Town of Hillsborough

Falls Lake Nutrient Sensitive Water
Stormwater Management Program

Existing Development Inventory

January 2013
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INTRODUCTION

Sub-Item (4)(d) of the Falls Lake Existing Development Rule 15A NCAC 02B .0278 states that:

“In preparation for implementation of their Stage I and Stage II load reduction programs, local governments shall develop inventories and characterize load reduction potential to the extent that accounting methods allow of the following by January 2013:

- Wastewater collection systems
- Discharging sand filter systems, including availability of or potential for central sewer connection
- Properly functioning & malfunctioning septic systems
- Restoration opportunities in utility corridors
- Fertilizer management plans for local government-owned lands
- Structural stormwater practices, including intended purpose, condition, potential for greater nutrient control
- Wetlands and riparian buffers including potential for restoration opportunities”

The following sections describe the Town of Hillsborough’s inventories developed to meet this requirement. While the Town maintains data regarding its wastewater collection and treatment system as well as structural stormwater devices, staff resources are limited and therefore some information is not as detailed.

This is especially true when trying to characterize load reduction potential. While Town staff identified a few specific load reducing opportunities and utilized the Falls Lake accounting tool to calculate potential reductions, resource constraints and lack of accounting methods for some possible practices made it difficult to determine load reduction potential.

For instance, there is a possibility that in some portion of Town owned utility corridors, native woody shrubs could be planted with the assumption that shrub species root systems would not pose a threat to buried pipes. However, Town staff does not know how much reduction credit the Division of Water Quality (DWQ) would allow for this practice. Likewise, there are issues with retrofitting existing structural practices. Dry detention basins could be converted to stormwater wetlands, but in many cases these may end up being undersized due to site constraints or may not meet the exact design criteria listed in the state’s design manual. Reduction credit from these types of situations may need to be determined.

This inventory does not include other best management practices such as enhanced street sweeping or leaf collection. Presumably these activities reduce nutrient loads entering the storm sewer system and may be more cost effective reduction practices compared to other practices. The Town assumes that some of these issues may be addressed further in the required Stage 1 program.
1. **Wastewater Collection System**

The Town of Hillsborough operates a wastewater treatment plant and collection system primarily within its corporate limits and extraterritorial jurisdiction (ETJ) area. A map showing the location of the plant and collection system is attached. The mapping data is available in a format suitable for use in a Geographic Information System (GIS) mapping program. The GIS data is available upon request.

The Town’s wastewater plant is currently being expanded and treatment technology upgraded. This is the first of two upgrades to meet point source requirements under the Falls Lake rules. Construction of the current upgrade is expected to be complete August 1, 2013.

Based on current information, Town staff believes that there are not a significant number of onsite septic systems that could be connected to the Town’s wastewater collection system. However, it is anticipated that as part of the Town’s Stage 1 implementation program, the Town will coordinate with Orange County Health Department to determine feasibility of connecting septic systems that are within the Town’s sewer services boundary.

2. **Discharging Sand Filter Systems**

Town of Hillsborough staff researched this and determined that there are no discharging sand filter systems operating within the Town’s corporate limits or ETJ. This was confirmed with the Orange County Health Department.

3. **Septic Systems**

There are a limited number of septic systems within the Town’s corporate limits and/or ETJ. The location of these systems is being provided by Orange County Health Department. Please refer to Orange County’s inventory for information on septic systems within the Town’s jurisdiction.

4. **Restoration Opportunities in Utility Corridors**

The Town of Hillsborough operates both a water distribution system and wastewater collection system. Generally, the Town maintains these utility corridors with the minimum area necessary to allow access. Therefore, there are limited opportunities for restoration activities, especially within water distribution system easements. Wastewater easements do offer some limited restoration potential since these are often gravity lines which follow near or actually cross streams.

Town staff have evaluated these areas and identified one corridor along the Eno River as having good potential for restoring riparian buffer within the easement. This particular corridor is also part of a proposed extension of the Town’s Riverwalk greenway. This project provides an excellent opportunity to identify specific restoration sites. The corridor is identified on the attached map, along with some other areas identified for riparian buffer restoration or enhancement (see Section 7).

Town stormwater staff will also be working with utility staff to determine the feasibility of planting native woody shrubs within Town utility corridors. Presumably, woody
shrubs will not produce root systems that interfere with pipes but provide better nutrient reduction than mowed grass. Due to staff constraints, specific areas have yet to be identified. The Town may proceed with a pilot project in the upcoming year. However it would be helpful to know from DWQ if planting shrubs would receive the same credit as restoring riparian buffers with tree species.

5. Fertilizer Management Plans

The Town of Hillsborough does not regularly apply fertilizer to Town own lands and therefore does not utilize fertilizer management plans. The exception is establishment of new play fields that may receive a one-time fertilizer application if necessary. Currently the Town only owns one playing field at Gold Park.

6. Structural Stormwater Practices

The Town of Hillsborough only began regulating nutrient loads in stormwater runoff from new development in 2008 when it was required to begin implementing the Neuse Basin nitrogen requirements. Last year, the Town began regulating both nitrogen and phosphorous pursuant to the Falls Lake rules. Structural stormwater practices installed to meet these two rules have been mapped and included in this inventory. Prior to the nutrient load requirements, the Town only required peak flow or “quantity” control of stormwater. Town stormwater staff have been identifying and mapping these structural practices to the extent practical.

Based on this effort there are 55 known structural stormwater practices within the Town’s jurisdiction. Of the 55, 20 are dry detention basins that have the potential to be retrofitted or rehabilitated to improve nutrient removal. The locations of the 55 stormwater structural practices are shown on the attached map. The dry detention basins are shown in blue.

Details for each structural stormwater practice are attached. This list is also being provided as an Excel file. The structural stormwater practice data is available in a format suitable for use in GIS applications. In addition to the location, the GIS data includes an attribute table providing the same details as the list provided here. The GIS data is available upon request.

Reduction potential is difficult to determine at this time. The most likely way to improve nutrient removal of these dry detention basins would be to convert them to a stormwater wetland or wet pond. However, some of the mapped detention basins do not have room to increase surface area. A simple and presumably cost effective way to retrofit dry detention basins is to create wetlands within the bottom of the basin. However, retrofitting the bottom of dry detention basins into wetlands may not meet the design standards in DWQ’s Stormwater Best Management Practices Manual and therefore would not receive full reduction credit.

Presumably retrofitting dry detention basins by converting them to wetlands without enlarging the footprint simply means they would be potentially undersized. The Falls Lake accounting tool does allow the user to account for undersized practices. Conservatively, if each of the 20 dry detention basins could be converted to a stormwater wetland at even 50% of the design manual’s required size, reductions in
nitrogen and phosphorous would be realized. Based on this conservative approach, Town staff estimates that retrofitting the 20 dry detention basins could potentially reduce nutrient loading by 15% to 20% from existing conditions.

It is important to note that the Town of Hillsborough was one of the partners in the C.W. Stanford Stormwater Retrofit and Reuse project that was funded by the Clean Water Management Trust Fund. This project treats stormwater from portions of the C.W. Stanford Middle School and Orange High School campuses located within the Town’s ETJ. The project included installation of a wet pond and 2 bioretention cells. Runoff from captured by the wet pond is then used to irrigate athletic fields on the campuses. This project went online in May of 2012 and is projected to reduce nitrogen by 48-72 pounds annually and reduce phosphorous by 5-10 pounds annually. A map showing an overview of the project is attached.

7. Wetland and Riparian Buffer Restoration Opportunities

The Town of Hillsborough enforces a 50-foot stream buffer through its Unified Development Ordinance (UDO) and Orange County enforces the Neuse buffer rules within the Town’s jurisdiction. Hillsborough has had a stream buffer requirement since 1986 for perennial streams. In 2007, the Town adopted an ordinance to enforce stream buffers on intermittent streams and it includes a “kick-in” clause that enforces a stream buffer on previously un-mapped streams identified in the field. Likewise, Hillsborough has been enforcing floodplain development rules since the 1980’s.

This proactive approach means there are limited opportunities for wetland and riparian buffer restoration. There are streams that have been channelized or piped prior to the enactment of these protections that would provide better nutrient removal processes but stream restoration is not only expensive, it also requires more land area than may be feasible. Staff is aware of these streams, but due to resource constraints has not been able to investigate feasibility.

Town stormwater staff has identified three specific areas where there are riparian buffer and/or wetland restoration possibilities. These include the Eno/Margaret Lane Corridor, Town Public Works Facility and the Town Wastewater Treatment Plant. Each is briefly described below. Maps showing each area are attached.

*Eno/Margaret Lane corridor*

The Eno River flows through the historic district of Hillsborough just south of Margaret Lane. There are several properties along the north bank of the Eno River in this area that historically mow to the river’s edge. Town staff believes that this area could be restored from grassed buffer to forested buffer. On the south side of the river there is an existing sewer easement with some limited restoration opportunity where trees can be planted on the river side of the easement. In addition, the Town is proposing to extend its greenway from Gold Park along this easement. As part of the alignment process, some areas have been identified that could have the riparian buffer enhanced by removing invasive species and planting native woody species. Using the Falls Lake accounting tool, approximately 1 pound of nitrogen and 0.2 pounds of phosphorous could be reduced annually from this restoration project.
Public Works Facility

The Town’s Public Works building and storage yard is located at the old water plant, but the two buildings and graveled parking/storage area are located within the 100-year floodplain. Fleet maintenance operations were moved from this area to a new facility and the Town is looking at moving the remainder of the Public Works facility from this location. This would allow removing the buildings and other impervious surface from the Public Works area and restore it to riparian forest. While there is some existing riparian forest between the buildings and the Eno River, it makes sense to expand the buffer by restoring this area to riparian forest. Based on the Falls Lake Accounting Tool as much as 8.7 pounds of nitrogen and 2.2 pounds of phosphorous could be reduced annually.

Wastewater Treatment Plant

The Town owns approximately 28 acres at its wastewater plant facility. Most of this acreage is open space, located with the 100-year floodplain and is currently in natural forest. However, Town staff has identified some possible nutrient reduction opportunities. First, there are two temporary sediment basins currently installed for the expansion project construction. At least one of these basins could be kept in place and converted to a stormwater wetland which would provide additional treatment of runoff. Second, there are some natural wetland areas near the plant that could be enhanced and two areas that could be used to create floodplain wetlands. Staff has not yet assessed these areas in detail, but Town staff believes that a 10 to 20 percent reduction in nutrients is possible. This could equate to about 6-7 pounds of nitrogen and 2-3 pounds of phosphorous reduced annually.

8. Attachments

Map – Sanitary Sewer & Water Mains
Map – Structural Stormwater Devices (BMPs)
Map – CW Stanford Stormwater Retrofit and Reuse
List – Structural Stormwater Devices (BMPs)
Map – Eno/Margaret Lane Restoration Opportunity
Map – Public Works Facility Restoration Opportunity
Map – Wastewater Treatment Plant Restoration Opportunity
Data shown on this map is from Town of Hillsborough GIS and is for reference only. Exact locations and boundaries should be field verified. This map was prepared by Town of Hillsborough Stormwater Division.

Legend
- **Sanitary Sewer Mains**
- **Water Mains**
- **Town Limits**
- **ETJ**

1 in = 3,000 ft

Date: 1/29/2013
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Legend

Stormwater BMPs
- All Other BMPs
- Dry detention
- Town Limits
- ETJ

1 in = 3,000 ft

Date: 1/29/2013
Still functioning as a skimmer basin, although no active construction; has retro-fit potential
Eno/Margaret Lane Restoration Opportunity

Legend

- Riverwalk Phase II Corridor
- Sanitary Sewer Mains
- Streams

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Date: 1/29/2013
Public Works Restoration Opportunity

Legend

- Sanitary Sewer Mains
- Streams

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