

Town of Ipswich
Stormwater Management Regulation

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Section 1. Purpose

The purpose of these Stormwater Regulations is to protect, maintain and enhance public health, safety, environment, and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased runoff, decreased ground water recharge, erosion and sedimentation, and nonpoint source pollution associated with new development and redevelopment of land, pursuant to the Town of Ipswich Stormwater Management bylaw.

These Stormwater Regulations (Regulations) have been developed to provide reasonable guidance for the regulation of project design, construction and post-development stormwater runoff for the purpose of protecting local water resources from degradation. It is in the public interest to regulate construction and post-development stormwater runoff discharges in order to control and minimize increases in stormwater runoff rates and volumes, soil erosion and sedimentation, stream channel erosion, and nonpoint source pollution associated with construction site and post-development stormwater runoff.

Section 2. Definitions

A. All definitions provided in the Town of Ipswich Stormwater Management Bylaw shall apply to these Regulations. Terms not defined in the Bylaw are included below.

B. Additional definitions:

ABUTTER: The owner(s) of land adjacent to regulated activity.

Administrative Stormwater Management Permit: Approval by the Stormwater Authority of a land disturbance activity that does not require a Stormwater Management Permit because of its size and/or scope.

ALTERATION OF DRAINAGE CHARACTERISTICS: Any activity on an area of land that changes the water quality, force, direction, timing or location of runoff flowing from the area. Such changes include: change from distributed runoff to confined or discrete discharge, change in the volume of runoff from the area; change in the peak rate of runoff from the area; and change in the recharge to groundwater on the area.

AS-BUILT DRAWING: Drawings that completely record and document applicable aspects and features of conditions of a project following construction using Stormwater Management Plans derived from a Stormwater Management Permit.

BEST MANAGEMENT PRACTICE (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff.

CERTIFICATE OF COMPLETION (COC): A document issued by the Stormwater Authority after all construction activities have been completed, which states that all conditions of an issued Stormwater Management Permit have been met and that a project has been completed in compliance with the conditions set forth in the permit.

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC): A certified specialist in soil erosion and sediment control. This certification program, sponsored by the Soil and Water Conservation Society in cooperation with the American Society of Agronomy, provides the public with evidence of professional qualifications.

CONSTRUCTION AND WASTE MATERIALS: Excess or discarded building or site materials, including but not limited to concrete truck washout, chemicals, litter and sanitary waste at a construction site that may adversely impact water quality.

DISCHARGE OF POLLUTANTS: The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

DRAINAGE EASEMENT: A legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

ESTIMATED HABITAT OF RARE WILDLIFE AND CERTIFIED VERNAL POOLS: Habitats delineated for state-protected rare wildlife and certified vernal pools under the Wetlands Protection Act Regulations (310 CMR 10.00) and the Forest Cutting Practices Act Regulations (304 CMR 11.00).

INFEASIBLE: Means not technologically possible, or not economically practicable and achievable in light of best industry practices.

LAND USE WITH HIGHER POTENTIAL POLLUTANT LOAD (LUHPPL): Land uses such as auto salvage yards, auto fueling facilities, exterior fleet storage yards, vehicle service and equipment cleaning areas, commercial parking lots with high intensity use, road salt storage areas, outdoor storage and loading areas of hazardous substances, confined disposal facilities and disposal sites, marinas, boat yards or other uses as identified by the Massachusetts Stormwater Handbook.

MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS: The performance standards as further defined by the Massachusetts Stormwater Handbook, issued by the Department of Environmental Protection, and as amended, that coordinate the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act G.L. c. 131 §. 40 and Massachusetts Clean Waters Act G.L. c. 21, §. 23-56 to prevent or reduce pollutants from reaching water bodies and control the quantity of runoff from a site.

OUTFALL: The point at which stormwater flows out from a point source discernible, confined and discrete conveyance into Waters of the Commonwealth.

PRIORITY HABITAT OF RARE SPECIES: Habitats delineated for rare plant and animal populations protected pursuant to the Massachusetts Endangered Species Act (M.G.L. c. 131A) and its regulations.

RECHARGE: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

SITE: The area extent of construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover.

SLOPE: The incline of a ground surface expressed as a ratio of horizontal distance to vertical distance.

SOIL: Any earth, sand, rock, gravel, or similar material.

STABILIZATION: The use, singly or in combination, of mechanical, structural, or vegetative methods, to prevent or retard erosion.

STORMWATER AUTHORITY: Ipswich Conservation Commission or its authorized agent(s).

STORMWATER MANAGEMENT PLAN: A document containing narrative, drawings, details and reporting requirements developed by a qualified professional engineer (PE), which describes structural and non-structural best management practices designed to control the discharge of pollutants from impervious surfaces and onsite activities as well as the volume and peak rate of surface runoff from a site on an ongoing basis after construction has been completed.

WETLAND RESOURCE AREA: Areas specified in the Massachusetts Wetlands Protection Act G.L. c. 131, § 40 and in the Ipswich Wetland Protection Bylaw.

WETLANDS: Tidal and non-tidal areas characterized by saturated or nearly saturated soils most of the year that are located between terrestrial (land-based) and aquatic (water-based) environments, including freshwater marshes around ponds and channels (rivers and streams), brackish and salt marshes; common names include marshes, swamps and bogs.

Section 3. Authority

- A. The Stormwater Regulations have been adopted by the Stormwater Authority in accordance with the Ipswich Stormwater Management Bylaw.
- B. The Stormwater Authority may periodically amend these regulations pursuant to Section 6 of the Stormwater bylaw and other relevant provisions of the General bylaws of the Town of Ipswich.
- C. Nothing in these Regulations is intended to replace or be in derogation of the requirements of any relevant local law, such as the Ipswich Zoning Bylaw, Wetlands Protection bylaw, Subdivision Control Law or any other Regulations adopted thereunder.

Section 4. Administration

- A. The Conservation Commission is designated as the Stormwater Authority under the Ipswich Stormwater Management Bylaw and shall administer, implement and enforce these regulations. Any powers granted to or duties imposed upon the Stormwater Authority may be delegated in writing by the Stormwater Authority to its employees or agents.
- B. Waiver. Following a public hearing on a written waiver request, the Stormwater Authority may waive strict compliance with any requirement of these regulations, where such action is:
 - (1) allowed by federal, state and local statutes and/or regulations;
 - (2) in the public interest; and

- (3) not inconsistent with the purpose and intent of the Stormwater Management bylaw.
- C. The Stormwater Authority may amend rules and regulations after holding a public hearing. Notice of the time, place and subject matter shall be published in a newspaper of general circulation once, not less than 14 days before the day of such a hearing.

Section 5. Applicability

- A. These regulations shall apply to all activities that individually or as part of a common plan of Development resulting in disturbance of land in excess of the thresholds below and which drain to the municipal separate storm sewer system (MS4) or, directly or indirectly, into a Watercourse or Waters of the Commonwealth.
- (1) Administrative Stormwater Management Review is required for projects disturbing between 5,000 square feet and less than 10,000 square feet.
 - (2) A Stormwater Management Permit is required for disturbance of 10,000 square feet or more of land, or for the disturbance of any amount of land where the proposed use is a land use of higher potential pollutant loads pursuant to the Massachusetts Stormwater Management Standards.
 - (3) The Stormwater Authority may require a permit for a project of any size which has caused or can reasonably be expected to cause or contribute to a violation of State Water Quality Standards or as deemed necessary by the Stormwater Authority for a project which would otherwise require an Administrative Stormwater Management Review.
 - (4) Disturbance of Land, New Development, or Redevelopment that is subject to jurisdiction under the Massachusetts Wetlands Protection Act and demonstrates compliance with the Massachusetts Stormwater Management Standards and the Ipswich Stormwater Management Bylaw and Regulations as reflected in an Order of Conditions issued by the Conservation Commission will not require a separate Stormwater Management Permit. The entire project and construction activities and all Stormwater Management must be fully within the jurisdiction of the Conservation Commission.
 - (5) A project that has been reviewed and definitively approved by the Planning Board under the Massachusetts Subdivision Control Law or the special permit provisions of the Ipswich Zoning Bylaws, may be deemed as acceptable under the Stormwater Management Bylaw only if the entire project and construction activities, including all land disturbance, adhere fully and meet the requirements as specified in the Stormwater Management Bylaw and these regulations adopted under the Bylaw. The Planning Board's issued Definitive Subdivision Permit, Final Approved Plans, and/or applicable Special Permit and associated permit conditions must require compliance with the Stormwater Management Bylaw and these associated Regulations. A separate Stormwater Management Permit will not be required. A copy of the final approved plans and approved permit will be shared with the Stormwater Authority.
- B. The following activities are exempt from the provisions of Section 5(A):

- (1) Maintenance of existing landscaping, gardens or lawn areas associated with a single family dwelling conducted in such a way as not to cause a nuisance;
- (2) Construction of fencing that will not substantially alter existing terrain or drainage patterns;
- (3) Construction of utilities other than drainage (gas, water, electric, telephone, etc.) which will not alter terrain or drainage patterns or result in discharge of sediment or other pollutants to the MS4 or, directly or indirectly, to a Watercourse or Waters of the Commonwealth;
- (4) Normal maintenance and improvement of land in agricultural or aquacultural use, as defined by the Massachusetts Wetlands Protection Act regulation 310 CMR 10.04; and
- (5) The maintenance and resurfacing, but not reconstruction, of any public or private way.

Section 6. Administrative Stormwater Management Review Procedure and Standards

- A. Administrative Review and Approval Required. Administrative approval must be obtained prior to the commencement of land disturbing activity (disturbing between 5,000 square feet and less than 10,000 square feet) of land.
- B. Application. A completed application for an Administrative Stormwater Management Review shall be filed with Stormwater Authority. The Administrative Stormwater Management Review Application package shall include:
 - (1) A completed Application Form with original signatures of all property owners;
 - (2) Narrative describing the proposed work including existing site conditions, proposed work and methods to mitigate any stormwater impacts;
 - (3) One original, one copy, and one electronic version of the plan that include:
 - (a) Existing site features including structures, pavements, plantings, and stormwater management systems etc.;
 - (b) Proposed work including proposed stormwater management systems and limits of disturbance; and
 - (c) Basic erosion and sedimentation controls.
 - (4) Payment of the application and review fees.
- C. Application Requirements and Performance Standards
 - (1) Application Requirements.
 - (a) The application for an Administrative Stormwater Management Review shall contain sufficient information for the Stormwater Authority, or its agent, to evaluate the environmental impact, effectiveness, and acceptability of the measures proposed by the applicant to reduce adverse impacts from stormwater runoff during construction, and on a long-term basis.
 - (b) Application shall include an operation and maintenance plan to inspect, properly maintain and repair installed BMPs after project completion to ensure that they are functioning according to manufacturer or design specifications for the life of the BMP.
 - (c) Applicants shall submit as-built drawings upon project completion.
 - (2) Performance Standards. Applicants shall retain on-site the first one (1) inch of runoff from the total post-construction impervious area. To the extent this is infeasible, the unretained portion shall meet the requirements below to the maximum extent practicable. When determining whether the requirements have been met, the Stormwater Authority shall consider all stormwater management practices available and capable of being implemented after taking into consideration costs, existing technology, proposed use, and logistics in light of overall project purposes. Project purposes shall be defined generally (e.g., single family home or expansion of a commercial development). Applicants shall detail how the project will:

- (a) Comply with the Massachusetts Stormwater Management Standards as further defined in the Massachusetts Stormwater Handbook unless infeasible.
 - (b) 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), implement structural and non-structural stormwater best management practices (BMPs) that are consistent with each such TMDL.
 - (c) To the extent the project will discharge, directly or indirectly, to an impaired water body not subject to a TMDL, implement structural and non-structural stormwater BMPs optimized to remove the pollutant or pollutants responsible for the impairment.
 - (d) Avoid disturbance of areas susceptible to erosion and sediment loss.
 - (d) Use Low Impact Development techniques unless infeasible. These may include but not be limited to reduction in impervious surfaces, disconnection of impervious surfaces, bioretention (rain gardens), and infiltration systems.
- D. Consent to Entry onto Property. An applicant consents to entry of the Stormwater Authority or its authorized agents in or on site to verify the information in the application and to inspect for compliance with permit conditions. Refusal to grant access may be grounds for denial and/or revocation of the permit.
- E. Information requests. The applicant shall submit all additional information requested by the Stormwater Authority to issue a decision on the application.
- F. Action by the Stormwater Authority. The Stormwater Authority may:
- (1) Approve the Administrative Stormwater Management Review Application if it finds that the proposed plan will protect water resources, not cause or contribute to a violation of State Water Quality Standards, and meets the objectives and requirements of the Ipswich Stormwater Management bylaw and related regulations;
 - (2) Approve the Administrative Stormwater Management Review Application with conditions, modifications or restrictions that the Stormwater Authority determines are required to ensure that the project will protect water resources and meets the objectives and requirements of the Ipswich Stormwater Management bylaw and related regulations; or
 - (3) Require submission of a Stormwater Management Permit Application if the project will disturb land beyond administrative review thresholds or in the opinion of the Stormwater Authority requires more extensive review.
- G. Fee Structure. Each application must be accompanied by the appropriate application fee as established by the Stormwater Authority. Applicants shall pay review fees as determined by the Stormwater Authority sufficient to cover any expenses connected with the review of the Administrative Stormwater Management Review Application before the review process commences. The Stormwater Authority is authorized to retain a Registered Professional Engineer or other professional consultant to advise the Stormwater Authority on any or all aspects of the Application.

- H. **Project Changes.** The Applicant, or their agent, must notify the Stormwater Authority in writing of any change or alteration of a land-disturbing activity authorized in an Administrative Stormwater Management Review approval before any change or alteration occurs. If the Stormwater Authority determines that the change or alteration is significant, based on the design requirements listed in Section 8(E) and accepted construction practices, the Stormwater Authority may require a Stormwater Management Permit application be filed. If any change or alteration from the Administrative Stormwater Management Review approval occurs during any land disturbing activities, the Stormwater Authority may require the installation of interim erosion and sedimentation control measures before approving the change or alteration.

Section 7. Stormwater Management Permit and Procedure

- A. **Permit Required.** A permit must be obtained prior to the commencement of land disturbing activity that may result in the disturbance of an area of 10,000 square feet or more, or activities that are part of a larger common plan of Development disturbing greater than, or equal to, 10,000 square feet.
- B. **Application.** A completed application for a Stormwater Management Permit shall be filed with Stormwater Authority. The Stormwater Management Permit Application package shall include:
 - (1) A completed Application Form with original signatures of all property owners;
 - (2) A list of abutters within 100 feet of the property, certified by the Ipswich Assessors Office;
 - (3) Three (3) copies each of the
 - (a) Stormwater Management Plan;
 - (b) Erosion and Sediment Control Plan; and
 - (c) Operation and Maintenance Plan.
 - (4) Payment of the application and review fees; and,
 - (5) One (1) copy each of the Application Form and the list of abutters filed with the Town Clerk.
- C. **Information Requests.** The applicant shall submit all additional information requested by the Stormwater Authority to issue a decision on the application.
- D. **Determination of Completeness:** The Stormwater Authority shall make a determination as to the completeness of the application and adequacy of the materials submitted. No review shall take place until the application is determined complete.
- E. **Fee Structure.** Each application must be accompanied by the appropriate application fee as established by the Stormwater Authority. Applicants shall pay review fees as determined by the Stormwater Authority sufficient to cover any expenses connected with the public hearing and review of the Stormwater Management Permit Application before the review process commences. The Stormwater Authority is authorized to retain a Registered Professional Engineer or other professional consultant to advise the Stormwater Authority on any or all

aspects of the Application. An additional consultant fee (review fee) may be required in accordance with M.G.L. c.44 §53G, as amended.

- F. Entry. Filing an application for a permit grants the Stormwater Authority or its agent, permission to enter the site to verify the information in the application and to inspect for compliance with permit conditions. Refusal to grant access may be grounds for denial and/or revocation of the permit.
- G. Other Boards. The applicant shall provide one copy of the application package to the relevant Town administrative boards or commissions, such as the Planning Board or Department of Public Works as deemed necessary by the Stormwater Authority.
- H. Public Hearing. Stormwater Authority shall hold a public hearing within twenty-one (21) days of the receipt of a complete application and shall take final action within twenty-one (21) days from the time of the close of the hearing unless such time is extended by agreement between the applicant and Stormwater Authority. Notice of the public hearing shall be by publication, posting and by first-class mailings to abutters at least seven (7) days prior to the hearing. Stormwater Authority shall make the application available for inspection by the public during business hours.
- I. Action by the Stormwater Authority. The Stormwater Authority may:
 - (1) Approve the Stormwater Management Permit Application and issue a permit if it finds that the proposed plan will protect water resources, not cause or contribute to a violation of State Water Quality Standards, and meets the objectives and requirements of the **Ipswich Stormwater Management Bylaw** and related regulations;
 - (2) Approve the Stormwater Management Permit Application and issue a permit with conditions, modifications or restrictions that Stormwater Authority determines are required to ensure that the project will protect water resources and meets the objectives and requirements of the Ipswich Stormwater Management Bylaw and related regulations;
 - (3) Disapprove the Stormwater Management Permit Application and deny the permit if it finds that the proposed plan will not protect water resources or fails to meet the objectives and requirements of the Ipswich Stormwater Management Bylaw and related regulations; or
 - (4) Disapprove the Stormwater Management Permit Application “without prejudice” where an applicant fails to provide requested additional information or review fees that in the Stormwater Authority’s opinion are needed to adequately describe or review the proposed project.
- J. Final Approval. Final approval, if granted, shall be endorsed on the Stormwater Management Permit by the signature of the majority of the Stormwater Authority (or by the signature of the person officially authorized by the Stormwater Authority).
- K. Project Changes. The permittee, or their agent, must notify Stormwater Authority in writing of any change or alteration of a land-disturbing activity authorized in a Stormwater Management Permit before any change or alteration occurs. If Stormwater Authority determines that the change or alteration is significant, based on the design requirements listed in Section 8(E) and accepted

construction practices, Stormwater Authority may require that an amended Stormwater Management Permit application be filed and a public hearing held. If any change or alteration from the Stormwater Management Permit occurs during any land disturbing activities, Stormwater Authority may require the installation of interim erosion and sedimentation control measures before approving the change or alteration.

Section 8. Stormwater Management Plan for Permit Applications

- A. The application for a Stormwater Management Permit shall include a Stormwater Management Plan. The Stormwater Management Plan shall contain sufficient information for the Stormwater Authority to evaluate the environmental impact, effectiveness, and acceptability of the site planning process and the measures proposed by the applicant to reduce adverse impacts from stormwater runoff during construction, and post-construction in the long-term.
- B. The Stormwater Management Plan shall fully describe the project in narrative, drawings, and calculations. It shall at a minimum include:
 - (1) Contact Information. The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected;
 - (2) Narrative describing:
 - (a) Purpose;
 - (b) Methodologies and assumptions;
 - (c) Existing and proposed uses and conditions;
 - (d) Project impacts and mitigation techniques including:
 - i. Summary of proposed land area to be cleared, proposed impervious area, work within proximity of regulated wetland resources, aquifer protection zones, earthwork within 4 feet of seasonal high groundwater elevations, and other sensitive environmental areas;
 - ii. Low Impact Development (LID) techniques considered for this project and an explanation as to why they were included or excluded from the project;
 - iii. Proposed best management practices;
 - iv. Identifying the immediate down gradient waterbody(s) that stormwater runoff from the project site discharges to, EPA's waterbody assessment and TMDL and/or impairment status of the waterbody(s), and the LIDs and BMP's included in the project to address the pollutant(s) of concern;
 - (e) Summary of pre- and post-development peak rates and volumes of stormwater runoff demonstrating no adverse impacts to down-gradient properties, stormwater management systems and wetland resources; and
 - (f) Conclusions

(3) Plans

- (a) Portion of the USGS Map indicating the site locus and properties within a minimum of 500 feet of project property line;
- (b) Existing conditions and proposed design plans having a scale of 1" = 20', or other scale acceptable to the Commission, showing:
 - i. Buildings and/or structures including materials, approximate height;
 - ii. Utilities including size, material and invert data; and
 - iii. Regulated wetland resource areas within proximity of the site
- (c) Stormwater management design plan(s) and details showing:
 - i. Location, size, material, inverts data and details for all existing and proposed stormwater management system components including structures, pipes, swales, detention, retention, and infiltration systems and any other Low Impact Development techniques or BMPs;
 - ii. Profiles of drainage trunk lines; and
 - iii. Drainage easements;
- (d) Separate Pre- and Post- Condition Watershed Plans indicating:
 - i. Structures, pavements, surface vegetation and other ground cover materials;
 - ii. Topography sufficient to delineate watershed areas;
 - iii. Point(s) of analysis;
 - iv. Watershed areas including upgradient areas that contribute stormwater flow onto the project site, labeled to be easily identified in calculations. Total pre and post watershed areas should be equivalent;
 - v. Breakdown summary of various surface conditions by soil hydrologic group rating; and
 - vi. Flow path for time of concentration (Tc) calculation.

(4) Calculations

- (a) Hydrologic calculation to determine pre and post peak rates and volumes of stormwater runoff for 2-, 10-, 25- and 100-year 24 hour storm events;
- (b) Groundwater recharge calculations and BMP drawdown (time to empty);
- (c) Water quality calculations including (if applicable):
 - i. TSS removal calculation for each watershed;
 - ii. Specific BMPs utilized in critical areas;

- iii. Specific BMPs utilized for land uses of higher potential pollutant loads; and
 - iv. Specific treatment for pollutant causing impairment of down-gradient waterbody identified by U.S. Environmental Protection Agency and Massachusetts Department of Environmental Protection.
 - (d) Hydraulic calculations to size drainage pipes, swales and culverts; and
 - (e) Supplemental calculations for sizing LID and BMPs and addressing impairments to water bodies.
 - (5) Soil mapping and test data;
 - (6) Massachusetts Department of Environmental Protection Checklist for Stormwater Report completed, stamped and signed by a Professional Engineer (PE) licensed in the Commonwealth of Massachusetts to certify that the Stormwater Management Plan is in accordance with the criteria established in the Massachusetts Stormwater Management Standards, the Ipswich Stormwater Management bylaw and these regulations; and
 - (7) Any other information requested by the Stormwater Authority.
- C. General Performance Standards for All Sites.
- (1) Low Impact Development and Green Infrastructure site design strategies shall be utilized to preserve existing natural features of the site, minimize the creation of impervious surfaces and manage stormwater in a decentralized fashion, unless infeasible.
 - (2) The selection, design and construction of all pre-treatment, treatment and infiltration BMPs shall be in accordance with Massachusetts Stormwater Handbook and shall be consistent with all elements of the Massachusetts Stormwater Standards including but not limited to those regarding new stormwater conveyances, peak runoff rates, recharge, land uses with higher potential pollutant loads, discharges to Zone II or interim wellhead protection areas, sediment and erosion control, and illicit discharges.
 - (3) Stormwater management systems on new development sites shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site and 60% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site. Average annual pollutant removal requirements shall be achieved through one of the following methods:
 - (a) Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved

BMP design guidance or performance standards (see Massachusetts Stormwater Handbook and design guidance manuals) may be used to calculate BMP performance; or

- (b) Retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site; or
- (c) Meeting a combination of retention and treatment that achieves the above standards.

(4) Stormwater management systems on redevelopment sites shall be designed to meet an average annual pollutant removal equivalent to 80% of the average annual post-construction load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorous (TP) related to the total post-construction impervious surface area on the site. Annual pollutant removal requirements are achieved through one of the following methods:

- (a) Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (See Massachusetts Stormwater Handbook and design guidance manuals) may be used to calculate BMP performance; or
- (b) Retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the redeveloped site; or
- (c) Meeting a combination of retention and treatment that achieves the above standards.

E. Stormwater Management Design Standards

- (1) Projects must be designed to collect and dispose of stormwater runoff from the project site in accordance with Massachusetts Stormwater Management Standards, Ipswich Department of Public Works requirements, including those for subdivisions, recognized engineering methodologies and these regulations with a requirement to include Low Impact Development techniques in the design.
- (2) Projects must manage surface runoff so that no flow is conducted over public ways, nor over land not owned or controlled by the Applicant unless an easement in proper form is obtained permitting such discharge.
- (3) Projects must use Low Impact Development techniques unless infeasible (as defined herein). These may include but not be limited to reduction in impervious surfaces, disconnection of impervious surfaces, bioretention (rain gardens) and infiltration systems.

- (4) Projects must use TR-55 and TR-20 methodologies to calculate peak rate and volume of runoff from pre-development to post-development conditions.
- (5) Stormwater management systems shall be designed to avoid disturbance of areas susceptible to erosion and sediment loss, avoiding, to the greatest extent practicable: the damaging of large forest stands; building on steep slopes (15% or greater); and disturbing land in wetland buffer zones and floodplains.
- (6) Watershed area for hydrologic analysis and BMP sizing calculations must include at a minimum the site area and all upgradient areas from which stormwater runoff flows onto the site.
- (7) For purposes of computing runoff, all pervious lands in the site are assumed prior to Development to be in “good hydrologic condition” regardless of the conditions existing at the time of the computation.
- (8) Length of sheet flow used for times of concentration is to be no more than 50 feet.
- (9) At a minimum, utilize the 24-hour rainfall data taken from the NOAA Atlas 14 Point Precipitation Frequency Estimates unless the Massachusetts DEP Stormwater Management Standards adopts other sources for 24-hour rainfall data.
- (10) Soils tests to be conducted by a Registered Professional Engineer or Massachusetts Soil Evaluator, performed at the location of all proposed Low Impact Development techniques and BMPs, to identify soil descriptions, depth to estimated seasonal high groundwater, depth to bedrock, and soil texture.
- (11) The design infiltration rate shall be determined from the on-site soil texture and published Rawls rates or saturated hydraulic conductivity tests.
- (12) Size drainage pipes to accommodate the 25-year storm event and maintain velocities between 2.5 and 10 feet per second using the Rational Method.
- (13) Size drainage swales to accommodate the 25-year storm event and velocities below 4 feet per second
- (14) Size culverts to accommodate the 50-year storm event and design adequate erosion protection. Design stream crossing culverts in accordance with the latest addition of the Massachusetts Stream Crossing Handbook.
- (15) Size stormwater basins to accommodate the 100-year storm event with a minimum of one foot of freeboard
- (16) All drainage structures are to be able to accommodate HS-20 loading.
- (17) Catch basins structures are to be constructed as required by the Ipswich Department of Public Works and spaced a maximum of 250 feet apart in roadways.

- (18) Catch basins adjacent to curbing are to be built with a granite curb inlet if required by the Ipswich Department of Public Works.
 - (19) Catch basins in low points of road and on roads with profile grades greater than 5 percent are to be fitted with double grates (parallel with curb) if required by the Ipswich Department of Public Works.
 - (20) All drain pipes are to be reinforced concrete pipe or High Density Polyethylene pipe and have a minimum diameter of 12 inches
 - (21) Outfalls are to be designed to prevent erosion of soils, and pipes 24 inches or larger are to be fitted with grates or bars to prevent ingress.
 - (22) Drainage easements are to provide sufficient access for maintenance and repairs of system components and be at least 20 feet wide.
 - (23) Minimize permanently dewatering soils by:
 - (a) Limiting grading within 4 feet of seasonal high groundwater elevation (SHGWE);
 - (b) Raising roadways to keep roadway section above SHGWE; and
 - (c) Setting bottom floor elevation of building(s) a minimum of 2 feet above SHGWE.
- F. Permittees shall submit as-built drawings (one hard copy and one electronic copy) no later than one year after completion of construction projects. The as-built drawings must depict all on-site controls, both structural and non-structural, designed to manage stormwater associated with the completed site.

Section 9. Erosion and Sedimentation Control Plan of Permit Applications

- A. The Erosion and Sediment Control Plan shall be designed to ensure compliance with these regulations, the MS4, and if applicable, the NPDES General Permit for Storm Water Discharges From Construction Activities. In addition, the plan shall ensure that the Massachusetts Surface Water Quality Standards (314 CMR 4.00) are met in all seasons.
- B. If a project requires a Stormwater Pollution Prevention Plan (SWPPP) per the NPDES General Permit for Storm Water Discharges From Construction Activities (and as amended), then the applicant is required to submit a complete electronic copy of the SWPPP (including the signed Notice of Intent and approval letter) a minimum of 14 days prior to construction. If the SWPPP meets the requirements of the General Permit, it will be considered equivalent to the Erosion and Sediment Control Plan described in this section.
- C. The Erosion and Sediment Control Plan shall remain on file with the Stormwater Authority. Refer to the latest version of the Massachusetts Erosion and Sediment Control Guidelines for Urban & Suburban Areas for detailed guidance.
- D. Erosion and Sedimentation Control Plan Content. The Plan shall contain the following information:
 - (1) Names, addresses, and telephone numbers of the owner, applicant, and person(s) or firm(s) preparing the plan;
 - (2) Title, date, north arrow, names of abutters, scale, legend, and locus map;
 - (3) Location and description of natural features including:

- (a) Watercourses and water bodies, wetland resource areas and all floodplain information, including the 100-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;
 - (b) Existing vegetation including tree lines, canopy layer, shrub layer, and ground cover, and trees with a caliper twelve (12) inches or larger, noting specimen trees and forest communities; and
 - (c) 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, and Priority Habitats of Rare Species within five hundred (500) feet of any construction activity.
- (4) Lines of existing abutting streets showing drainage and driveway locations and curb cuts;
 - (5) Existing soils, volume and nature of imported soil materials;
 - (6) Topographical features including existing and proposed contours at intervals no greater than two (2) feet with spot elevations provided when needed;
 - (7) Surveyed property lines showing distances and monument locations, all existing and proposed easements, rights-of-way, and other encumbrances, the size of the entire parcel, and the delineation and number of square feet of the land area to be disturbed;
 - (8) Drainage patterns and approximate slopes anticipated after major grading activities (Construction Phase Grading Plans);
 - (9) Location and details of erosion and sediment control measures with a narrative of the construction sequence/phasing of the project, including both operation and maintenance for structural and non-structural measures, interim grading, and material stockpiling areas;
 - (10) Path and mechanism to divert uncontaminated water around disturbed areas, to the maximum extent practicable. When determining whether the requirements have been met, the Stormwater Authority shall consider all stormwater management practices available and capable of being implemented after taking into consideration costs, existing technology, proposed use, and logistics in light of overall project purposes. Project purposes shall be defined generally (e.g., single family home or expansion of a commercial development).;
 - (11) Location and description of industrial discharges, including stormwater discharges from dedicated asphalt plants and dedicated concrete plants, which are covered by this permit;
 - (12) Stormwater runoff calculations in accordance with the Massachusetts Department of Environmental Protection's Stormwater Management Policy;

- (13) Location and description of and implementation schedule for temporary and permanent seeding, vegetative controls, and other stabilization measures;
 - (14) A description of construction and waste materials expected to be stored on-site. The Plan shall include a description of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response;
 - (15) A description of provisions for phasing the project where one acre of area or greater is to be altered or disturbed;
 - (16) Plans must be stamped and certified by a qualified Professional Engineer registered in Massachusetts or a Certified Professional in Erosion and Sediment Control; and
 - (17) Such other information as is required by the Stormwater Authority.
- E. Erosion Controls Design Standards. The Sediment and Erosion Control Plan shall be developed to comply with the MS4 and shall meet the following standards:
- (1) Minimize total area of disturbance;
 - (2) Sequence activities to minimize simultaneous areas of disturbance;
 - (3) Minimize peak rate of runoff in accordance with the Massachusetts Department of Environmental Protection Stormwater Standards;
 - (4) Minimize soil erosion and control sedimentation during construction;
 - (5) Divert uncontaminated water around disturbed areas;
 - (6) Maximize groundwater recharge;
 - (7) Install and maintain all Erosion and Sediment Control measures in accordance with the Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas, manufacturers specifications and good engineering practices;
 - (8) Prevent off-site transport of sediment;
 - (9) Protect and manage on and off-site material storage areas (overburden and stockpiles of dirt, borrow areas, or other areas used solely by the permitted project are considered a part of the project);
 - (10) Comply with applicable Federal, State and local laws and regulations including waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control;
 - (11) Protect natural resources and prevent significant alteration of 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, and Priority Habitats of Rare Species from the proposed activities;
 - (12) Institute interim and permanent stabilization measures, which shall 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;

- (13) Properly manage on-site construction and waste materials, including truck washing and cement concrete washout facilities;
- (14) Prevent off-site vehicle tracking of sediments; and
- (15) Incorporate appropriate BMPs designed to comply with the Massachusetts Stormwater Handbook.

Section 10. Operation and Maintenance Plan for Permit Applications

- A. A stand-alone Operation and Maintenance Plan is required at the time of application for all projects that include structural and non-structural stormwater BMPs. The Operation and Maintenance Plan shall be designed to ensure compliance with the Permit and these regulations for the life of the system. The Operation and Maintenance Plan shall remain on file with the Stormwater Authority and shall be an ongoing requirement. The Applicant shall provide copies of the Operation and Maintenance Plan to all persons responsible for maintenance and repairs.
- B. The Operation and Maintenance Plan shall include:
 - (1) The name(s) of the owner(s) for all components of the system;
 - (2) A map showing the location of the systems and facilities including all structural and nonstructural stormwater best management practices (BMPs), catch basins, manholes/access lids, pipes, and other stormwater devices. The plan showing such systems and facilities to be privately maintained, including associated easements shall be recorded with the Essex County Registry of Deeds prior to issuance of a Certificate of Compliance by the Stormwater Authority pursuant to Section 15.
 - (3) Maintenance Agreement with the Stormwater Authority that specifies:
 - (a) The names and addresses of the person(s) responsible for operation and maintenance;
 - (b) The person(s) financially responsible for maintenance and emergency repairs;
 - (c) An Inspection and Maintenance Schedule for all stormwater management facilities including routine and non-routine maintenance tasks to be performed. Where applicable, this schedule shall refer to the Maintenance Criteria provided in the Stormwater Handbook or the EPA National Menu of Stormwater Best Management Practices or equivalent;
 - (d) Instructions for routine and long-term operation and maintenance shall have sufficient detail for responsible parties to perform necessary maintenance activities and prevent actions that may adversely affect the performance of each structural and/or nonstructural stormwater BMP.
 - (e) A list of easements with the purpose and location of each; and
 - (f) The signature(s) of the owner(s) and all persons responsible for operation and maintenance, financing, and emergency repairs, as

defined in the Maintenance Agreement, if maintenance is to be performed by an entity other than the owner.

- (4) Stormwater Management 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; and
 - iii. Direct maintenance access by heavy equipment to structures requiring 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 permanent stormwater control, unless a waiver is granted by the Stormwater Authority pursuant to Section 4(B).
 - (d) Easements shall be recorded with the Essex County Registry of Deeds prior to issuance of a Certificate of Compliance by the Stormwater Authority pursuant to Section 15.
- (5) Changes to Operation and Maintenance Plans
 - (a) The owner(s) of record of the Stormwater Management system must notify the Stormwater Authority of changes in ownership, assignment of Operation and Maintenance responsibilities, or assignment of financial responsibility within 30 days of the change in ownership. The owner of record shall be responsible for Operation and Maintenance activities until a copy of the updated Operation and Maintenance Plan has been furnished to the Stormwater Authority signed by the new owner or any new responsible person.
 - (b) The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of the Stormwater Management bylaw by mutual agreement of the Stormwater 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 and/or maintenance responsibility.
- (6) Enforcement. To ensure adequate long-term operation and maintenance of stormwater management practices, applicants are required to implement one or more of the following procedures, as directed by the Stormwater Authority:
 - (a) Filing by the applicant of an annual Operation and Maintenance Report with the Stormwater Authority on a form specified by the Stormwater Authority, accompanied by an annual filing fee established by the Stormwater Authority for administration and enforcement of the operation and Maintenance plan.

- (b) Establishment by the applicant of a dedicated fund or escrow account in the form of a Bond, Insurance Policy or similar instrumentality, to be maintained for a number of years and for an amount specified by the Stormwater Authority. Such fund or account may be used by the applicant to perform its operation and maintenance responsibilities or, if the Stormwater Authority finds that the applicant has failed to comply with the Plan, by the Stormwater Authority to perform or cause to be performed the required operation and maintenance tasks;
- (c) Payment by the applicant to the Stormwater Authority of an amount specified by that Authority in compensation for its acceptance of ownership of all privately constructed BMPs;
- (d) A maintenance contract between the applicant and the Stormwater Authority in an amount specified by the Stormwater Authority whereby the Stormwater Authority will perform or cause to be performed the required operation and maintenance tasks;
- (e) Submission by the applicant of an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. The certification shall be signed by the person(s) or authorized agent of the person(s) named in the permit as being responsible for ongoing operation and management;
- (f) Recording of Operation and Maintenance Plans at the Southern Essex District Registry of Deeds or Land Court.

Section 11. Inspection and Site Supervision for permit applicants.

- A. Pre-construction Meeting. Prior to starting the clearing, excavation, construction, Redevelopment or land disturbing activity, the applicant, the applicant's technical representative, the general contractor or any other person with authority to make changes to the project, may be required to meet with the Stormwater Authority or its designated agent, to review the approved plans and their proposed implementation. The need for a pre-construction meeting shall be determined by the Stormwater Authority based on the project scope.
- B. Stormwater Authority Inspection. The Stormwater Authority, or its designated agent or consultant, shall make inspections as herein required and shall either approve that portion of the work completed or shall notify the applicant wherein the work fails to comply with the Erosion and Sedimentation Control Plan or the Stormwater Management Plan as approved. The approved Erosion and Sedimentation Control Plan and associated plans for grading, stripping, excavating, and filling work, bearing the signature of approval of the Stormwater Authority, shall be maintained at the site during the progress of the work. In order to obtain inspections, the applicant shall notify the Stormwater Authority at least two (2) working days before each of the following events:
 - (1) Erosion and sedimentation control measures are in place and stabilized;
 - (2) Site Clearing has been substantially completed;
 - (3) Rough Grading has been substantially completed;
 - (4) Final Grading has been substantially completed;

- (5) Close of the Construction Season; and,
 - (6) Final Landscaping (permanent stabilization) and project final completion.
- C. Stormwater Management System Inspections.
- (1) An inspection may be made of the excavation for the stormwater management system to ensure adequate separation of the stormwater system from ground water and presence of approved soil type.
 - (2) Stormwater Management System Inspection: An inspection may be made of the completed stormwater management system, prior to backfilling of any underground drainage or stormwater conveyance structures.
- C. Applicant Inspections. The applicant or his/her agent shall conduct and document inspections of all control measures no less than weekly or as specified in the permit, and prior to and following anticipated storm events. The purpose of such inspections will be to determine the overall effectiveness of the Erosion and Sedimentation Control Plan, and the need for maintenance or additional control measures as well as verifying compliance with the Stormwater Management Plan. The applicant or his/her agent shall submit weekly reports to the Stormwater Authority or designated agent in a format approved by the Stormwater Authority.

Section 12. Surety for projects requiring permits.

The Stormwater Authority may require the permittee to post before the start of land disturbance activity, a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the bond shall be approved by town counsel and be in an amount deemed sufficient by the Stormwater Authority to ensure that the work will be completed in accordance with the permit. If the project is phased, the Stormwater Authority may release part of the bond as each phase is completed in compliance with the permit but the bond may not be fully released until the Stormwater Authority has received the final report as required by Section 14 and issued a certificate of completion pursuant to Section 15. Said surety funds shall be maintained in a special account established by the Stormwater Authority pursuant to G.L. c. 44, §53G1/2.

Section 13. Final Reports for projects requiring permits

Upon completion of the work, the permittee shall submit a report (including certified as-built construction plans) from a Professional Engineer (P.E.), surveyor, or Certified Professional in Erosion and Sediment Control (CPESC), certifying that all erosion and sediment control devices, and approved changes and modifications, have been completed in accordance with the conditions of the approved permit. Any discrepancies should be noted in the cover letter.

Section 14. Certificate of Completion for projects requiring permits.

The Stormwater Authority shall issue a letter certifying completion upon receipt and approval of the final reports and/or upon otherwise determining that all work has been conducted in conformance with these regulations and the Stormwater Management Permit conditions.