Storm Water for Towns

Water is important to everyone. Most people agree that we need clean water. However, all is not well with our waters.

Both the Mass Department of Environmental Protection (DEP) and the U.S. Environmental Protection Agency (EPA) have tracked much of the trouble to stormwater.

You’ve seen stormwater hitting your windshield and being swished off, running from driveways and parking spaces into the street, and running down streets by the curb. Would you want to drink it at the curb? Or swim in it?

As we have built up the land, the source of water that feeds our water supplies and water bodies shifted more and more to polluted storm water. There’s no longer enough dilution to be the solution to pollution. Something has to change. We know we’re not going to stop building so we have to build better. Stormwater is now regulated by State and Federal laws and municipalities must comply. EPA and DEP find it necessary to push cities and towns to manage stormwater better.

Municipal officials, paid and volunteer, bear the responsibility to steer their cities and towns through the challenge of locally cleaning up the water. The jobs related to storm water in Massachusetts municipalities are spread through multiple departments, boards, and officials. Each needs to understand the storm water basics, the job to be done, and their part in it. Coordination is essential for clarity, efficiency and cost control.

The Basics

Storm water (or stormwater) is rain and/or snowmelt that runs off over the land; also called “runoff.” The word “storm water” is used in two ways.

Pure rain and snowmelt as it falls, is the primary definition. The second use of “storm water” refers to rain/snowmelt runoff from developed land which has picked up salt, sand, trash, agricultural or lawn fertilizer, dog poop, or other stuff found in its path as it flows to local water bodies. Properly this is “contaminated storm water.” The dual meaning can lead to confusion but context tells which meaning is intended. EPA’s regulatory definition is “Storm water – storm water runoff, snow melt runoff, and surface runoff and drainage,” which can be considered to include both meanings.
The change from clean to contaminated storm water happens rapidly when the runoff goes across land that has been developed by pre 2000 standards. And the total acreage of developed land has been grown quickly since the 1950s. Development dramatically increases hard surfaces, roofs, roads, and paved parking. Runoff from hard surfaces cannot soak down into the ground to replenish the ground water – the runoff moves rapidly and is exposed to whatever contaminants are present.

The result is fast transport of murky gray storm water into streams, lakes, wetlands, and water supplies. Rapid runoff worsens pollution when it rains and there is less groundwater to replenish stream flows when it doesn’t rain.

Developing land carelessly will mean more pollution and flooding. Groundwater recharge is cut off and the extra water going overland causes flooding. These harmful effects can dry up wells and rivers; as well as deluge basements of homes and businesses.

Storm water and drainage systems must be managed more carefully and existing mistakes corrected. It will take time but it’s not that hard. The basic principles are to improve development standards for current and future storm water management, and eliminate existing sources of pollution.

It’s doable but means paying attention and spending some money:

1. Reduce what has to be managed. Get as much storm water as possible soaked into the ground before it is contaminated and before it reaches the drainage system. That protects and replenishes groundwater.

2. Avoid contact between runoff and contaminants by reducing exposure. Encourage people to change habits (e.g. pick up after pets). Stop contaminated discharges into the storm drainage system (e.g. sewer misconnections or leaks). Install systems that filter and remove contaminants that unavoidably get into the storm water (e.g. road sand).

State and Federal Regulations
MassDEP and U.S. EPA require cities and towns to manage storm water locally. Cities and towns must comply with state and federal laws. DEP uses stormwater standards in the Wetlands Protection Act regulations (310 CMR 10.00) that are administered by the local
Conservation Commissions. EPA requires a municipal permit for stormwater systems under the federal Clean Water Act regulations for the National Pollutant Discharge Elimination System (NPDES).

EPA’s permit regulates the Municipal Separate Storm Sewer System. (No one’s going to say that easily, hence the acronym “MS4.”) The MS4 is the municipal drainage system that collects runoff and takes it to some water body or wetland or floods land somewhere. All MS4 discharges must achieve Clean Water Act water quality standards. If a city or town fully accomplishes the tasks listed in the (lengthy) permit, EPA deems the MS4 to have met water quality standards. If a town fails to do everything, EPA assumes at least some MS4 discharges are “causing or contributing” to violation of clean water standards. While compliance can be expensive, officials must recognize that EPA can impose fines of up to $25,000 per day if the work falls short of the requirements.

To that end, it is important to note that the MS4 includes the entire surface of streets and roads, as well as catch basins, pipes, detention ponds and channels. For details, please visit EPA storm water websites:

http://www.epa.gov/region1/topics/water/stormwater.html


The intent of the DEP & EPA permits is to reduce our rapidly increasing environmental debt. These permits require municipalities to apply effective techniques (“Best Management Practices”) to keep the amount of runoff recharging groundwater as high as feasible to mimic undeveloped conditions; and use other BMPs to clean up the remaining runoff before it is discharged to surface waters and wetlands. State and federal requirements overlap and apply to different municipal activities.

A prudent municipality will concentrate on the goal of healthy water and take advantage of technical information accompanying the EPA permit tasks and DEP regulations. The elements of a well-designed municipal program include local ordinances and stormwater management tasks required by the agencies. In many cases, one element of a municipal program can cover more than one regulatory requirement, which can boost efficiency and reduce costs. But, it depends on all departments understanding the full program and recognizing their roles.

A clear program will also identify elements that can be indirectly funded by another activity. For instance, if a city or town has a FEMA Hazard Mitigation Plan, FEMA money to reduce flood hazard might pay for a DPW project to reduce the volume of storm water that causes flooding. Such a project can also identify and disconnect some illicit connections to the MS4 in the process.
There’s online help available for design of such a program, such as:

University of Connecticut NEMO: http://nemo.uconn.edu/tools/stormwater/
Massachusetts Watershed Coalition: http://www.commonwaters.org/
EPA resources: http://cfpub1.epa.gov/npdes/home.cfm?program_id=6

Other online information that can help to target and solve runoff problems includes:
http://www.mass.gov/dep/water/resources/wqassess.htm
http://www.mass.gov/dep/water/resources/envmonit.htm#reports
http://www.nrdc.org/water/default.asp

DEP Requirements:
There are ten DEP stormwater standards applied through Massachusetts Wetlands Protection Act. The standards focus on managing runoff during and after development and redevelopment. The DEP standards are part of the “Massachusetts Stormwater Handbook” that can be downloaded at http://www.mass.gov/dep/water/laws/policies.htm#storm

The Standards have existed as policy since the 1990s. In 2008, they were made regulations and have the force of law. Administration of the Standards is the responsibility of the local Conservation Commission through the Massachusetts Wetlands Protection Act. The Storm Water Standards apply to development and redevelopment projects with discharge to wetlands or within 100 feet of a wetland. In summary, the ten Standards are:

1. There shall be no new untreated stormwater discharges.
2. Peak discharge after development shall be no greater than the pre-development peak discharge.
3. Match the pre-development groundwater recharge or minimize loss of recharge if this match is not possible (see also Standard 5 for exception)
4. Stormwater treatment must remove at least 80% of the total suspended solids before discharge to a wetland or water body.
5. Where runoff is exposed to high pollutant potential, special measures are required. (See DEP Stormwater Handbook Vol. 1, Ch.1 for acceptable methods)
6. In public water supply protection zones and other “critical” areas, runoff must be controlled by specific pollution prevention practices. (See DEP Stormwater Handbook Vol. 1, Ch. 1 for acceptable methods).
7. The Standards apply to redevelopment as much as possible. At a minimum the project must improve the pre-project conditions.
8. During construction activities, pollutants & sediment must be controlled. There must be a plan for pollution prevention before the project starts.
9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.
10. All illicit discharges to the stormwater management system are prohibited.

At the least, the Conservation Commission must require use of the methods in the DEP Stormwater Handbook for development and redevelopment within the WPA jurisdiction. The Stormwater Handbook Vol. 2 provides “how to” information. The DEP’s standards do not address pollution from existing conditions until construction is proposed.

The DEP standards can be adopted into other ordinances/bylaws, codes and regulations administered by other officials or boards such as the zoning bylaw, Subdivision Rules and Regulations, and permits for connection or discharge to the town drainage system (e.g. driveway cuts, new private land catch basins). In addition to defending the MS4, consistent storm water rules help to prevent conflicting local permits that cause confusion and sometimes cause law suits.

**EPA Requirements**

The EPA MS4 permit assigns specific tasks that are grouped as “6 Minimum Measures” which must be part of the municipal Stormwater Management Plan (SWMP):

1. **Public Education:** There are many online sources of education materials, such as:
   - EPA materials available at: [http://cfpub.epa.gov/npdes/stormwatermonth.cfm](http://cfpub.epa.gov/npdes/stormwatermonth.cfm)
   - SuAsCo Watershed Council: [http://stormwatermatters.org/](http://stormwatermatters.org/)
2. **Public Participation:**
   - The permittee shall engage the public in review and implementation of the municipal SWMP.
   - The SWMP and all annual reports shall be available to the public.
   - The permittee shall report on public participation activities such as websites; hotlines; clean-up teams; monitoring teams; or an advisory committee.
3. **Illicit Discharge Detection and Elimination:** permittee must develop map of entire drainage system, outfall monitoring, and locations of polluting input to the MS4. Cities and towns must enact regulations prohibiting polluting inputs.
4. **Construction Controls:** Construction approvals backed up by municipal bylaw - don’t let the problem get worse. Apply DEP standards, low impact development standards and construction period erosion controls.

5. Post construction controls: Local regulations must require ongoing maintenance of all the constructed stormwater management systems to keep up the good work. Long-term controls can be set up in the initial construction permits. Apply “Low Impact Development” techniques, such as those described on these websites: http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-lid.html http://www.lowimpactdevelopment.org/about.htm

6. Good Housekeeping for municipal operations and properties, especially, landscaping, roads, and stormwater drainage. Facilities such as waste water treatment plants and highway barns are governed by other NPDES storm water permits in addition to the MS4 Permit.

The EPA MS4 permit also requires:
- Creation and regular updating of the Storm Water Pollution Prevention Plan for municipal facilities. This written plan must make clear stormwater management activities, as well as personnel assigned for preventing pollution.
- Record Keeping & annual reporting.
- Certification that the planned storm water management program will not affect Federal rare species or sites on the Historic Register. This certification is required OR the storm water program must include means to ensure protection. The certification or precautionary program must accompany the application.
- Compliance with tasks assigned by DEP published Total Maximum Daily Load (TMDL) analyses for MS4 discharges to “impaired waters”. Find your TMDLs at: http://www.mass.gov/dep/water/resources/tmdls.htm

Community Stormwater Solutions

Effective storm water management will fulfill local legal responsibilities and protect the health of community waters. Municipal officials need to know current ordinances and drainage systems; and the best ways to handle storm water.

Municipal officials must also inform local residents about the stormwater program (i.e., what it is and why it’s necessary). It’s good to know where the problems occur. Identify local waters that have been impaired including those in downstream communities. There is very helpful information about river and stream watersheds available at DEP’s website: http://public.dep.state.ma.us/Watershed/Map.aspx

Identify the sources of the pollutants causing impairments, as required by the MS4 map and monitoring. If a source is dumping or an illegal connection, use local legal powers and staff to get it corrected. If the source is the result of a wide-spread public practice (e.g. too much lawn fertilizers) then educational materials can help change behavior.
To locate pollutant sources, trace the routes of road runoff into the drainage system. By the time the MS4 discharges to local waters, it is loaded with pollutants from impervious surfaces. The drainage system and all its outlets should be on a map to guide the tracing.

Impervious surfaces do nothing to remove contaminants such as trash, sand or sediment, and dissolved nutrients, salts or heavy metals, which are common in urban and suburban runoff. Unlike vegetated areas, hard surfaces change stormwater into polluted runoff.

The EPA MS4 permit makes municipalities responsible for the quality and quantity of the stormwater released from drainage systems. Therefore, the municipality needs to defend the system from pollutants or excessive flow input – two of many reasons to enact bylaws covering storm water management and illicit discharges into the system. Appendix A of the MS4 permit supplies helpful definitions in familiar language.

**Things to Consider:**

- Particles and sediment are pollutants. Mud matters.
- Every road is a drainage conveyance.
- Once runoff flows to a public-road, the municipality becomes responsible for the quantity and quality of this stormwater.
- Every new drainage system and road a town “accepts” will expand municipal responsibilities.
- Concrete and asphalt paving can be manufactured to be pervious.
- Flowing water dissolves or mechanically moves many materials. Those mix together in storm water creating a witches brew full of pollutants.

**Holding down costs:**

- A part-time employee could coordinate the municipal departments that must be involved in stormwater compliance and do the reporting to regulators. Local stormwater personnel should have technical background and GIS training. If less than 20 hours/week, the cost for a part-time coordinator can be low. In contrast, fines for non-compliance and consultants can be expensive. Cooperating with neighboring towns with connected watersheds or drainage systems may be cost effective, and stormwater staff could be shared.

- Planning Boards & Conservation Commissions should not accept designs with greater impervious surfaces than necessary. For example, driveways can carry a lot of water into the municipal roads and drainage systems. Runoff from parking and driveways should soak into the ground as much as possible. If runoff never enters the town drainage system, there’s less water to treat or manage, hence lower long-term cost.
- MGL Chapter 44, Section 53G authorizes Conservation Commissions, Planning Boards, and Zoning Boards of Appeals to hire an outside consultant to review plans at an applicant’s expense. Use that power if a plan is questionable, such as when you can’t tell from the plan how stormwater enters and leaves the site under existing and proposed conditions.

- Municipal officials can consider a Stormwater Utility to provide funding for the improvements of local drainage systems. Detailed guidance on “How to Create a Stormwater Utility can be downloaded at: http://www.pvpc.org/web-content/docs/landuse/storm_util.pdf

Tackling stormwater all at once may be daunting but there’s lots of help available from websites listed in this guidance. Municipal officials can also download A Community Guide to Growing Greener that is available on the Massachusetts Watershed Coalition website www.commonwaters.org. These guidelines are intended to advance greener growth and cleaner water. This guidance can help municipal boards, builders, businesses and community residents to use effective, lower-cost measures that will cleanse runoff and prevent it from harming local streams, lakes and water supplies.

The Growing Greener Guide describes design and construction practices for stormwater management, erosion & sedimentation control, landscape design, and site planning. This guide will also be useful for communities required to meet the EPA MS4 permit regulations and DEP stormwater standards.

Massachusetts Watershed Coalition
The Coalition's mission is to protect and restore streams, lakes and water supplies. The MWC partners with local, state and federal agencies and our programs focus on low impact design, stormwater & sustainable watersheds. We help home owners, businesses and community groups to design and install practices that prevent and fix stormwater problems. We also assist municipal officials to enact community bylaws and accomplish local water protection projects. For more information, please email mwc@commonwaters.org or telephone 978-534-0379.