



**Structural Stormwater  
“Best Management Practice” (BMP)  
Program Summary**

**January 2014**



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## Introduction

Adding impervious surface decreases the amount of stormwater that infiltrates into the ground. This increases the amount and velocity of stormwater runoff. This can cause accelerated erosion and downstream flooding. In addition, as stormwater flows across impervious surfaces, it picks up various pollutants. These include excess nutrients, oil and grease, bacteria and sediment. Polluted stormwater flows down storm drains and ditches where it is discharged, untreated, into local streams, rivers, and lakes. Stormwater runoff pollution causes adverse impacts to aquatic ecosystems, poses human health risks, and can greatly increase the cost of treating drinking water.

For this reason one of the six minimum measures required by the Town of Hillsborough’s (town) National Pollutant Discharge Elimination System (NPDES) Phase II stormwater permit is a *post-construction stormwater run-off control program*. The program addresses discharges of post-construction stormwater runoff from new development and redevelopment areas.



The town’s program includes using both structural and non-structural controls. Non-structural controls include riparian buffer and floodplain protection, as well as other site design requirements that encourage open space. Structural controls are engineered stormwater control devices such as dry detention ponds, wet detention ponds, stormwater wetlands, bioretention, grassed swales, etc. These devices are often referred to as stormwater best management practices or BMPs. Stormwater BMPs serve to control both the *quantity* as well as the *quality* of the stormwater runoff.

## Regulatory Requirements

NPDES post-construction stormwater requirements were initially adopted by the town in 2008. At that time, the town was also required to adopt measures to control nitrogen in stormwater runoff pursuant to the State of North Carolina’s (state) Neuse stormwater rules. Subsequently, the Neuse stormwater requirements were replaced with the state’s Falls Lake Rule for New Development (February 28, 2011). The Falls Lake Rule for New Development requires more restrictive nitrogen control and added a phosphorous control requirement as well. The specific stormwater standards required for development and redevelopment projects can be found in Section 6.20 of the town’s Unified Development Ordinance (UDO) and are summarized in Table 1. Stormwater standards are different depending upon whether the development is considered low or high density<sup>1</sup>.

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<sup>1</sup> As defined under state stormwater management regulations, a *low-density* project is any project that has no more than two (2) dwelling units per acre or twenty-four (24) percent built-upon area (BUA) for all residential and non-residential development; a high-density project is any project that exceeds the low density threshold for dwelling units per acre and built-upon area.

**Table 1. Town of Hillsborough Stormwater Standards for New Development**

**Low Density**

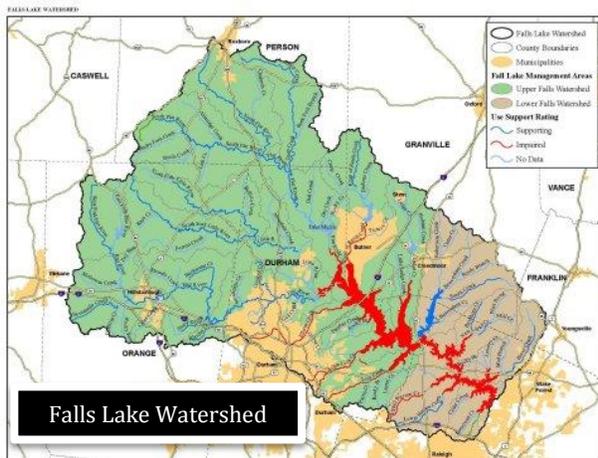
- Vegetative stormwater conveyances only (i.e. swales and ditches)
- No net increase in peak flow for the 1-year, 24-hour storm
- Meet applicable stream buffers
- Meet nutrient loading rates  
*Nitrogen loading, 2.2 lbs/ac/yr*  
*Phosphorus loading, 0.33 lbs/ac/yr*

**High Density**

- Control/treat runoff from all surfaces generated from first inch of rain
- No net increase in peak flow for the 1-year, 24-hour storm
- Meet applicable stream buffers
- Runoff volume drawdown 48-120 hours
- 85% Total Suspended Solids (TSS) reduction
- Meet nutrient loading rates  
*Nitrogen loading, 2.2 lbs/ac/yr*  
*Phosphorus loading, 0.33 lbs/ac/yr*

In addition, any development or redevelopment project that is required to install stormwater BMPs must also provide the following to the town’s Stormwater Program Manager:

- As-built survey and engineer’s certification
- Recorded operation & maintenance agreement
- Recorded maintenance/storm drainage easements
- Deed restrictions/covenants
- Annual maintenance inspection report<sup>2</sup>



Once constructed, these BMPs are owned and maintained by the property owner, homeowner association (HOA), or equivalent. The town does not take ownership of stormwater BMPs (other than those located on town-owned property like Gold Park).

Prior to adoption of the NPDES Phase II and Falls Lake new development requirements, the town simply required development to control the peak rate (i.e. amount or velocity) of stormwater runoff. Most of the required BMPs were dry detention ponds and a couple of wet ponds. However, there were no provisions, at the time of their approval to inspect and ensure that these stormwater BMPs were being maintained and operational.

<sup>2</sup> The annual maintenance inspection report must be conducted by a qualified individual at the owner’s expense. A qualified individual includes a registered North Carolina professional engineer, surveyor, landscape architect, soil scientist, aquatic biologist, or person certified by the North Carolina Cooperative Extension Service for stormwater treatment practice inspection and maintenance.

### Town Inspection Requirements

As stated above, annual inspection maintenance reports are required to be conducted by the owner of the stormwater BMP and a copy provided to the town’s Stormwater Program Manager for review. However, two regulatory requirements necessitate the town to implement its own inspection program. Pursuant to the town’s NPDES Phase II permit, each stormwater BMP permitted by the town requires inspection at least once every five years. Similarly, the Falls Lake Stormwater Rule for New Development requires BMPs approved to meet the Falls Lake rules to be inspected at least once every five years (as dictated in the town’s plan approved by the state).

Town staff inspections of stormwater BMPs are only required for those BMPs permitted after adoption of the NPDES Phase II requirements in 2008. However, there is another regulatory driver that prompted town stormwater staff to develop an inspection program of all stormwater BMPs approved by the town, regardless of which set of rules required the construction of the BMP. Under stage 1 of the Falls Lake Stormwater Rule for *Existing* Development, the town will be required to offset the nutrient load from development that occurred between the baseline year (2006) and enforcement of Falls Lake requirements (2012). As such, it is important to know which stormwater BMPs are functioning. Only stormwater BMPs that are fully functional can be claimed towards nutrient reductions. In fact, the state required the town to submit an inventory of all stormwater BMPs and include a simple assessment of which BMPs might be “retro-fitted” to reduce nutrients even further. A map showing the location of the stormwater BMPs is included as Attachment 1. Currently there are 66 stormwater BMPs within the town’s planning jurisdiction.



### 2013 Stormwater BMP Campaign

Based on the regulatory drivers discussed above, the town Stormwater Program Manager developed and began implementing a campaign to notify stormwater BMP owners that town staff would be inspecting BMPs. The “notice to inspect” letters also requested BMP owners to provide the town with as-built surveys, design engineer certifications, operation and maintenance agreements and annual inspection reports, if they had not already done so.

While the intent of this campaign was to obtain as much of the requested information as possible, the primary purpose was to ensure that at a minimum all stormwater BMPs within the town’s jurisdiction, regardless of when they were permitted, be properly maintained and functional. Requiring that an annual maintenance inspection be conducted and a report submitted to the town, was the best way of ensuring proper operation. The letters were written using stern enough language so that they would be

taken seriously, but showed a willingness to be flexible. A copy of one of the letters is provided as Attachment 2.



Prior to sending the letters, the town Stormwater Program Manager conducted informal site visits of each stormwater BMP and noted which were operational and which needed maintenance. Approximately 48 of the 67 BMPs needed some sort of maintenance. In one case, a development that was supposed to have three BMPs had never converted them from temporary sediment basins.

Letters were sent in April, May and June 2013. To date, responses accounting for 40 of the BMPs were received. From those responses, the

Stormwater Program Manager has met with owners or representatives of approximately 25 BMPs. Meetings were conducted at the BMPs to inspect them and discuss town requirements. These meetings have been amenable and owners have appreciated the flexible approach the town is willing to take. As a result an additional 17 stormwater BMPs were brought into compliance. Table 2 summarizes the status of stormwater BMPs as of January 31, 2014.

**Table 2. Status of Stormwater BMPs as of January 2014**

|   |    |
|---|----|
| Total Stormwater BMPs.....                  | 67 |
| Stormwater BMPs Compliant .....             | 31 |
| Stormwater BMPs Requiring Maintenance ..... | 28 |
| Non-Functioning Stormwater BMPs.....        | 7  |

Formal inspections have not been conducted of most BMPs. Lack of formal inspections are due to primarily two factors. First, staff wanted to provide owners ample time to respond and bring their BMPs into compliance. Second, there is a large workload. To help address workload constraints, staff is having the stormwater BMP database converted to use in the “Utility Cloud” system. Utility Cloud is an online system that will improve inspection efficiency. This system is currently being used successfully by the Utility Department for various work flows and inspections.

Formal inspections by town staff are expected to be completed during calendar year 2014. Non-compliant stormwater BMPs will be issued a notice of violation (NOV). The NOV will require each BMP to be brought into compliance within a reasonable amount of time. If stormwater BMPs are not brought into compliance, penalties may be issued. The UDO allows for civil penalties of \$100 and up to \$500 for criminal penalties. These fines are relatively small and may not be an adequate deterrent, especially noting that the town could be fined up to \$27,500 per day, per violation pursuant to its NPDES Phase II Stormwater permit. The town does have the authority to complete maintenance and/or fix non-

functioning stormwater BMPs and bill the owner. Stormwater BMP owners that have not responded to the initial 2013 letters will be prioritized first for inspection. Stormwater staff believes that the approach taken has been fair and reasonable to the regulated community. However, the discrepancy in what the town may have to pay versus the owner is one of the issues needing further discussion.

### Challenges and Issues

As was expected, stormwater BMP owners, especially HOAs were not enthused to receive the notice to inspect letter. Some indicated that they did not know they had a stormwater BMP. Others were willing to bring them into compliance. The biggest issue was funding. Many stormwater BMP owners simply have not budgeted money to inspect and maintain stormwater BMPs. This was particularly true with HOAs. Smaller HOAs especially complained that they cannot collect enough dues to pay for required maintenance.

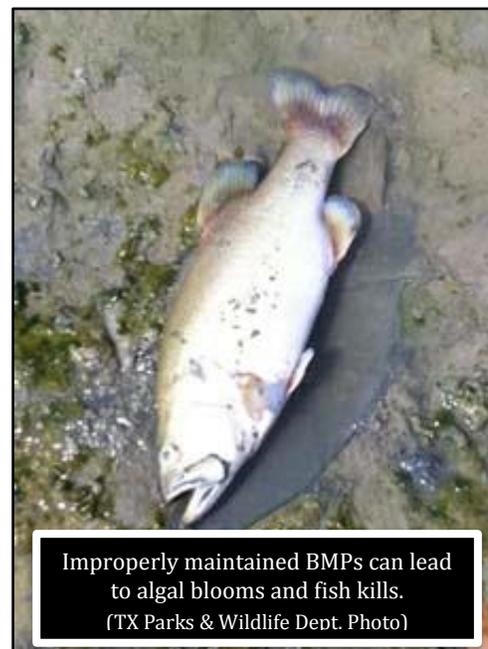
Town staff has been willing to work with these entities to allow ample time for compliance. However, those that do comply now may soon wonder why other BMP owners have been allowed to be slack with maintenance. Conversely, small HOAs may feel like they are being “picked on” or request the town to help fund maintenance. This can cause equitability issues that are difficult to resolve. Equitability and maintenance cost were the most frequent issues raised as a result of the campaign.

To be able to develop a solution, it is important to understand the consequences. In simple terms, there are two primary consequences as a result of failing stormwater BMPs:

1. The Town of Hillsborough can be issued a violation and fined for being out of compliance with its stormwater permit; fines are significantly higher than what the town currently could fine a stormwater BMP owner;  
  
and most importantly,
2. Local water quality can be adversely impacted.

For example, the town is required to ensure proper function of stormwater BMPs approved and constructed pursuant to current standards. If during a state audit a stormwater BMP was found to be malfunctioning, the town would be in violation of its stormwater permit. Even older stormwater BMPs (approved prior to the town’s current standards) could result in a violation issued to the town. If for instance, a dry detention pond that was constructed in 2001 had failed and as a result sediment from the pond was washing into the receiving stream, the town would be in violation of its NPDES stormwater permit and subject to fines.

Regardless, water quality downstream of a malfunctioning stormwater BMP may adversely impact the aquatic



environment. Long-term these impacts could force additional regulation of stormwater discharges. Additional regulation often requires local governments to remediate impacts, which in turn results in an increased tax burden for citizens. Such is the case with the Falls Lake rules.

### **Discussion**

Proper function of stormwater BMPs presents the town with a challenge. Frequent inspection is a great way to ensure properly maintained stormwater BMPs. Properly maintained BMPs reduce stormwater runoff impacts and maintain compliance with the town’s stormwater permit. However, frequent inspections by town staff requires additional staff time. Increased inspections take away from other equally important aspects of the town’s stormwater program.

This is one reason why the majority of municipalities across North Carolina require stormwater BMP owners to conduct annual inspections and maintenance of their BMPs. This reduces the burden on municipalities but increases burden on the regulated community. This sometimes produces inconsistency. Some stormwater BMPs owners may be diligent while others not. To save money, owners may utilize inexperienced contractors or personnel to conduct inspections and maintenance. This is why the town is required to do periodic inspections, but is inspecting once every five years enough?

Additionally, the current fee structure for penalties associated with stormwater BMP violations needs to be reviewed and adjusted as appropriate. Since violation of the town’s NPDES stormwater permit could result in significant fines, it may be necessary to amend the UDO to allow the town to in turn recoup penalties from the BMP owner. However, this will not help situations where HOAs do not have enough funds to complete annual inspections and maintenance.

#### *Magnolia Place Subdivision*

As an example, consider the Magnolia Place subdivision. Magnolia Place is a small residential development with 42 lots. Properties within this subdivision have a median tax value of approximately \$138,000. The development contains a stormwater wet pond owned by the HOA. While the pond provides a visual amenity and open space, it is designed to regulate peak flow of stormwater. As such it must be maintained. Primary maintenance issues are removal of woody growth, especially from the dam embankment. Tree roots can cause “piping” in the dam, weaken it and eventually cause the dam to fail. Since there were no provisions to maintain the wet pond previously, large trees have grown on the downslope of the dam. Other minor woody vegetation also needs removed at the inlets to the pond. The Stormwater Program Manager has met with HOA representatives and they indicated a lack of funds to pay for the necessary maintenance.

They also bring up a 16-lot subdivision along Red Oak Court that drains to their stormwater pond, but the lots are not part of the Magnolia Place HOA. While the Magnolia Place HOA may be justified in wanting the Red Oak Court lots to help pay for maintenance of the pond, stormwater staff consider that a civil issue and believe that the town has no authority to address that specific issue, only maintenance of the stormwater pond.

In a case like this is the town willing to discuss assisting HOAs? If so, is that equitable? How would it be funded? This leads to another discussion question...should the town take over ownership of all stormwater BMPs?

Stormwater staff believes that the town should not take ownership of private BMPs. There are a lot of liabilities associated with this and is beyond the scope of the discussion here. The primary issue remains how to ensure proper maintenance and function of stormwater BMPs and how to enforce penalties to reduce the potential burden to the town.

As a starting point to this discussion, three options are provided below.

1. *Make minimal changes to the current approach.*

Quite simply, the town can continue conducting compliance inspections of stormwater BMPs once every five years as required. As stated earlier, this may lead to inconsistencies that require additional staff time to re-inspect. Violations are more likely due to these inconsistencies and which would also require more staff time.

This approach would definitely require stormwater staff to review the current penalty fee structure and make adjustments to reduce the town’s potential liability of having much higher fees levied against the town.

2. *Conduct annual inspections for all stormwater BMPs.*

With this approach, the town would utilize stormwater staff (the stormwater program manager is already certified as a stormwater BMP inspector) to conduct the required annual maintenance inspection or hire a qualified contractor(s) to do so. This approach would eliminate inconsistency between inspections, but would require additional staff or at a minimum additional funds to hire a contract inspector. The inspection could be provided as a “service” to stormwater BMP owners which would provide some financial relief to the regulated community, but still has to be paid for by citizens. However it is assumed that having the town conduct inspections rather than each BMP owner, efficiency would increase making it more cost effective.

This approach assumes however, that the stormwater BMP owner will still be responsible for ensuring that required maintenance is completed. While this approach would help stormwater staff stay “on top of BMP issues” and provide consistency of inspections and reporting, it does not alleviate the issue raised by HOAs.

3. *Conduct annual inspections and complete maintenance for all stormwater BMPs.*

This approach sounds onerous but may have some merit. The thought here is that the stormwater BMP owners maintain their ownership and all liability, but the town actually would complete annual inspections and any required maintenance. Presumably the town would contract with a firm or perhaps two or three firms to maintain all BMPs. Since only one (or two)

firms would be doing all the work, the assumption would be that they could provide less expensive pricing...sort of “an economy to scale” so to speak.

Annual inspections would be handled by stormwater staff or a contractor that his not affiliated with the maintenance company to avoid conflict of interest issues. This approach eliminates inconsistencies, and contracts can be time limited and re-bid periodically to ensure competitive pricing. In theory, this would eliminate the concern that there are non-functioning BMPs and therefore eliminate the threat of civil penalties from the state or EPA for failing stormwater BMPs.

An approach like this could be funded either with a stormwater utility fee assessed to each property owner based on impervious surface, or stormwater BMPs owners could be assessed a periodic fee for this service. Again, the thought is that it would be less expensive having the town control inspection and maintenance rather than each stormwater BMP owner contracting with different companies. To staff’s knowledge no local governments within the state have taken this approach.

At this time, stormwater staff is not recommending one approach over another. This is simply a starting point for discussion. Stormwater staff does believe that a review of penalties should be conducted and changed appropriately, regardless of how the town proceeds in enforcing maintenance of stormwater BMPs.

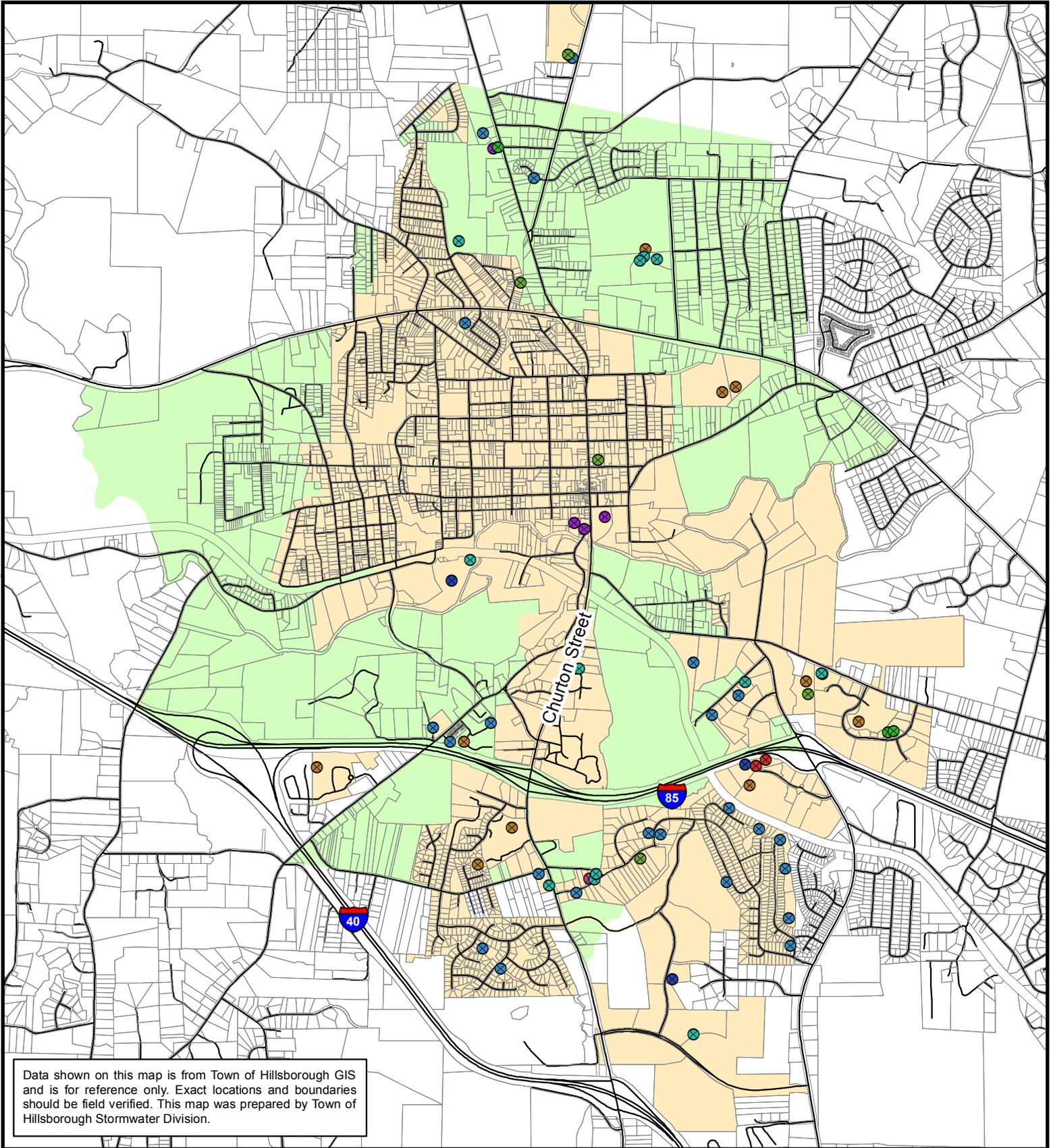
This discussion leads into even a larger discussion of how the town will meet and fund requirements of the Falls Lake Rule for Existing Development. Since retro-fitting existing stormwater BMPs to improve nutrient removal is one option to meet the Falls Lake Rules, there may be circumstances where the town actually takes over ownership and maintenance of a stormwater BMP that has been retro-fitted.

**Attachments**

Attachment 1 – Map of BMPs

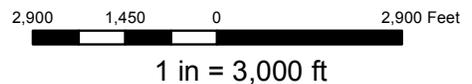
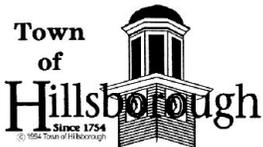
Attachment 2 – Example “Notice to Inspect Letter”

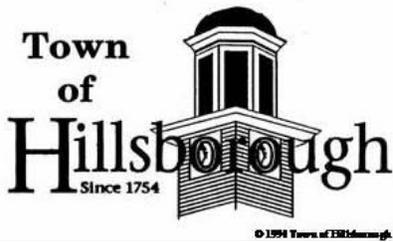
# Structural Stormwater Devices (BMPs)



## Legend

- |  |                        |  |                       |
|--|------------------------|--|-----------------------|
|  | Bioretention - grassed |  | Level spreader        |
|  | Bioretention           |  | Stormwater wetland    |
|  | Bioretention swale     |  | Underground detention |
|  | Dry detention          |  | Wet pond              |
|  | Grassed swale          |  |                       |





## NOTICE OF INTENT TO INSPECT

Stormwater Management Division  
101 E. Orange Street / P.O. Box 429  
Hillsborough, NC 27278  
Phone: (919) 732-1270, Ext. 77, Fax: (919) 644-2390  
Website: [www.ci.hillsborough.nc.us](http://www.ci.hillsborough.nc.us)

April 8, 2013

**File Copy**

Magnolia Place Homeowners Association, Inc.  
PO Box 366  
Hillsborough, NC 27278

Re: Project Name: *Magnolia Place* PIN: *9863778686*  
Property Owner: *Magnolia Place Homeowners Association, Inc.*

Dear Sir/Madam:

You are receiving this letter because the referenced property contains at least one engineered, structural stormwater control device or what is known as a stormwater best management practice (BMP). The stormwater BMP was required by the Town of Hillsborough (Town) to meet stormwater management requirements for the development of the above referenced project.

As part of your approval from the Town, you are required to maintain and operate the stormwater BMP in proper function. This includes conducting routine inspections at least monthly and submitting an annual maintenance inspection report to the Town for review and approval. The annual maintenance inspection report must be performed by a qualified registered North Carolina professional engineer, surveyor, landscape architect, soil scientist, aquatic biologist, or person certified by the North Carolina Cooperative Extension Service for stormwater BMP inspection and maintenance.

Failure to properly maintain and operate the stormwater BMP, including required documentation, or failing to submit required annual maintenance reports will result in a violation of Town code enforceable by civil penalties, criminal penalties (misdemeanor) or both. Furthermore, malfunctioning stormwater BMPs may cause impacts to adjacent properties such as flooding, erosion or a discharge of stormwater pollutants. These impacts may also violate state and federal laws and therefore be subject to additional civil fines and/or criminal actions.

In fact, the discharge of stormwater runoff is regulated federally by the Environmental Protection Agency (EPA) through the National Pollutant Discharge Elimination System (NPDES) program. In North Carolina, the NPDES program is implemented by the North Carolina Department of Environment and Natural Resources, Division of Water Quality (DWQ). The Town is authorized to discharge stormwater runoff to stormwater conveyance systems and local streams by its NPDES Phase II Stormwater Permit (NCS000466). The permit requires the Town to reduce pollution found in stormwater runoff which includes maintaining an inventory and periodic inspection of both privately and publically owned stormwater BMPs.

This letter is to inform you that the stormwater BMP(s) on your property is scheduled for inspection by Town stormwater staff within the next 120 days. Access to the stormwater BMP by Town staff is authorized as part of your previous project approval. You will not be notified prior to the inspection. If the stormwater BMP is found to be malfunctioning you will receive an official Notice of Violation and a report detailing steps to bring the stormwater BMP into compliance.

Additionally, our records indicate that our office has never received the following documents required for the stormwater BMP(s) on the referenced property:

- Annual Maintenance Inspection Report(s)
- Operation and Maintenance Agreement
- As-built Survey
- Design Engineer's Certification

As stated above, failure to maintain records and submit required annual reports will result in a violation. However, we would prefer to work with you to rectify any deficiencies and ensure proper operation of stormwater BMPs. Managing stormwater runoff and its effects on our local water resources takes a partnership. Therefore we are giving property owners 90 days to comply with self-inspection and reporting requirements. We are also requesting that contact information for the Financially Responsible Party shown on the attached form, be updated and emailed to the Town.

In the interim, I would be more than happy to schedule a time to meet with you, answer questions or provide additional information. Our goal is to ensure proper maintenance and documentation of the stormwater BMP(s) located on your property. If you are not the financially responsible party or believe that you have received this letter in error please contact me as well. I can be reached by telephone at (919) 732-1270, extension 77 or by email at [terry.hackett@hillsboroughnc.org](mailto:terry.hackett@hillsboroughnc.org).

Thank you for your cooperation in this effort to protect our local waterways.

Sincerely,



Terry L. Hackett  
Stormwater Program Manager