

Prioritized Action and Outreach
Nashoba Watershed Stormwater Project

Julia Kindlon, OARS, August 2013

1. ACTON

1.1 Ideas/Priority Areas:

Information from: Roland Bartl, Planning Director, June 20, 2013; Paul Campbell, Engineering Department, May 30, 2013; Nashoba Brook Watershed Stormwater Meeting, Concord, July 25, 2013 (see Appendix 1 for Participant List).

Priority Action: finishing bylaw to control post-construction stormwater runoff

Important Points:

- Want data on effectiveness and reliability
- Concerns: loss of control, mosquito complaints, urban areas, ensuring filtration
- WRAC working to comply with NPDES – drafting bylaw for post-construction runoff control – almost finished, next step = outreach
- Bylaws state that post-development recharge cannot be less than pre-development
- Priority Areas: single family homes and subdivisions of less than four lots
- Recommend bringing workshops to board members

It is important to see data and to know that if stormwater management techniques are implemented, they will be effective and reliable. The town may lose some control with LID and decentralization of stormwater management. Enforcement becomes more difficult as does maintaining the system. Other concerns include the worry of mosquito complaints due to detention and retention ponds, the effectiveness of LID in urban areas and that LID shouldn't dictate urban design, and ensuring that filtration is actually happening. The two large parcels identified by the Geosyntec study in Acton are in their protection resource area (zone 1 and zone 2), so small cumulative efforts might be best to ensure they are not recharging pollutants. In an effort to comply with NPDES, the Water Resources Advisory Committee (WRAC) was implemented to help work on proposing bylaw changes and to draft a bylaw for post construction runoff control.

Acton has also worked to get rid of some excessive requirements to help with stormwater. For instance, subdivision streets were originally required to be 36 feet wide, now the requirement is only 20feet. Acton has some LID techniques implemented in private areas such as the porous pavement for the Beacon Court Development private way and vegetated swales and rain gardens in the design of the Sarah Lane Subdivision. Acton has also been figuring out solutions for providing handicapped access in conjunction with permeable paving, which is usually less even than required for electric wheelchairs. They have installed a cement pad for handicapped parking use in an otherwise permeable (stone dust) parking lot at the Arboretum. Although potholes form in the stone dust, they also act as speed bumps. There was also an extra parking lot made at Nara Park using free asphalt road scrapings which are permeable and have a very low cost. New developments in Acton must comply with the bylaws, and while some of these

haven't been touched since the late 1980s, there is still the requirement that post-development recharge cannot be less than pre-development.

The biggest priority areas for stormwater recharge in Acton are single family homes and subdivisions of less than four lots. If one wants to bring about changes in Acton by influencing board members, bringing workshops to them may help as it is difficult to get members to voluntarily attend a meeting outside of work. Acton has been working to teach 4th and 5th graders about stormwater every two years. Schools also take trips to the wastewater treatment plant and the hope is that students will transfer the messages they learn on to their parents.

1.2 Acton Regulatory Framework

Discharges to the Municipal Storm Drain System

The Discharges to the Municipal Storm Drain System Bylaw aims to prevent pollution and unauthorized flow from entering Acton's Municipal Separate Storm Sewer System (MS4), to prohibit and require the removal of illicit connections and discharges to the MS4, and to prohibit obstruction of the MS4. This bylaw sets up the Board of Health as its administrator, implementer, and enforcer. It also describes criteria for permits, exemptions, emergency suspension of the storm drainage system access, notification of spills, and enforcement.

Zoning Bylaws

The goal of the Zoning Bylaw is to implement Acton's zoning powers in order to achieve objectives including conservation of health; protection against floods; facilitation of adequate sewage disposal, drainage, and open space; and prevention of pollution to the environment. This bylaw declares that a development site, a planned conservation residential community, a planned unit development, and a senior residence are not allowed to have a peak rate of stormwater runoff which exceeds "the rate existing prior to the new construction based on a 10-year design storm". The stormwater drainage facilities on a development site should be designed to prevent overflow onto the street, but the board of selectmen can authorize these facilities to be off-site if it's based on a 25-year design storm and the applicant can maintain working order of the facilities. This bylaw states that Common Land can be used as open space development or as a retention or detention facility for stormwater from lots or streets. The bylaw also affirms that interior area landscaping in parking areas substituted with bioretention areas designed to help lessen and trap runoff can be considered part of open space minimum requirement.

Subdivision Rules and Regulations

Acton's Subdivision Rules and Regulations work to help protect the town citizens; to comply with zoning bylaws; and to ensure adequate supply of drainage, water, and sewerage. The Planning Board is the designated authority for these rules and regulations which declare that the maximum rate storm water runoff from a subdivision is not allowed to go above "the rate existing prior to the new construction based on a 10 year design storm". These regulations lay out the requirements for calculations used in the design of storm water drainage system and state that the planning board may approve off-site stormwater

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drainage facilities for a development provided that the 10 year design storm rate is not exceeded and that the applicant is able to ensure the facility is properly maintained.

Environmental Regulations (Wetlands Protection) Bylaw

The Environmental Regulations (Wetlands Protection) bylaw, under the administration of the Conservation Commission, is designed to protect Acton's resource areas (wetlands, adjoining buffer zones, flood and riverfront areas, banks, and vernal pools) through the regulation of activities which would negatively impact "public or private water supply, groundwater, flood control, erosion control, storm damage prevention, water pollution prevention, fisheries, protection of endangered or threatened species, and wildlife habitat". This bylaw also sets up a fine for failing to adhere to the plans for the construction of a stormwater or drainage structure.

Storm Water Management Plan

The Acton Storm Water Management Plan represents how Acton, during the 2003-2008 period, planned to meet the NPDES Phase II guidelines. The plan includes information on regulatory requirements, current programs, proposed BMPs, and a timeline for public education and outreach, public participation/involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control, and pollution prevention/good housekeeping. The plan also includes eligibility requirements for small MS4s and an overview of the Assabet River Total Maximum Daily Load Phase I findings.

By-law for the Control of Post Construction Stormwater Runoff Draft

This bylaw has not been adopted yet, but in the draft the goal is to establish minimum requirements and controls for stormwater to protect the public who reside in the watersheds which are under this bylaws' jurisdiction. One of the ways it aims to do this is by having no increase in stormwater runoff from developments or redevelopments so as to lessen flooding and siltation, maintain recharge areas and stream channels, keep stream temperatures from increasing, and diminish erosion to stream banks. This bylaw seeks to protect the quality of local water by minimizing any increase in nonpoint source pollution due to stormwater runoff from a development. The yearly volume of stormwater runoff from any development site should be minimized and must not exceed pre-development hydrologic conditions. Where possible, erosion and nonpoint source pollution shall be reduced and stormwater runoff shall be decreased in quantity and velocity. This bylaw also declares that Acton shall strive to meet the required "reduction in nonpoint source pollutant contributions to exceeding phosphorus limits for the Assabet River TMDL [total maximum daily loads]". This draft includes information about permit procedures and requirements, general performance criteria for stormwater management, basic stormwater management design criteria and requirements for a stormwater management plan approval, construction inspection provisions, maintenance and repair of stormwater facilities, enforcement and penalties, and a plan for the development of a stormwater design manual. In the table of contents there is a section for stormwater management credits and waivers, though that section changes to stormwater management waivers and variances in the body of the bylaw.

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2. LITTLETON

2.1 Ideas/Priority Areas

Information from: Savas Danos , Littleton Electric Light and Water Departments (LELWD) General Manager, May 30, 2013.

Littleton has always been ahead of the curve on stormwater management. In fact, they were one of the first towns in the country with percent coverage rules. Littleton hasn't made any major changes to bylaws relevant to stormwater since 2007; around the same time that they created a Low Impact Design/Best Management Practices Manual to show what techniques were best for their town. It remained separate from the bylaws so that it could be updated easily. Littleton currently has water restrictions in place (Drive to 65), though it is better received when referred to as a water conservation program. To minimize risk, Littleton prefers that any new stormwater management techniques be passive. There are new members on many of the relevant boards and a priority is educating these new members on stormwater recharge and its relevant bylaws. Other priorities include the area adjacent to King Street and the need to maintain stream flow pre and post development. The sanitary sewer systems actually work best when operating with more wastewater, so the goal is often to build towards the maximum amount of wastewater to increase efficiency and profit. Some ideas include a minimum depth of top soil requirement, justification for the removal of vegetation, and a change for the definition of a bedroom from number of rooms to number of people.

Important Points:

- Like passive stormwater management techniques
- Has separate manual to keep stormwater techniques up-to-date
- Priorities:
 - o Need to educate new board members
 - o Area adjacent to King Street
 - o Maintain stream flow pre and post development
- Ideas
 - o Minimum depth of top soil requirement
 - o Justification for the removal of vegetation
 - o Change the definition of a bedroom from number of rooms to number of people.

2.2 Littleton Regulatory Framework

Code of the Town of Littleton: Part II, General Legislation: Chapter 173, Zoning

The purpose of the Littleton Zoning Bylaw is to benefit Littleton while maintaining its rural and historic character. This bylaw helps regulate new and re developments which would add to or further impair stormwater. Article XIV of this bylaw refers to the Aquifer and Water Resource District. These areas have percent impervious coverage restrictions to help ensure recharge. In the Aquifer district, impervious cover greater than 15% but less than 30% of the total area requires a permit; and, in the Water Resource

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district, impervious cover greater than 20% but less than 50% of the total area requires a permit. Under this same article, the bylaw asserts that stormwater runoff from impervious cover should be recharged on-site and that one should reference the *Town of Littleton Low Impact Design/Best Management Practices Manual* for methods of infiltration. The Zoning Bylaw also proclaims that design requirements for site plans must use the methods in the manual to “the greatest extent reasonable” to manage and treat stormwater.

Code of the Town of Littleton, Massachusetts: Chapter 249: Subdivision of Land Regulations:

The sections most relevant to stormwater recharge in the Subdivision of Land Regulations are Easements (249-47), Stormwater Management (249-51), and Erosion and Sediment Control (249-52). The Easements section states that, “where a subdivision is traversed by a watercourse, drainageway, channel or stream, the Board [Planning Board] may require that there be provided a stormwater or drainage easement”. The purpose of the Stormwater Management section (249-51) of the Subdivision Land Regulations is to recharge stormwater when feasible and environmentally preferable. It references the MA DEP Stormwater Management Handbook as the required guide for designing and implementing stormwater management. This section also declares that street drainage must be treated with at least one best management practice (BMP) before entering a wetland or water body. The Erosion and Sediment Control section of this bylaw asserts that runoff characteristics should be as close as possible to predevelopment conditions, that water resources should be protected, and that sediment basins should be installed to help remove particulates from runoff.

Wetlands Protection:

The purpose of the Littleton Wetland Bylaw is the protection of water resources and wetlands in Littleton. It does this by regulating any activity that could affect the wetland resource areas. This bylaw is under the authority of the Conservation Commission and declares that no one may fill, alter, dredge, or remove any of the areas protected by this bylaw without their permission. This bylaw also lays out the criteria for applications, fees and charges, hearings and meetings, permits and conditions, exemptions, and enforcement.

Town of Littleton Low Impact Design/Best Management Practices Manual

The *Town of Littleton Low Impact Design/Best Management Practices Manual* is meant to assist developers in learning about and using different stormwater management options. Numerous Littleton bylaws reference this manual, but it remains separate from these bylaws so that it can be updated easily. This helps it stay up to date on its description of Low Impact Development (LID) methods and Best Management Practices (BMPs) that are useful to the town of Littleton. This manual includes a matrix showing where different LID techniques are most effective in Littleton and a section, which includes relevant equations, on how to approach site design. It explains the goals for BMP use, a description of BMPs useful in Littleton, and criteria for evaluating BMPs. This manual also lays out background information about the hydrologic cycle and infiltration as well as the impact of development on hydrology.

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3. WESTFORD

3.1 Ideas/Priority Areas

Information from: Paul Starratt, Town Engineer, June 19, 2013; Nashoba Brook Watershed Stormwater Meeting, Concord, July 25, 2013

Priority Action: Completing their Stormwater Master Plan and potentially creating a stormwater utility

Important Points:

- Biggest accomplishment – passing stormwater bylaw and regulations
- Wants proof of effectiveness of LID and for the town not to be responsible – monitors LIDs on private property to learn more
- Working on stormwater management plan and possible stormwater utility
- Recommends influencing designers and engineers so that they will influence developers and influencing landscapers with a workshop
- Priority Area: Commercial parking lots are biggest contributor to stormwater runoff

Westford has been moving forward with stormwater management. After passing the Stormwater Management bylaw back in 2008, as of Nov. 2012 they had passed its rules and regulations. There is an interest in LID, but there is also concern about its reliability. People wonder how it will hold up against New England winters. LID techniques have been implemented on some private developments (longest time scale only 5 years) which allow Westford to monitor its effectiveness without taking on the responsibility of its upkeep. On town property, LIDs have been implemented at the Norman E. Day School as part of the Living Lab program and at the Water Department by an Eagle Scout. These LIDs provide Westford officials with a teaching tool. At the school for instance, one week each year Starratt and others teach 5th graders about stormwater and its effect on coldwater fisheries.

Going forward, they would like to create a stormwater master plan, for which, on July 1' 2013 the department received \$300,000 appropriated by a town meeting. The goal of this master plan is threefold: 1) To gain a comprehensive understanding of Westford's stormwater system. 2) To determine what needs to be done to bring Westford in compliance with MS4 permits, NPDES, and the DEP, for the sake of being in compliance and for the town to be a model for developers. 3) To resolve how to get capital costs under control. The current idea for controlling capital costs is a stormwater utility which would provide funding and distribute cost while introducing LID to homeowners who could implement LID on their private property as a way of lowering their own costs.

Westford is also pursuing a TURI grant for workshops on stormwater and turf management (see letter of intent on next page). Some of the people most resistant to stormwater management in Westford are developers who tend to prioritize profits over environmental protection. The best way of influencing developers is through their designers and engineers. Some planning board members can also be resistant to LID. Planning Boards may be prone to being sued, which can lead to stormwater management

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decisions being left up to judges. Starratt has used OARS' presentation as a tool to introduce planning board members to the idea of stormwater management. Holding workshops to educate landscape contractors is recommended, though they tend to be competitive and might not all want to gather together. The biggest priority for LID in Westford is commercial parking lots which can be one of the biggest contributors to stormwater runoff.

3.3 Westford Regulatory Framework

Discharges to Municipal Storm Drain System Bylaw:

The Westford Discharges to the Municipal Storm Drain System Bylaw aims to regulate illegal discharges and connections to the Municipal Separate Storm Sewer System (MS4). The Board of Health is the responsible authority for this bylaw which applies to all flows entering the MS4. This bylaw prohibits illicit discharges, illicit connections, and obstructions to the Municipal Storm Drain System.

Stormwater Management Bylaw:

The goal of the Westford Stormwater Management Bylaw is to regulate stormwater runoff from newly developed and redeveloped sites on any subdivision which requires a definitive plan, on any land disturbance greater than one acre or part of plan greater than one acre, and on any ANR (Approval Not Required) lots meeting at least one of these criteria. The Stormwater Authority is the Westford Planning Board and they are in charge of enforcing this bylaw and developing its rules and regulations.

Rules & Regulations for Stormwater Management:

The Westford Rules & Regulations for Stormwater Management are established by the Planning Board to protect the public and the environment. These regulations set up minimum requirements to control the negative impacts of a decrease in groundwater recharge, of stormwater runoff from construction and post-development sites, and of new development and redevelopment non-point source pollution. This bylaw also lays out the criteria for obtaining a Stormwater Management Permit which must include a calculation of impervious area and a record of all structural Best Management Practices. The design criteria laid out by the performance standards in this bylaw include criteria for sensitive areas such as coldwater fisheries and discharges to water-quality impaired waters; hydrologic design criteria (such as water velocity limits and detention time); and having a design which includes the allowance for natural groundwater recharge, the minimization of water used for irrigation, and the elimination of invasive species. To meet the performance standards of this bylaw a design must comply with the standards in the MA DEP's Stormwater Management Standards and Handbook. These regulations also contain information about construction and erosion control inspections.

Zoning Bylaw:

The Zoning Bylaw of the Town of Westford is designed to regulate zoning for purposes including ensuring adequate supply of drainage, water, sewerage, and open space as well as averting pollution of the environment. It requires that for any change which would make a lot 15% (or more than 2,500sq. ft)

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impervious “a system for groundwater recharge must be provided that does not degrade groundwater quality”. This bylaw includes the stormwater management requirements needed in order to receive a special permit for a Senior Residential Multifamily Development, an Assisted Living Facility, or a Major Commercial or Retail project. One of the requirements for site plan approval by the Planning Board laid out in this bylaw is that any new construction or alteration to a site must include provisions for stormwater drainage as laid out in the Subdivision Rules and Regulations. The design of these new lot changes should aim to “minimize the volume of cut and fill, the number of removed trees 6" caliper or larger, the length of removed stone walls, the area of wetland vegetation displaced, the extent of stormwater flow increase from the site, soil erosion, and threat of air and water pollution”.

Zoning Regulations:

The purpose of the Westford Zoning Regulations is to promote growth and development while protecting resources. Section 3.7 of these regulations focuses on Westford’s Water Resources Overlay District which seeks to ensure the quality of “water related resources” for the purpose of conservation, use, and consumption through the minimization of developments’ negative impacts. Relevant regulations include the requirement of subdivisions bordering the Overlay District to implement a stormwater management plan and parking areas may be required to have permeable surfaces or be relocated to limit runoff.

Non-Zoning Wetlands Bylaw:

The Westford Non-Zoning Wetlands Bylaw works to protect wetlands in Westford, not including retention/detention ponds created as part of a stormwater management system, as well as associated water resources and neighboring land areas which could affect the wetlands “including but not limited to the following: public or private water supply, groundwater protection, flood control, erosion and sedimentation control, storm damage prevention, water pollution prevention, fisheries, shellfish and wildlife habitat and recreation and aquaculture values”. The Conservation Commission is responsible for the administration of this bylaw which limits activity in the buffer zone (within 100 feet of wetland area) and contains information on permits, fees, exceptions, prohibited activities and uses, notice and hearings, definitions, rules and regulations, and enforcement.

Wetlands Rules and Regulations

The goal of the Westford Wetlands Rules and Regulations is “to create uniformity of forces and to help clarify the provisions” of the Wetlands Bylaw. These regulations are set up by the Conservation Commission as issued in Westford’s Wetlands Protection Bylaw. These rules and regulations lay out the application procedures, information to be included in plans, how to get a certificate of compliance, and information about emergency projects under the Wetlands bylaw.

Subdivision Rules and Regulations:

These rules and regulations aim to regulate the construction and lay-out of subdivisions. One of the utilities required on a subdivision is stormwater drainage which should be recharged to the maximum extent possible, preferably using the current guidelines of the Department of Environmental Protection

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(DEP). Sites with over an acre of disturbed area or which require the submission to the EPA of a NPDES Stormwater Permit must submit all plans and approved permits to the Town Engineer. This bylaw includes criteria for catch basins, open drainage systems, surface water drainage systems, detention and retention basins, and stormwater runoff in street gutters. In the case of water (a stream, channel, drainageway, or watercourse) traversing a subdivision, the planning board may require a stormwater easement or drainage right-of-way.

APPENDICES

1. Nashoba Watershed Stormwater Meeting List of Attendees

Nashoba Watershed Stormwater Meeting The Wheelhouse, Concord, July 25, 2013			
Who	Town	Department	Email
Paul Starratt	Westford	Town Engineer	pstarratt@westfordma.gov
Kate Hollister	Westford	Stream Team and Planning Board	kdemh@ll.mit.edu
Diane Duane	Westford	Stream Team and Westford Conservation Trust	diane97@comcast.net
Janet K. Adachi	Acton	Chair, Board of Selectmen & liaison to Water Resources Advisory Committee	jkajeg@msn.com
Jeff Clymer	Acton	Acton Planning Board and Water Resources Advisory Committee	jeff.clymer@aonhewitt.com
Pamela Cady	Acton	Energy Conservation Analyst Municipal Properties Department	pcady@acton-ma.gov
Bettina Abe	Acton	Natural Resources Department – Acton Conservation & Water Chestnut Removal	babe@acton-ma.gov
Matt Mostoller	Acton	Environmental Compliance Manager – Acton Water District	Matt@actonwater.com
Delia Kaye	Concord	Natural Resources Director	dkaye@concordma.gov

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 Nashoba Watershed Stormwater Project
 Julia Kindlon, OARS, August 2013

2. Acton Bylaw Matrix (Source: Review of Acton bylaws by OARS)

TOWN: Acton						Acton
Bylaw Chapter	Chapter U			Chapter F		Chapter W
Bylaw Title	Discharges to the Municipal Storm Drain System	Zoning Bylaw	Subdivision Rules and Regulations	Environmental Protection (Wetland Protection)	Storm Water Management Plan	By-law for the Control of Post Construction Stormwater Runoff Draft
Date of Bylaw Passage	Town Meeting April 5, 2010	Amended through April 2012	Adopted 1965 Last Amended December 6, 2011	Town Meeting April 8, 2003 (effective July 8, 2003)	Sept. 5, 2003	NA
Purpose and Objectives	U1	1.2	Header: Page 5	F1	Executive Summary 1.2	1.2
Organizational features						
Administration	Board of Health U5	Board of Appeals, Board of Selectmen, and Planning Board Section 10	Planning Board Section 1	Conservation Commission F3.7	No Administration. Board of Health, Engineering, Highway, Recreation, Planning and Board of Selectman all gave input	Water Resources Advisory Committee 3.0
Definitions	U2	1.3	2.1	F3		Section 2
Reference to MA DEP Stormwater Handbook			5.3.26 (DEP Stormwater Management Policy)		6.2 7.3 b)	3.5 3.6 Section 6 6.1.2 6.1.3 7.1
Rules and Regulations	6.1	4.3.8.3 7.13.4 10.3.1 10.5.1	These are Regulations.	F13	Want rules and regulations for bylaw they are drafting: 5.3 c). Plan to review existing rules and regulations:	

					5.4 table 5.1, 6.3 a), 7.3.	
Exemptions or waivers	U9	3.10.6.18 6.7.9.2 8.3.5 8.5	8.1.23.2 11.1	F4		3.2
Submittal for Permit/Certificate of Completion	U7	8.7, 9.2, 9.3, 9B.2, 10.2, 10.3, 10.4		F6.3	1.5 1.6	3.1.1 Section 4 6.1.6 9.8 10.10
Permit Coordination with other Boards	7.1 7.2	10.3.3				7.2
Public Input	11.2 15.1	9.8 9B.15 10.3.4 10.5.4 9A.8	5.4 5.7 5.8 11.9	F5.1 F7.1	Section 4	
Operation & Maintenance		4.1.5.1 4.1.5.2 4.1.7.3 4.1.7.4 4.1.7.5 4.2.3.5 b & d 5.5B.1.2 e) iv 5.6.3.2 e 6.9.1.5, 6.9.3 b, 6.9.4.5, 6.9.5.4, 6.9.6.4 9.1 9.6.3.2 d 9B.9.2.4	8.7.2 10.1 10.1.1.4 10.1.1.6 c) 10.1.1.7 11.2.2		1.6 7.1 (b.) 7.2 7.3 c) 8.1 b) & c) 8.2 a) & c) 8.3 c) & d) 8.4 table 8.1	3.5 4.2 4.4 5.1 6.1.6 8.3 Section 9 9.6 9.8 10.3 5.
Surety			6.3.1	F12		
Review/action by Enforcing Authority	U12	4.4.9 Section 11	11.8	F14	5.1 b) 5.3 c) 5.4 Table 5.1 6.1 (g.) 6.3 b)	3.6 Section 10

					7.1 7.2	
Municipal Inspection, Monitoring, & Enforcement	1.2.6 12.3 2.	3.5.17.14 3.10.1.3 6.7.8.8	6.2.4 7.1 11.4		Recommendations 1.2 4.1 b) 5.2 5.3 d) 5.4 table 5.1 6.1 g) 6.3 b) 7.2 7.3 d) 8.1 d) 8.2 8.2 a) 8.3 c) 8.4 table 8.1	3.5 4.3 4.5 5.1 7.3 Section 8 Section 9 10.3
Appeal Process	12.9	10.1	5.2.3.2 5.9.2	F15		3.0 10.2 10.7
Severability	13.1	11.3		F16		3.4
Techniques and Components						
Illicit Discharge Prohibition	1.2.3 8.1				Section 5	
Illicit Discharge Exemptions	U9					
Notice of Spills	U11					
New Development and Redevelopment during Construction		4.4.2.1 5.5B.2.1 8.1.5 8.3.2 8.3.4 8.7	8.2.3 8.3.1 8.3.2 8.5.4		1.1 6.2 Section 7	1.1 1.2 3.1.3 3.1.4 6.1.1 6.1.4
Erosion and Sediment Control		3.5.17.12 3.8.1.5 k 9B.14	5.3.24 8.3 9.8.7	F1 F8.4 F8.5	3.2 6.1 (a) & (c) 6.2	1.1 1.2 3.2.5

			11.2.1.3 11.4.1	F14	6.3 b) 6.4 table 6.1 8.3 c)	5.1 6.1.5 8.3 10.3 2 & 4
Control of Construction Waste			5.3.28 8.3 9.1.10	F8.5 F14	Section 6. Section 7.	6.1.5
Performance Stds.			Section 8		EPA & MADEP standards: 1.2 Other MADEP standards: 7.3 b)	3.5 Section 6
Street Sweeping	Water discharge exempt: 9.2 12.				Introduction 8.2 b) 8.3 c) 8.4 table 8.1	
Catch Basins	Under definition for MS4	4.2.3.5 e 4.3.6.3 9.6.3.2 e 9B.9.2.5	5.3.21 8.2.1 8.2.2.1 8.3.4 8.3.5 8.5.1 9.2.1 9.2.2 11.4.6.2 11.4.6.3 D-2		Introduction 4.3 e) 7.3 c) 8. 8.2 a) 8.3 c) 8.4 table 8.1	9.3
Specifically mention LID			10.1.1.4			
Bioretention areas, vegetated swales, grassed filter strips		6.9.1.7 c 4.2.3.5 e 9.6.3.2 e 9B.9.2.5			7.3 c)	
Rain Gardens						
Stream Buffers				F3.5 F3.14 F8.4 F8.5	7.3 a)	5.1

Infiltration trenches, dry wells					7.3 c) 9.	
Rain Barrels						
Green Roofs						
Pervious Pavement					7.3 c)	
Impervious area reduction		4.3.4 4.3.8.1 6.9.4.7 b 10.4.1.1 3 10.4.1.2 3 10.4.3.6 10.4.3.12 10.6.3.2			7.3 a)	3.1.1 4.1 6.1.7
Preserve Open Space		4.2 4.4.3 5.3.5.2 5.3.8.1 5.3.9 5.3.11.1 5.5C.1.1 5.5C.1.3 b 6.8 9.6.3.3 9B.9.3 10.4.3.3 10.4.3.5 10.4.3.12.2 10.4.4.1 4 9A.2.2 9A.7.2 9A.7.2.2	8.8		7.3 a)	
Runoff Reuse						
Mimic Hydrology						
Downstream Effects						5.1
“Stormwater credits” system						In the Table of Contents, Section 5 is Stormwater

						Management Credits and Waivers. In the bylaw, this section changes to Stormwater Management Waivers and Variances.
Offsite mitigation						5.1

3. Littleton Bylaw Matrix (Source: Review of Acton bylaws by OARS)

TOWN: Littleton				
Bylaw Chapter	Chapter 173	Chapter 249 (Concentrating on Sections 47, 51, 52)	Chapter 171	
Bylaw Title	Zoning	Subdivision of Land Regulations	Wetlands Protection	Low Impact Design/Best Management Practices Manual
Date of Bylaw Passage	Adopted 5/9/1988 Town Meeting Amendments through 2012	Adopted March 22, 2012	Adopted May 5, 2003 Town Meeting	May 2007
Purpose and Objectives	173-1	249-1	171-1	1.1
Organizational features				
Administration	Building Inspector 173-3	Planning Board 249-1	Conservation Commission 171-1 A&B	
Definitions	173-2	249-6		2.3 Descriptions of BMPs relevant to Littleton
Reference to MA DEP Stormwater Handbook		249-51 A & H		2.3.1 2.3.2 2.3.3 3.2 Section 4
Rules and Regulations	173-61 Article XVI 173-87	These are Regulations.		

	173-168			
Exemptions or waivers	173-11 173-27 C 173-153 A 173-184 B	249-100	171-6	
Submittal for Permit/Certificate of Completion	173-4 173-7 173-61 173-62 173-73 173-88 173-94/173-96 173-147 173-165/173-166		171-5	1.2 – references permit required in Littleton Zoning Bylaw
Permit Coordination with other Boards	Maren Toohill is permit coordinator			
Public Input	173-7 B 173-117 B 173-184 C		171-4	
Operation & Maintenance	173-63 173-149 E			Figure 4 2.4 3.2 Steps 3, 5 & 6
Surety				
Review/action by Enforcing Authority	173-5 173-96 A, C & E 173-172		171-8	
Municipal Inspection, Monitoring, & Enforcement	173-63 E 173-88 A (5) 173-126 G			
Appeal Process	173-6			
Severability	173-12		171-9	
Techniques and Components				
Illicit Discharge Prohibition				
Illicit Discharge Exemptions				
Notice of Spills	173-64			
New Development and Redevelopment during	173-10 B (2) 173-20 C	249-51 I 249-52 B		Figure 4

Construction	173-73 173-74 D 173-87 B			
Erosion and Sediment Control	173-32 C 173-57 C (4) 173-63 D 173-88 B (4) 173-88 C. 4. a 173-127 C & E 173-131 B (7) 173-183	249-52		
Control of Construction Waste		249-52 B, E & F		
Performance Stds.	173-175		171-7	
Street Sweeping				
Catch Basins	173-32 C (5)	249-51 D 249-52 F & G		2.3.3 Figure 4
Specifically mention LID	173-32 C (6) Cites Manual [173-18 F, 173-63 D, 173-179 B (1)]			Subject of this manual.
Bioretention areas, vegetated swales, grassed filter strips	173-32 C (6)			2.3.3 Figure 4 2.3.2
Rain Gardens	173-32 C (6)			2.3.3
Stream Buffers				2.3.1 2.3.3 Figure 4
Infiltration trenches, dry wells	173-63 D & E			2.2.1 2.3.1 Figure 4
Rain Barrels				2.3.2 Figure 4
Green Roofs				2.3.3 Figure 4
Pervious Pavement	173-32 C (6)			2.3.1 Figure 4 Example 2c-3, 2d-2

Impervious area reduction	173-61 173-63 D 173-108 C 173-153 B 173-179 B			3.2
Preserve Open Space	173-88 C. 1 173-93 173-100 173-112 173-147 C 173-149 F 173-152 A 173-175 C 173-176			Introduction 1.5
Runoff Reuse				
Mimic Hydrology				Introduction 2.3.1
Downstream Effects				
"Stormwater credits" system				1.1 1.2 3.2 Step 3
Offsite mitigation				

4. Westford Bylaw Matrix (Source: Review of Acton bylaws by OARS)

TOWN: Westford								
Bylaw Chapter	Chapter 82	Chapter 147	Under Chapter 147	Chapter 171	Chapter 235	Chapter 218		
Bylaw Title	Discharges to the Municipal Storm Drain System	Stormwater Management	Rules and Regulations for Stormwater Management	Town of Westford Non-Zoning Wetlands Bylaw	Wetlands Rules and Regulations	Subdivision Rules and Regulations	Zoning Bylaw	Town of Westford Zoning Regulations
Date of Bylaw Passage	Adopted May 9, 2008 Town meeting	Adopted May 9, 2008 Town meeting	Adopted November 5, 2012	Adopted 5/11/1987 Updated 4/17/2012	Adopted 1/1/1989 Updated 4/17/2012	Adopted 11/3/1981 Updated 10/25/2005	Adopted 3/12/1955 Updated 6/29/2012	Adopted Nov. 1972 Updated Feb. 2011
Purpose and Objectives	82.1	147.1	1.0	171-1	235-1 B	218-2	1.3	1.2
Organizational features								
Administration	Board of Health 82.5	Planning Board 147.5	Planning Board 3.0 & 4.0	Conservation Commission	Conservation Commission 235-1 A	Planning Board 218-1 218-5	Building Commissioner 9.1.1	Planning Commission 7.0
Definitions	82.2	147.2	2.0	171-9	235-2	218-3	10.2	8.2
Reference to MA DEP Stormwater Handbook		147.5 C	6.0 J 7.0 A 12.0 B 1			DEP stormwater management guidelines 218-12 E.(2)	MA DEP SW management policy 9.3A.4 4A	
Rules and Regulations	82.6	147.5 B	These are Regulations.	171-8	These are Regulations.	These are Regulations.	9.2.4 9.3.7 9.3A.2	These are Regulations.
Exemptions or waivers	82.8	147.4 B 147.8	8.0	171-3	235-6	218-7	4.3.6 7.3.4 8.5.6 4 9.3A.5 9.3A.6 9.4.6	
Submittal for		147.4 A 3	6.0	171-4		218-6	WRPOD*	4.0

Permit/Certificate of Completion		147.6		171-7		218-11 F. (4) 218-12 C. (1) & (2) 218-13 A (3) j.	- 8.1.8, 8.1.9, 8.1.10 FOD* - 8.2.5, 8.2.6, General - 9.1.2 Special Permits - 9.3, 9.3A	
Permit Coordination with other Boards		147.4 C				218-11 C & D	7.1.11 8.1.8 2.	
Public Input		147.5 B	6.0 D 8.0 C	171-6	235-1 C	218-8.1 218-11 E 218-29 C	7.1.12 8.4.7 1	4.3.2 7.4.2
Operation & Maintenance		147.1 B	6.0 K 12.0			218-12 E(4) 218-13 B(4) 218-13 I (5)	5.3.8. 11 7.2.11 3. 8.3.2. 4. 8.4.6 11. 9.3A.4 3. H 9.3A.4. 8. 9.3A.8 9.4.4 6.	3.7.3 5 & 6 3.8.2 E
Surety			10.0					
Review/action by Enforcing Authority	82.11 82.11 C 82.11 H	147.9	9.0	171-11		218-5.1 218-10 B 218-11 C& D	3.3.3 2 9.1.3 9.3A.8 9.4	3.8.13 7.2 7.5
Municipal Inspection, Monitoring, & Enforcement	82.11 C 82.11 H	147.1 B 147.5 A	11.0 12.0		253-3 D	218-11 G 218-16 B	9.3A.7 C. 9.3A.8	4.2.6
Appeal Process	82.11 I	147.5 E			253-3 D	218-11 J. (1)	9.2 9.4.11	7.4
Severability	82.12	147.10	13.0	171-13	295-7	218-8	1.7 6.2.7	1.5 3.8.11 6.3
Techniques and								

Components								
Illicit Discharge Prohibition	82.7							
Illicit Discharge Exemptions	82.8							
Notice of Spills	82.10							
New Development and Redevelopment during Construction		147.1 B 147.7	7.0 B. 2			218-4.1 218-12 A (1)		
Erosion and Sediment Control		141.1 B 147.7	11.0 C 12.0 A	171-1		218-12 E. (1) 218-12 F. (4) 218-13 B. (1) & (4) 218-13 I (5) 218-14 B	8.1.9 2. d. 9.3A.1 4. 9.4.7 1. a	4.4.4 2 4.4.4 2. d 4.4.4 3 4.4.4 3. e 5.6.8
Control of Construction Waste		147.1 B 147.7	1.0 11.0		235-1 D (1)	218-24	6.3.4 2. B 7.3.5 4.	
Performance Stds.		147.7	7.0			Minimum standards: 218-4.1 Design Standards: Article V Construction Standards: Article VI	9.3A	Conditional use standards 3.2.5, 3.3.5, 3.5.5, 3.6.5, 3.7.5 Development Standards: 3.8.7 General Standards: 4.3.5 Specific Standards: 4.3.6, 4.5.5, 4.7.4 Standards: 4.4.4, 4.6.3, 4.8.2, 4.8.3, 5.14

Street Sweeping	Discharge Exempt: 82.8 B. 12							
Catch Basins		Under Definition for MS4 in 147.2	6.0 H 6.0 K 12.0 B 4 c) ix			218-12 C. (5) 218-13 B. (3) 218-16 B 218-17 E 218-24 A	8.1.9 2 d.	
Specifically mention LID		147.1 B 147.2	6.0 A 7.0					
Bioretention areas, vegetated swales, grassed filter strips		Under Definition for BMP in 147.2	Vegetated Swales under definition for Conveyance in 2.0 7.0 B) 3.a)			218-12 E (5) 218-13B (4)		
Rain Gardens		Under Definition for BMP in 147.2						
Stream Buffers			7.0 3. a)	171-2 B			8.4.6 14. 8.4.7 2 f.	
Infiltration trenches, dry wells			6.0 J) 2. 7.0 3. a)				8.1.9 2. d.	
Rain Barrels								
Green Roofs								
Pervious Pavement								
Impervious area reduction		147.1 B					7.3.5 2 8.1.7 within table 3. (a) 8.1.9 2. d.	
Preserve Open Space		Greenspace 147.1 B				218-13 J	1.3 2.2.2 4. 3.5.4 3. 4.3.2 4.3.7 2.	3.4.1 3.5.1 3.5.6 1. 3.6.1 3.6.6 1

							5.1.3 3. 5.4.2. 6.3.4 b. 6.4.5 20&21 7.1 7.2.1 1. 7.2.4 3. 7.2.7 1. 7.2.10 7.2.11 7.3.1 2 & 3 8.4.4 5. 8.4.5 3. 8.4.6 11. 9.3A.1 3.	3.8.2 E 4.5.2 3. a&c 4.5.3 3, 5 & 9 4.5.4 4 4.5.8 4.6.2 4 4.6.3 4 & 5 4.7.3 2,8 &10 4.7.7
Runoff Reuse								
Mimic Hydrology								
Downstream Effects								
"Stormwater credits" system								
Offsite mitigation							9.3A.7	