New MS4 Stormwater Regulations Require Townships to Reduce Sediment

For nearly half a century, America has been on a mission to clean up its waterways and ensure fresh, abundant water for all. During the past few decades, stormwater management has become an integral part of that goal. This year, many townships that must comply with federal stormwater requirements have a critical deadline looming: **Most must develop a pollutant reduction plan by this summer and then decrease their sediment discharge over the next five years.**

BY **AMY BOBB** / CONTRIBUTING WRITER, PSATS

Anyone involved in local government for any period of time is familiar with the many generations of stormwater management.

Take Cheri Grumbine, manager of North Lebanon Township in Lebanon County, for instance. When she began her township career in 1986, stormwater management involved the creation of large detention basins that would capture stormwater and slowly release it into a stream with little thought to sediment and other pollutants.

Soon enough, she saw water quality, and not just quantity, become the focus of stormwater management. It hit home sometime around 2000 when federal regulations emerged requiring municipalities to get a better handle on stormwater pollutants discharged to streams, creeks, and rivers. Under the National Pollutant Discharge Elimination System (NPDES) regulations, North Lebanon Township and nearly 1,000 other local governments with municipal separate storm sewer systems *(called MS4 communities)* in the state had to implement specific actions, called best management practices, to prevent or minimize undesirable stormwater runoff.

"Since 2003, we have had a stormwater management program in place, and each year we have done more and more around the required practices," Grumbine says. "We have trained our employees, inventoried and mapped our stormwater systems, conducted inspections of all these facilities, and provided public education."

Now, North Lebanon faces what may be its most onerous and costly mandate to date. The state Department of Environmental Protection (DEP) is administering a new permit that requires certain MS4 communities *(those that either are located in the Chesapeake Bay watershed or contain surface water impaired with certain pollutants)* to develop and implement a pollutant reduction plan that will reduce sediment discharge by 10 percent over the next five years.

"In the past in Pennsylvania, stormwater management to comply with the MS4 permit has been about education, outreach, and good housekeeping, but there's never been a hook before," says Nathan Walker, senior water resources planner with Amec Foster Wheeler in Blue Bell, Montgomery County. "DEP has now yanked that hook through this upcoming MS4 permit. For the first time, we will have a permit that actually requires municipalities to go back and clean up water from past issues."

2017 is shaping up to be a critical year for MS4 communities, which must develop and submit these pollutant reduction plans along with their general permit application by September 16. Following a review by DEP, the permits are scheduled to go into effect March 16, 2018, and then the real work of reducing sediment and nutrient run-off can begin.

"Municipalities should be in the heart of their planning by now," says Lee Murphy, environmental group manager at DEP's central office. He notes that townships must really have their plans complete by August 3 since a 45-day public participation period is required. ➤

STORMWATER MANAGEMENT

"There's this sense of urgency now to really make these BMPs work so that **they clean up stormwater and improve water quality."**

Developing and implementing a pollutant reduction plan will be challenging, not to mention costly and complicated, for municipalities, and it will require some creative thinking, but the good news is that municipalities are not alone. DEP staff, engineering consultants, counties, authorities, environmental and conservation groups, and other municipalities are all potential resources for helping townships comply with this latest round of stormwater regulations.

"Municipalities are going to have to start thinking outside the box when it comes to these stormwater issues," says Russ Benner, vice president and operations manager of T&M Associates, an engineering consulting firm in the Lehigh Valley. "Townships that think about teaming opportunities and tackling stormwater on a regional watershed basis will ultimately find greater success than going it alone."

The route to clean water

To understand where we are with stormwater management today, we have to go back to 1969 when the Cuyahoga River, polluted from decades of industrial waste, ignited in Cleveland. A river on fire drew national attention to a very real problem in America: Our waters were sick and polluted, and if we didn't take action soon to improve them, we were in a heap of trouble.

This incident, which helped to spur the environmental movement in the United States, began a nationwide effort, initiated by passage of the Clean Water Act in 1972, to clean up our waterways. The endeavor started by treating the most obvious problems first — sewage and industrial pollution.

"Pennsylvania has been very successful in eliminating these point sources of pollution," DEP's Murphy says, "but at the same time, we were adding enormous impervious areas from increased development, and this created large stormwater flow rate and volume that eroded our streambanks. In fact, about half of the pollutant load occurring in our streams is the result of erosion to streambanks."

Scientists and government agencies began to understand that to truly achieve clean, abundant water, they would have to reduce pollutants caused by runoff from not just large but small rain events, too.

"We learned that most stormwater pollutants result from storms that are fairly small," Murphy says, noting that up to 90 percent of the pollutant load in a stream is released from storms with rainfall of less than two inches.

Through implementation of the NPDES program in the 1990s, the federal government turned to best management practices, called BMPs, to reduce the discharge of pollutants picked up as rain water and melting snow run across impervious surfaces, such as roads and parking lots. Over the last decade or so, this strategy took a six-pronged approach focused on public education, public involvement, illicit discharge, runoff from construction and post-construction sites, and pollution prevention and good housekeeping. *(See the box at right for more about these six minimum control measures.)*

Passage of the Clean Water Act in 1972 initiated a nationwide push to clean up waterways, starting with the most obvious problems of sewage and industrial pollution. In the 1990s, the federal government passed regulations that focused on reducing pollutants that enter waterways via stormwater. *(Inset)* As part of public education efforts in its stormwater management program, North Londonderry Township in Lebanon County stencils storm drains with reminder messages not to dump pollutants because outlets drain to the Chesapeake Bay watershed. *(Far right photo courtesy of North Londonderry Twp.; smaller photo courtesy of LTAP)*

STORMWATER MANAGEMENT

"Each generation of stormwater management **gets a little more complicated, involved, and costly.**"

DEP's new focus

Best management practices centered on six minimum control measures became the thrust of DEP's MS4 permit, and while they were a good start for minimizing pollutant load, they did not require specific load calculations or percentage reductions. As a result, Pennsylvania was still falling short of its pollutant reduction goals and often lagging behind its neighbors and even the rest of the nation on improving water quality.

"The EPA [U.S. Environmental Protection Agency] had expected to see greater improvement in the state's water quality by this point," Murphy says. "Part of the problem was that since 2003, when the original round of permits was started, DEP hadn't been able to invest much staff time in enforcing permits and helping municipalities deal with the requirements."

About two years ago, the department decided to change its focus, invest more staff, time, and resources in the MS4 program, and add pollutant discharge goals to its 2018 MS4 permit requirements.

"There's this sense of urgency now to really make these BMPs work so that they clean up stormwater and improve water quality," Benner of T&M Associates says.

With its 2018 permit requirements, Murphy says, DEP hopes to satisfy the EPA and keep the federal agency from further pursuing the much more onerous and demanding total maximum daily load (TMDL) plans that municipalities with impaired streams are required to address.

"We decided to take the bull by the horns and take charge of those impairments with our own process that will hopefully prevent the need for the EPA to do any more TMDL plans," he says.

At the same time, DEP has taken a more cooperative and helpful tack by trying to work with and better educate local governments on the new requirements. For example, because the state-managed process for addressing local impaired waters largely mirrors that of the Chesapeake Bay pollutant reduction plan, DEP is encouraging municipalities with both a Chesapeake Bay and a local impaired mandate to combine their efforts and do a single plan for both.

"We are doing what we can to simplify, clarify, and allow single, simple methods to serve all the objectives," he says.

Perhaps one of the more useful things DEP has done to prepare municipalities for the 2018 permit was to create an MS4 requirements table that lists each MS4 municipality by county and identifies whether it must comply with Chesapeake Bay and/or sediment and nutrient reduction goals for impaired streams. *(This list is available on the Municipal Stormwater page of the DEP website,* ***www.dep.pa.gov*** *— scroll down to the third-to-last paragraph of the text — and on the PSATS website,* ***www.psats.org*** *— look for the green "MS4 Requirements" button on the bottom left of the home page.)*

"In the past, a municipality had to figure out on its own if it was in a Chesapeake Bay drainage area. We never provided a list," Murphy says. "With the addition of the impaired water requirement, we used our data to develop a list last year that would make it crystal clear which municipalities had to comply with what."

As part of an initiative to educate municipalities, DEP trained close to 2,000 people on the requirements of the new 2018 permit last year, and Murphy and other agency staff continue to travel the state to meet with municipal officials and engineering consultants about stormwater management efforts.

"We are always meeting with groups and answering questions and listening to what they have to say," Murphy says. "In this way, we are learning a lot about stormwater and are better understanding the opportunities and problems associated with its management."

Tackling the complex

As the stormwater program coordinator at Derry Township Municipal Authority in Dauphin County, Mike

Insects, such as mayflies, are indicators of a waterway's health.

IMPAIRED STREAMS:
It's all about the bugs

Just how does a stream get classified as impaired? It's all about the bugs, says Lee Murphy of DEP.

The department will send out teams of biologists periodically to assess streams. Rather than simply taking a water sample, which Murphy says really only shows the health of the stream as a snapshot in time, the biologists will set up a net downstream and see what kinds of bugs and critters they catch.

The number of insects and mix of species will indicate the health of the water and thus the quality of the stream.

Callahan is eyeball deep these days in calculations and paperwork as he tackles the 2018 MS4 permit requirements and prepares a pollutant reduction plan by the September 16 deadline.

"Even though we have been preparing here at Derry, we know that 2017 is going to be a busy year," he says.

There's certainly a lot to do. The 2018 permit requires, for the first time, that municipalities determine baseline load calculations and specify percentage load reductions. With the help of the Army Corps of Engineers, Derry Township has already mapped its storm watersheds as required under previous versions of the permit, but Callahan is continuing to work with the authority's engineer to beef up certain areas on the map and update the location of outfalls to streams while calculating baseline pollution, all requirements of the new MS4 permit application.

Once a baseline is established, the next step is determining how to reduce pollutants by implementing best management practices.

"Our big issue will be sediment reduction and how we can accomplish that in the next five years," he says. The township is in the Chesapeake Bay watershed and is home to a number of impaired streams, so Callahan says the strategy will be to tackle the impaired waters first as this will go a long way toward meeting the Chesapeake Bay requirements, too.

"With this new permit, we need to know how we are going to reduce our pollutants, where we are going to do it, and how we are going to pay for it," Callahan says.

If all that sounds complicated, it's probably because it is. Consultants involved in the evolution of stormwater management can attest to how complex it has become.

"Each generation of stormwater management gets a little more complicated, involved, and costly," says Cedarville Engineering's Carol Schuehler, who has served as a municipal engineer for two decades. "This latest version is asking MS4s to model how much pollution is coming from their contributing watershed and figure out how they can reduce that by a certain percentage."

Nathan Walker, a water resources

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- **How Parks and Trails Can Address Stormwater Issues**
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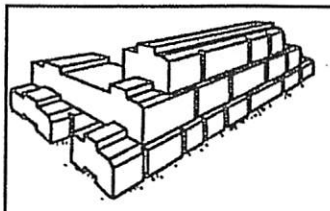

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"For the first time, we will have a permit that actually **requires municipalities to go back and clean up water from past issues.**"

planner for Amec Foster Wheeler, agrees. "The level of sophistication that stormwater management systems are now requiring has been converging to the levels of managing sanitary systems," he says.

Adherence to such increasingly complex engineering-type standards could, at times, cause tension between townships and their engineering consultants, Joseph Viscuso, senior vice president and director of strategic growth for Pennoni, says.

"A word of advice is to spend time with your consultant to determine the most cost-effective way to submit the MS4 plan," he says. "There may be areas where municipal staff can do some of the data gathering and sampling."

He also recommends township officials sit down with their engineer and DEP to decide how to prioritize BMPs.

Not only are townships having to turn to engineers and consultants to handle the required complex calculations and designs, but they are seeking out other creative solutions for delving into the increasingly complicated world of stormwater management, whether that be by turning to an authority, hiring a coordinator, or working with other municipalities.

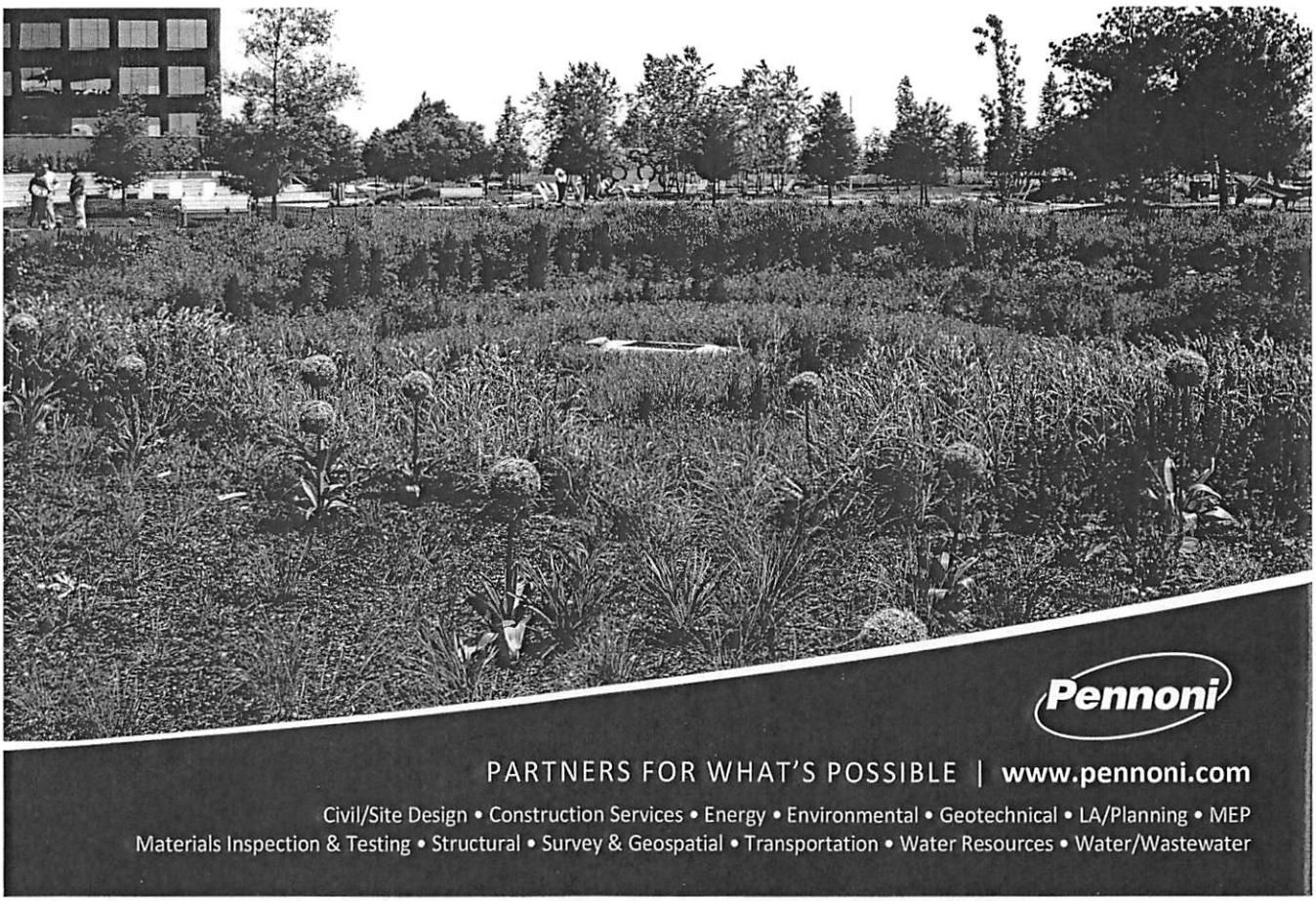
"These new MS4 requirements are expensive and are going to require you to commit to doing projects. They may even require you to get land if you don't have it," Benner of T&M Associates says.

In Dauphin County, the Derry Township supervisors decided to turn the municipality's stormwater management responsibilities over to an authority with experience in sewage.

"Stormwater is a big issue, and we knew something had to be done, especially with the increasing Chesapeake Bay and MS4 requirements," supervisor Matt Weir says. "We are fortunate to already have in place a talented municipal authority that knows pipes, billing, and accounting."

Tasking the authority, which had experience in sewage management regulations, with the stormwater mandate made the most sense, he says, especially after the passage of Act 68 of 2013, which allowed local governments to form a stormwater authority and charge fees to offset the costs of complying with the regulations. *(See article on page 34.)*

Other municipalities have decided



STORMWATER MANAGEMENT

A GOOD NEIGHBOR

The township used BMPs, including a retention basin, evergreen plantings, and a rain garden.

(Photos courtesy of North Lebanon Twp.)

When neighbors around the Nort Lebanon Township building in Lebanon County complained abc stormwater runoff after an en- largement of the recycling facili increased impervious space, the township improved stormwater management at the site. The pro erty is not located in an "urbaniz area," so the project did not cou toward the township's MS4 plan but the board of supervisors felt was important to be a good neig bor and set a good example.

to hire a stormwater coordinator. North Fayette Township in Allegheny County did just that after a wake-up call of sorts two years ago when it went through a mock DEP inspection as part of a stormwater program with the Southwestern Pennsylvania Commission.

"We learned that stormwater was a big enough issue that we decided to create an environmental compliance coordinator position and hired someone to handle our stormwater education and compliance efforts," township manager Robert Grimm says. "As I told the board at the time, we can't guarantee that having someone in this position will absolve us of all the issues that may come up in an EPA or DEP audit, but it should greatly improve our odds of doing well."

In the year and a half that the coordinator has been on board, she has made great progress in tackling development-related stormwater issues and educating the public and the staff, including the police, on pollution awareness, Grimm says. The township has also joined forces with neighboring municipalities, including Moon and Findlay townships, to provide public education on stormwater and begin working on pollution reduction projects together.

"We know we still have a way to go, especially with the new pollutant reduction requirements this year, but we are happy with our stormwater program progress," he says. "We feel we are continuing to take steps in the right direction."

Working together

When it comes to conserving resources and saving money, experts say joining with neighboring municipalities to prepare and implement a join pollutant reduction plan makes sense.

"Stormwater knows no boundaries," Benner says. "That's why it's so important to talk to neighboring communities in a particular watershed and see how you can work together."

All across the state, regional approaches for tackling stormwater management and MS4 requirements are taking place. In York County, the planning commission has taken the lead in developing a pollutant prevention plan for 42 municipalities. In Luzerne County, at least 33 municipalities have responded to the Wyoming Valley Sanitary Authority's offer to serve as the regional planning agency for stormwater.

"We think the best solution for municipalities is to prepare plans jointly with other municipalities," DEP's Murphy says. "To date, a lot of folks at the local level have stepped up to the challenge of meeting the MS4 requirements, and we are doing all in our power to help them."

A joint pollutant reduction plan* can save municipalities money, but it also provides greater flexibility for locating BMPs within a larger watershed region, a concept that DEP greatly favors.

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* ***Editor's note:*** *The municipality will still be the permit holder and be individually responsible for meeting its specific municipality goal.*

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"For example, your township might have six BMPS, but the borough next door, which has been built out for the past 50 years, doesn't have the space to construct any," he says. "Because your BMPs are protecting the stream, however, the borough can join in the benefits of yours while also sharing in the cost of creating and maintaining them."

In Lebanon County, a group of municipalities is exploring a regional approach to meet the 2018 permit requirements looming before them.

"This marks the first time that municipalities will be required to do on-the-ground projects to reduce pollutants going to waterways," Kris Troup, planning director of North Londonderry Township, acknowledges. "The cost associated with doing this has our township supervisors concerned. We estimate it will cost $150,000 a year just to comply and implement the new BMP requirements, and that's on top of the other things we are already doing, such as street sweeping, spill control, and culvert cleanouts."

In January, North Londonderry joined other municipalities in the county for a brainstorming session to figure out how to pay for these additional costs during the planning and implementation stages.

"The 18 municipalities in Lebanon County with MS4 permits are currently funding their programs through their general budgets," Troup says. "No one will be able to do that with the expected increased costs."

He says the situation boils down to two options for his township: go on their own or join a regional group. A group of 10 municipalities in the county that use the same engineering firm has taken the lead in exploring a regional pollutant prevention plan together, but because North Londonderry doesn't use that engineer, it is waiting to see whether an opportunity will arise to join the group later.

Cheri Grumbine, manager of North Lebanon Township, one of the municipalities considering the agreement, says the goal was to have an intermunicipal agreement adopted and in place by March 1 so that the engineer can begin working on a joint pollutant reduction plan.

"Once we have that agreement in

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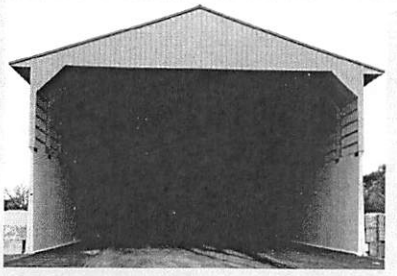

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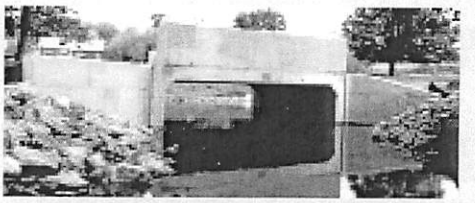

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place, we plan to open it up to other municipalities in the county that have different engineers to see if they want to come on board, too," she explains.

Grumbine says the initial cost estimate for implementing BMP projects in the 10-municipality region is $6 million. Using a formula based on total impervious area and population, North Lebanon's price tag would come in at $1 million, or $200,000 annually, over the next five years.

Up until this latest MS4 development, the township had been able to pay for stormwater management expenses out of its general fund and through grants, but the new requirements over the next five years will prove costlier. In light of a new law passed last year that amends the Second Class Township Code to allow townships to assess stormwater fees for meeting MS4 obligations, she says, North Lebanon has been kicking around the idea of assessing such a fee. *(See the article on page 34 for more about the stormwater fee.)*

"However, it's just one more fee placed on our residents," she says, noting that a final decision has yet to be made.

To townships grappling with costs, Pennoni's Viscuso reminds them that the problem of managing stormwater is not going away.

"As development continues," he says, "having the right ordinances in place to install proper and long-lasting BMPs while also coming up with the funds to monitor them moving forward will be key."

Reducing pollutants

DEP may have set the 2018 permit's pollutant reduction goals of 10 percent for sediment and 5 percent for nutrients, but each MS4 community must determine for itself which BMPs to use to achieve this goal. Schuehler of Cedarville Engineering explains that municipalities can choose options from

Navigating the maze of stormwater management requirements

Over its evolution, stormwater management has become more confusing as townships have had to contend with both increasing state and federal requirements. To make better sense of it all, we have spelled out some of the more common ones:

Act 167 plans — The state Stormwater Management Act *(Act 167 of 1978)* granted the legislative basis for managing stormwater in Pennsylvania. It required counties to complete a watershed plan *(although nearly four decades later, not all have)* and municipalities to adopt ordinances consistent with the plan.

National Pollutant Discharge Elimination System (NPDES) — These regulations marked the first time the federal government became involved in stormwater management. A two-pronged approach was taken. Under phase I, large construction sites *(five acres or larger)* and the most populous municipalities *(those with populations of 100,000 or more)* were required to obtain an NPDES permit and develop stormwater management plans.

Most townships didn't have to deal with the federal NPDES program until phase II, when nearly 1,000 municipalities *(called small MS4s)* in "urbanized areas" *(as defined by the U.S. Census Bureau)* were required to implement and enforce a stormwater management program.

DEP's general permit — Following the NPDES requirements, the Department of Environmental Protection took the lead in administering the program in Pennsylvania and established a general permit *(PAG-13)* that required MS4s to implement a stormwater management program. Each generation of the permit has tried to further reduce stormwater pollutants.

With the new 2018 permit, DEP is requiring MS4 communities in the Chesapeake Bay watershed, as well as those that have local impaired streams, to reduce their sediment discharge, in most cases, by 10 percent.

Although municipalities in the bay watershed had to have a pollutant reduction plan in place beginning in 2013, the goal for reducing pollutants was unspecified until now.

To complicate matters, townships that have a locally impaired stream may or may not have a total maximum daily load (TMDL) plan developed through the EPA requiring a reduction in pollutants. For those required municipalities without a TMDL plan yet, DEP is hoping the impaired-stream pollutant reduction plan in the 2018 permit will spare them from having a more burdensome TMDL plan done.

"The clock has been ticking for municipalities with impaired streams to have a TMDL plan," Lee Murphy of DEP says. "It's a federally controlled process that takes a long time to get done, and if there are any issues that come up after a TMDL study, the EPA has to be brought in to bless any adjustments made to the plan."

Individual permit — An MS4 community would apply to DEP for this type of permit whenever a TMDL plan is involved or there are discharges to special-exception waters.

Chapter 102 permits — These permits, which reference the related provision in the Pennsylvania Code, are issued for BMPs developed, implemented, and maintained during earth disturbance activities at construction sites of one acre or more. They also regulate BMPs that capture and infiltrate stormwater on a site after the construction is completed. These permits are covered under minimum control measures 4 and 5 in an MS4 municipal stormwater management plan.

STORMWATER MANAGEMENT

"This marks the first time that municipalities will be required to do **on-the-ground projects to reduce pollutants going to waterways.**"

a menu of BMP models, such as forest buffers, tree plantings, and streambank restoration.

"They will have to do calculations to show how much reduction they are going to achieve for each project," Schuehler says.

"DEP does not mandate specifics for how this pollution reduction obligation is satisfied," Murphy of DEP notes, although the department encourages townships to first look for what he calls "low-hanging fruit" BMPs.

"We do not want municipalities spending any more money than they have to," he says.

An example he gives is converting a concrete flood-control *detention* basin, which was installed in the 1960s, '70s, or '80s to collect water and dirt and reduce peak flooding downstream, into a high-performing modern *retention* basin.

"By ripping up the concrete apron and raising the outlet structure a foot or two, all of a sudden it's a wet pond with the ability to infiltrate a lot of water and capture the sediment in the basin," he says.

As long as they capture sediment and encourage infiltration, BMP designs are only limited by the imagination, Murphy notes. A township can do something as simple as no longer requiring curbs along development streets to encourage stormwater runoff into swales, where it can infiltrate the ground.

"This does not necessarily have to be complicated stuff," he says. "It sometimes only takes what we call lifestyle changes to make it happen."

Just as municipalities go about planning for responsibilities they manage, such as recreation or land use and zoning, they should do the same when it comes to stormwater management.

"The planning process for stormwater has to be equally thoughtful and unique to your township," Benner says. "One size isn't going to fit all."

For as complex as the latest round of stormwater management requirements is, sometimes the advice to townships is really pretty simple.

"Get educated as much as you can and understand what you have to do," Benner says. "Then keep an open mind about what needs to be done and get to work." ✦

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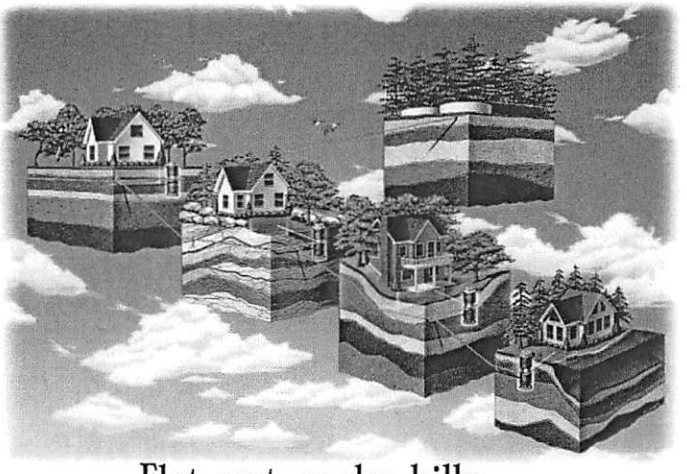

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