwater Handbook and the Design Principles in this Appendix must be followed to the greatest extent practicable.

For Major Stormwater and Erosion Control Permits, the Standards included in the Massachusetts Department of Environmental Protection's Massachusetts Stormwater Handbook and the Design Principles in this Appendix must be followed.

A. Erosion & Sedimentation Control Design Principles

The Erosion & Sedimentation Control Design Principles aim to prevent soil erosion and subsequent soil runoff and sedimentation resulting from site construction and development.

- 1) Soil erosion must be minimized and sedimentation will be controlled during construction, provided that prevention of erosion is preferred over sedimentation control.
- 2) Erosion and sedimentation controls must be installed in accordance with sound engineering practices prior to the commencement of construction on-site and maintained throughout the construction phase. Sedimentation controls must be placed to prevent soils or other eroded matter from being deposited onto adjacent properties, or rights-of-ways or into the public storm drainage system, or wetlands or water bodies.
- 3) Biodegradable erosion and sedimentation controls are encouraged.
- 4) Such measures must be monitored on a weekly basis and before and after storm events, or as needed, and be reinforced or replaced when needed, per judgment of the site foreman, owner, and/or Conservation Commission. Such erosion and sedimentation controls must remain in place until the site has become stabilized with an adequate vegetative cover.
- 5) Erosion and sedimentation controls must be removed as soon as possible following construction and once the site has become stabilized.
- 6) Uncontaminated surface water must be diverted around disturbed areas.
- 7) Off-site transport of sediment must be prevented, including sediment tracked by vehicles leaving the site.
- 8) On and off-site stockpile areas must be managed to provide protection from erosion and sediment transport.
- 9) Applicable Federal, State and local laws and regulations must be complied with fully including waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control.
- 10) Interim and permanent stabilization measures must be instituted on a

disturbed area as soon as practicable but no more than 14 days after construction activity has temporarily or permanently ceased on that portion of the site.

- 11) On-site construction and waste materials must be handled properly to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to stormwater and measures to prevent and respond to spills.

B. Stormwater Management Design Principles

The Stormwater Management Design Principles aim to capture and recharge stormwater at the point where it falls on a site. The Stormwater Management Design Principles also aim to prevent stormwater discharges from contributing to pollution of surface water and groundwater resources.

- 1) All projects must not result in an increase of offsite runoff, or a change of groundwater and/or surface water levels on an adjacent property.
- 2) All projects must comply with the performance standards of the most recent version of the Massachusetts Stormwater Handbook (Handbook), with the following differences from the Handbook:
 - a. The Stormwater Management Standards apply to single family houses, as well as housing development and redevelopment projects comprised of detached single-family dwellings on four or fewer lots and multi-family housing development and redevelopment projects with four or fewer units, including condominiums, cooperatives, apartment buildings and townhouses.
 - b. Drainage Design: Drainage calculations must be performed for existing site conditions (pre-development) and proposed site conditions (post-development) based on approved site plans. Storms of 2, 10, 25, and 100 year frequency events must be analyzed.
 - c. Stormwater management systems on new development sites must be designed to:
 - i. Retain the volume of runoff equivalent to, or greater than, one (1) inches multiplied by the total post-construction impervious surface area on the site;
 - ii. Remove 90% of the average annual load of Total Suspended Solids generated from the total post-construction impervious area on the site; and
 - iii. Remove 60% of the average annual load of Total Phosphorus (TP) generated from the total post-construction impervious surface area on the site.

- d. Stormwater management systems on redevelopment sites, must be designed to:
 - i. Retain the volume of runoff equivalent to, or greater than, 0.80 inch multiplied by the total post-construction impervious surface area on the site;
 - ii. Remove 80% of the average annual post-construction load of Total Suspended Solids (TSS) generated from the total post-construction impervious area on the site; and
 - iii. Remove 50% of the average annual load of Total Phosphorus (TP) generated from the total post-construction impervious surface are on the site.
 - e. To the extent that the project will discharge, directly or indirectly, to a water body subject to one or more pollutant-specific Total Maximum Daily Loads (TMDLs) or to Certain Water Quality Limited Waters, implement structural and non-structural stormwater Best Management Practices (BMPs) that are consistent with each such TMDL or Water Quality Limited Waters.
- 3) No Untreated Discharges. All stormwater runoff generated from land development and land use conversion activities must not discharge untreated stormwater runoff directly to a wetland, local water body, municipal drainage system, or abutting property, without adequate treatment.
 - 4) Channel Protection. Protection of channels from bank and bed erosion and degradation must be provided by attenuating the 24-hour extended detention storage of runoff of the post-development 10-year, 24-hour return frequency storm event.
 - 5) Overbank Flooding Protection. Downstream overbank flood and property protection must be provided by attenuating the post-development peak discharge rate to the pre-development rate for the 10-year, 24-hour return frequency storm event as required by the MA DEP LID Management Policy.
 - 6) Extreme Flooding Protection. Extreme flooding and public safety protection must be provided by attenuating the peak discharge rate from the 100-yr, 24-hour return frequency storm event to the pre-development rates.
 - 7) Recharge:
 - a. Annual groundwater recharge rates must be maintained, by promoting infiltration and recharge through the use of structural and non-structural methods. At a minimum, annual recharge from the post development site must equal the annual recharge from pre-development site conditions.

- b. The stormwater runoff volume to be recharged to groundwater should be determined using the methods prescribed in the latest version of the Massachusetts Stormwater Handbook. The recharge requirements must apply to all activities within the jurisdiction of this Bylaw except as noted, and unless specifically waived by the Conservation Commission or its Designated Agent.
- 8) Construction of any structures or impervious surfaces should be avoided to the extent practicable within the floodplain to prevent water quality impairments to adjacent water bodies.
- 9) Water Quality Volume. The prescribed water quality volume required in the sizing of a structural stormwater practice must be calculated as $1.2 \times \text{total watershed area} \times \text{runoff coefficient (Rv)}$, where $Rv = 0.05 + 0.009(I\%)$ and $I\% = \text{percent of impervious area}$.
- 10) Hydrologic Basis for Design of Structural Practices. For facility sizing criteria, the basis for hydrologic and hydraulic evaluation of development sites are as follows:
 - a. Impervious cover is measured from the site plan and includes any material or structure on or above the ground that prevents water from infiltrating through the underlying soil.
 - b. Impervious surface is defined to include, without limitation: paved parking lots, sidewalks, roof tops, driveways, patios, and paved, gravel and compacted dirt surfaced roads.
 - c. Off-site areas must be assessed based on their “pre-developed condition” for computing the water quality volume (i.e., treatment of only on-site areas is required). However, if an offsite area drains to a proposed BMP, flow from that area must be accounted for in the sizing of a specific practice.
 - d. Off-site areas draining to a proposed facility should be modeled as “present condition” for peak-flow attenuation requirements.
 - e. The length of sheet flow used in time of concentration calculations is limited to no more than 50 feet for predevelopment conditions and 50 feet for post development conditions.
 - f. Detention time for the one-year storm is defined as the center of mass of the inflow hydrograph and the center of mass of the outflow hydrograph.
 - g. The models TR-55 and TR-20 (or approved equivalent) will be used for determining peak discharge rates.
 - h. For purposes of computing runoff, all pervious lands in the site must be assumed prior to development to be in “good hydrologic condition” regardless of conditions existing at the time of computation.

- i. Flooding and channel erosion impacts to receiving streams due to land development projects must be determined at each point of discharge from the development project and such determination must include any runoff from the balance of the watershed which also contributes to that point of discharge.
- j. The specified design storms must be defined as a 24-hour storm using the rainfall distribution recommended by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), the Northeast Regional Climate Center “Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada,” and the National Atmospheric and Oceanic Administration (NOAA) Atlas as most recently amended as of the date of application.
- k. Proposed residential, commercial, or industrial subdivisions must apply these Stormwater Management criteria to the land development as a whole. Individual lots in new subdivisions are not considered separate land development projects, but rather the entire subdivision must be considered a single land development project. Hydrologic parameters must reflect the full proposed build-out land development and must be used in all engineering calculations.

C. Low Impact Development Design Principles

Low Impact Development (LID) are stormwater management systems that minimize impervious surfaces and mimic natural conditions. LID manages rainfall at the source utilizing small landscape features located at the lot level.

1. The total area of disturbance must be minimized.
2. Activities must be sequenced to minimize simultaneous areas of disturbance.
3. Identify and preserve the site's natural features, hydrology, and ecological integrity including preservation of existing permeable soils, drainage ways, wetlands, floodplains, slopes, healthy native and naturalized non-invasive vegetation, woodlands, significant plant communities and wildlife habitats, and natural soil structure.
4. Designate a building envelope(s). The extent and location of construction, clearing, structures, parking areas, and associated site improvements must be limited to the designated building envelope(s).
5. Site, and when appropriate, cluster buildings in locations that avoid environmentally sensitive areas. Minimize the size of building footprints.
6. Minimize impervious surfaces (less than 10% impervious surface is recommended) wherever possible through LID design of streets, parking lots, driveways and other site elements. Examples include:
 - minimizing travel lane widths;

- minimizing the number and size of parking spaces;
 - minimizing parking aisle widths;
 - use of shared parking areas;
 - minimizing driveway widths;
 - avoiding use of curbing and utilizing country drainage techniques;
 - use of one-way loop streets;
 - use of hammerhead turnarounds;
 - adding center landscaping with bioretention to cul-de-sacs;
 - use of shared driveways; and
 - use of porous pavement or permeable pavers.
7. Minimize grading, clearing and soil compaction with a focus on preservation of existing topography, vegetation, and soils (especially those in Hydrologic Soil Groups A and B) where it most benefits hydrologic functions. Fit development to the natural terrain to the maximum extent possible, such as avoiding steep slopes.
 8. Use and/or create subwatersheds to treat and manage runoff as close to the source as possible using smaller, decentralized stormwater management techniques.
 9. When plants are used for stormwater management, use 75% or more native and/or naturalized non-invasive vegetation. Select plants based on their ability to survive in the conditions under which they will be planted without additional irrigation, fertilization, or pesticides.
 10. Consider, propose and implement LID Stormwater BMPs versus structurally engineered closed/underground systems. LID Stormwater BMPs include, but are not limited to:
 - Grassed Channels/Swales;
 - Water Quality Swales
 - Bioretention Areas & Rain gardens;
 - Tree Filters;
 - Vegetated filter strips;
 - Cisterns and rain barrels;
 - Green roofs;
 - Constructed wetlands;
 - Subsurface gravel wetlands; and
 - Infiltration trenches, chambers, or basins.