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## ABBREVIATIONS

BAT	BEST AVAILABLE TECHNOLOGY
BMP	BEST MANAGEMENT PRACTICE
CAC	CONSERVATION ADVISORY COUNCIL
CSO	COMBINED SEWER OVERFLOW
CWA	CLEAN WATER ACT
DO	DISSOLVED OXYGEN
EPA	ENVIRONMENTAL PROTECTION AGENCY
GIS	GEOGRAPHICAL INFORMATION SYSTEM
MEP	MAXIMUM EXTENT POSSIBLE
MOU	MEMORANDUM OF UNDERSTANDING
MS4	SMALL MUNICIPAL STORM SEWER SYSTEM
NOI	NOTICE OF INTENT
NOT	NOTICE OF TERMINATION
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
NPS	NON-POINT SOURCE
NYS DOT	NEW YORK STATE DEPARTMENT OF TRANSPORTATION
NYS DEC	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SEAMAB	SIGNIFICANT ENVIRONMENTAL AREA MANAGEMENT APPEALS BOARD
SPDES	STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM
SSO	SANITARY SEWER OVERFLOW
SWMP	STORM WATER MANAGEMENT PLAN
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
UA	URBANIZED AREA



## **I. EXECUTIVE SUMMARY**

The Town of Colonie is required to comply with the New York State Department of Environmental Conservation's (NYSDEC) expanded program to improve the quality of storm water runoff and protect waterways. This program is federally mandated by the Environmental Protection Agency (EPA) under their Storm Water Phase II Final Rule dated December 8, 1999. New York State is authorized to implement this program on behalf of EPA via a NYSDEC permitting process that includes construction activities and operators of small municipal separate storm sewer systems (MS4s). The Town of Colonie is designated for inclusion in this process by being located in an urbanized area (UA) and serving a population between 10,000 and 100,000 with a separate storm sewer system. The entire Town is within a state designated UA as are most of the communities and some of the institutions in the Capital region area.

The Town has submitted a Notice of Intent to apply for coverage under a MS4 SPDES permit on March 6, 2003. The permit period is for five years. This report or Storm Water Management Plan is a required and significant first step towards compliance. The MS4 and construction activity permits are general permits and will cover vast groups of discharges with one set of requirements that each permittee must meet. Operators of construction sites larger than 1 acre of land disturbance would be required to submit a Notice of Intent (NOI) to the NYSDEC, develop and implement a Storm Water Pollution Prevention Plan (SWPPP) with appropriate Best Management Practices (BMPs) to minimize discharge of pollutants from the site, and submit a Notice of Termination (NOT) when final stabilization of the site has been completed. The Town will serve oversight, regulatory, review, construction observation, and enforcement roles regarding land developments projects covered under the construction activity permits.

The most significant goal of this program is to improve the quality of the State's water. The Storm Water Phase II Final Rule is the next step in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted storm water runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges that have the greatest likelihood of causing continued environmental degradation.

Sediments, litter and debris can create additional maintenance and flooding potential of storm water sewer systems. Beach closures, destroyed habitat, unsafe drinking water, fish kills, and many other severe environmental, economic and human health problems can result from water pollution. Visible pollutants degrade the aesthetic value of watershed lands and stream corridors and can threaten community vitality.

The NYSDEC permitting process requires six minimum Best Management Practices (BMP's) in a permittee's Storm Water Management Plan (SWMP). These minimum BMP's are as follows:

- 1) Public Education and Outreach on Storm Water Impacts
- 2) Public Involvement/Participation
- 3) Illicit Discharge Detection and Elimination
- 4) Construction Site Storm Water Runoff Control
- 5) Post-Construction Storm Water Management
- 6) Pollution Prevention/Good Housekeeping for Municipal Operations

This report recommends a watershed approach that will hopefully instill a sense of individual and community "ownership" for the particular watershed(s) in which they live, work or attend school in. The benefit of this approach is that greater levels of awareness, participation, involvement and volunteerism are likely if the issues to be solved are in their own backyard.

There will be significant costs to implement the program proposed, but they are hard to estimate at this early stage. Additional investigations are required to assess water quality issues and determine effective solutions where required. The recommendations herein address a majority of the larger watershed issues throughout the Town. Costs can be reduced by utilizing volunteer organizations, recycled products and sound watershed management. The latter philosophy promotes watershed vitality and recognition of its assets to the community.

## II. INTRODUCTION

Many communities in New York State are now required to comply with the New York State Department of Environmental Conservation's (NYSDEC) expanded program to improve the quality of storm water runoff and protect waterways. This program is federally mandated by the Environmental Protection Agency (EPA) under their Storm Water Phase II Final Rule dated December 8, 1999. New York State is authorized to implement this program on behalf of EPA via a NYSDEC permitting process that includes construction activities and operators of small municipal separate storm sewer systems (MS4s).

The Town of Colonie is designated for inclusion in this process by being located in an urbanized area (UA) and serving a population between 10,000 and 100,000 with a separate storm sewer system. The entire Town is within a state designated UA as are most of the communities and some of the institutions in the Capital region area. The Town is obligated to submit a Notice of Intent to apply for coverage under a SPDES permit by March 10, 2003. These MS4 and construction activity permits are general permits and will cover vast groups of discharges with one set of requirements that each permittee must meet.

The most significant goal of this program is to improve the quality of the State's water. The following passages from EPA's Storm Water Phase II Final Rule summary best describes the program's history and intentions:

“The 1972 amendments to the Federal Water Pollution Control Act, later referred to as the Clean Water Act (CWA), prohibit the discharge of any pollutant to navigable waters of the United States from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Efforts to improve water quality under the NPDES program traditionally have focused on reducing pollutants in industrial process wastewater and municipal sewage treatment plant discharges. Over time, it has become evident that more diffuse sources of water pollution, such as storm water runoff from construction sites, are also significant contributors to water quality problems.

Sediment runoff rates from construction sites are typically 10 to 20 times greater than those from agricultural lands, and 1,000 to 2,000 times greater than those of forest lands.

During a short period of time, construction activity can contribute more sediment to streams than can be deposited over several decades, causing physical and biological harm to our Nation's waters.

Since the passage of the CWA, the quality of our Nation's waters has improved dramatically. Despite this progress, however, degraded waterbodies still exist. According to the 1996 National Water Quality Inventory (Inventory), a biennial summary of State surveys of water quality, approximately 40 percent of surveyed U.S. waterbodies are still impaired by pollution and do not meet water quality standards. A leading source of this impairment is polluted runoff. In fact, according to the Inventory, 13 percent of impaired rivers, 21 percent of impaired lake acres and 45 percent of impaired estuaries are affected by urban/suburban STORM WATER runoff and 6 percent of impaired rivers, 11 percent of impaired lake acres and 11 percent of impaired estuaries are affected by construction site discharges.

Phase I of the U.S. Environmental Protection Agency's (EPA) storm water program was promulgated in 1990 under the CWA. Phase I relies on National Pollutant Discharge Elimination System (NPDES) permit coverage to address storm water runoff from:

- (1) "medium" and "large" MS4s generally serving populations of 100,000 or greater,
- (2) construction activity disturbing 5 acres of land or greater, and
- (3) ten categories of industrial activity.

The Storm Water Phase II Final Rule is the next step in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted storm water runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff.

Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges that have the greatest likelihood of causing continued environmental degradation."

The development of a watershed changes the way precipitation and snowmelt are converted to runoff, infiltration to the soil/water table, used by vegetation or evaporated. The more impervious surfaces such as buildings, pavement, sidewalks and other hardscapes there are in a watershed the more water will runoff. Although the tendency to think of runoff as the only factor with water quality issues is typical, infiltration and ground water recharge is also very important to the health of streams, waterbodies and the lifeforms they sustain. The diagram below compares the relationship of runoff, infiltration and evaptranspiration for natural, rural, suburban and urban type of land uses.



Pollutants common to storm water include but are not limited to the following:

- a) pesticides
- b) fertilizers
- c) oils/grease
- d) glycols
- e) salt
- f) litter/debris
- g) pathogens (bacteria and viruses)
- h) toxic chemicals
- i) heavy metals
- j) animal manure/farms

The most common nonpoint pollutants are sediment and nutrients. Nonpoint source pollution (NPS) occurs when rainfall, snowmelt, or irrigation flows over land or through the ground, picks up pollutants, and conveys them into rivers, lakes, ponds, coastal waters or ground water. Any pollutant that is picked up by runoff on its journey can ultimately affect natural habitats and the living organisms they sustain. These pollutants are typically soluble, nonsoluble or of a floatable nature. Nonpoint source pollution, particularly sediment, also alters the shape and flow of streams and other aquatic systems and may promote conditions for nonnative species invasion and degrade aquatic and stream habitat. Sediments, litter and debris also create additional maintenance and flooding potential of storm water sewer systems. Beach closures, destroyed habitat, unsafe drinking water, fish kills, and many other severe environmental, economic and human health problems result from these wide-spread pollutants. Visible pollutants degrade the aesthetic value of watershed lands and stream corridors. Each year, polluted runoff threatens community vitality. The Shaker Creek enters the Mohawk River one mile upstream of the intake structure to Latham Water District's filtration plant. This was a previous issue before the Airport installed a glycol recovery system and switched to using propylene glycol only instead of the more toxic ethylene glycol.

Restoration and protection of coastal and other aquatic resources costs millions. Although the Town of Colonie is less impacted than other communities that are more dependent on water resources for tourism (beaches) or estuaries/coastal areas (commercial fishing) they still have an important stake in water quality issues. Many streams are in the backyards of numerous properties whose children play in or near these water bodies.



The permitting process requires six minimum Best Management Practices (BMP's) in a permittee's Storm Water Management Plan (SWMP). These minimum BMP's are as follows:

- 1) Public Education and Outreach on storm water Impacts
- 2) Public Involvement/Participation

- 3) Illicit Discharge Detection and Elimination
- 4) Construction Site Storm Water Runoff Control
- 5) Post - Construction Storm Water Management
- 6) Pollution Prevention/Good Housekeeping for Municipal Operations

There are numerous approaches available to improving water quality in a community, some of which are referenced within Appendix F. Included in these references are internet links to actual case studies in storm water management and public education.

This report recommends a watershed approach that will hopefully instill a sense of individual and community “ownership” for the particular watershed(s) they live, work or attend school in. BMP Nos. 1, 2 and 6 deal with educating people on the impacts their daily routines and/or responsibilities have on water quality. The benefit of this approach is that greater levels of awareness, participation, involvement and volunteerism are likely if the issues to be solved are in their own backyard versus a generalized effort that may not apply as directly to them.

A watershed is the area of land that contributes drainage to a particular body of water. Land features such as slope, soil permeability, quantity of impervious areas, elevation and contour determine which way the water flows. We have identified the drainage area for water bodies as small as a backyard stream and as large as the Lisha Kill on the report mapping. Watersheds represent the natural boundaries within which nonpoint source pollution is best managed. They enable us to know the origins and route that runoff travels before flowing into a receiving water body. Watershed boundaries are irrespective of governmental boundaries. Therefore, effective protection and restoration of our waterways necessitates multi-jurisdictional partnerships and collaboration. The Lisha Kill receives runoff from the Towns of Rotterdam, Guilderland, Niskayuna and the City of Schenectady before it enters the Town of Colonie. The Lisha Kill also exits the Town and re-enters Niskayuna on its way to the Mohawk.

The permit process is a combination of investigation, record keeping/documentation, planning, prioritization, authoring or revising pertinent policies, scheduling, budgeting and ultimately implementing beneficial improvements to the Towns Storm Water Management System. This permit process has a five year duration whereby the storm water program must be fully implemented by March 10, 2008.

### III. PURPOSE/REGULATORY INTENT

The main goal of this permitting process is to improve water quality, primarily surface waters. The improvement in awareness of municipalities, institutions, land developers and the general public regarding water quality issues and nonpoint source pollution is key to this goal. The appropriate storm water management for an individual watershed is typically complex involving numerous variables and people. These issues are rarely static and evolve over time. On the municipal and institutional level (MS4s), a major part of the effort is not only awareness but also to maintain a hierarchy that plans, reviews, monitors, regulates storm water management policies and performs related tasks to ensure watershed water quality. Public work officials and planners are the typical personnel types involved in a municipality.

The emphasis of the NYSDEC permitting process is directed at urbanized areas where pollutant levels are suspected to be more concentrated due to manmade impacts. The following list summarizes the parties covered or possibly waived under the NYSDEC general permits:

- 1) Operators of small municipal separate storm sewer (MS4s) in “urbanized areas” as delineated by the Federal Bureau of Census. A “small MS4 is any MS4 not already covered by Phase I of the NPDES Storm Water program. The applicable NYSDEC permit is entitled “SPDES General Permit for Storm Water Discharges from Municipal Separate Storm Water Sewer Systems (MS4s)”, Appendix G.
- 2) Operators of small construction sites that disturb  $\geq 1$  acre and  $< 5$  acres of land are required to obtain permit coverage. Operators of larger construction sites that disturb  $\geq 5$  are already regulated under Phase I of the NPDES storm water program. The applicable NYSDEC permit is entitled “SPDES General Permit for Storm water Discharges from Construction Activity”, Appendix G.
- 3) Permitting authorities may waive “automatically designated” Phase II dischargers (small MS4s and construction activity) if dischargers meet the necessary criteria. Small MS4s located outside of urbanized areas and construction activity disturbing less than 1 acre, and any other storm water discharges can be designated for coverage if the NPDES permitting authority or USEPA determines that storm water controls are necessary.

Similar to the Phase I general permit program, operators of small construction sites would be

required to submit a Notice of Intent (NOI) to the NPDES permitting authority, develop and implement a Storm Water Pollution Prevention Plan (SWPPP) with appropriate BMPs to minimize discharge of pollutants from the site, and submit a Notice of Termination (NOT) when final stabilization of the site has been completed.

The permit is applied for by filing a NOI with NYSDEC who will make them publically available in a searchable database on the Internet. Unless notified by the DEC to the contrary, dischargers who submit an NOI in accordance with the requirements of this permit are authorized to discharge storm water from small municipal separate storm sewer systems under the terms and conditions of this permit five (5) days after the date that the NOI is postmarked. The DEC may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information. The submittal of an NOI is an affirmation to the operators understanding and belief that the activity is eligible for coverage under this permit and a SWPPP has been prepared and will be implemented in accordance with NYSDEC permit conditions.

This permit expires five (5) years after issuance or March 10, 2008. However, an expired general permit continues in force and effect until a new general permit is issued. Operators seeking authorization under a new general permit must submit a new NOI in accordance with the terms of such new general permit. The Town should review draft and permit conditions proposed by NYSDEC in the Fall of 2007 and resubmit a new NOI by March 10, 2008. The NOI shall be signed by either a principal executive officer or ranking elected official.

**IV. SIX MINIMUM BEST MANAGEMENT POLICIES**

NYSDEC and EPA maintain lists of potential BMP's that operators of storm water systems and construction sites can utilize to minimize pollutants associated with runoff and land disturbances. Both agencies are also amenable to innovative solutions or uses of Best Available Technology (BAT) to reduce the discharge of pollutants to the maximum extent possible (MEP). The six minimum BMP's listed in the NYSDEC permits describe the minimum effort required to achieve improved water quality and compliance with the permitting process. Other BMP's, whether small or large, general policy or site specific structural BMP(s), that can provide beneficial and cost effective water quality improvements are also welcomed.

The official description and requirements of the minimum BMPs can be found in the NYSDEC Permits in Appendix G. The following list briefly discusses NYSDEC's six minimum control measures that must be included in the Town's SWMP and statements regarding the current status or implementation needs, respectively:

**1) Public Education and Outreach on Stormwater Impacts**

Status: Not yet developed. Although the Town of Colonie has published decent storm water infrastructure standards and peak flow/runoff attenuation policies that are available to the public it has not yet fully implemented a public education/outreach program on storm water impacts. Organizations like the Conservation Advisory Council (CAC) and Significant Environmental Area Management Appeals Board (SEAMAB) interface with the public now and are valuable assets.

Implementation An outreach/education plan , schedule and strategy have not yet been

Needs: determined. This report discusses specific actions in the recommendations section.

**2) Public Involvement/Participation**

Status: Not yet developed. Planning and strategizing must occur to determine the most appropriate means to involve the public in ways that will produce meaningful results. The most difficult part of this requirement will be to define and monitor measurable goals. Public attendance can be measured by head count but meaningful involvement, conceptual understanding and measurement of success seems to be more subjective than empirically based. Past successes for similar efforts is encouraging.

Implementation To be determined in the first 18 months of the 5 year permit period.  
Needs: Research of other entity's (including other states) programs and their successes would be invaluable. It is hoped the watershed approach adopted will instill public feeling of watershed ownership, and perhaps competition, which would help improve levels of active community participation.

### **3) Illicit Discharge Detection and Elimination**

Status: Not yet developed on a town-wide basis. The Town's sanitary landfill on Route 9 has developed and implemented its own SWMP and SWPPP which contains a hierarchy and policies/strategies for illicit discharges.

Implementation To be determined in the first 18 months. This first involves a  
Needs: thorough review of existing town environmental policies such as the "Town of Colonie including the Villages of Menands and Colonie Hazardous Materials Incident Response Emergency Management Plan". Other intra-department policies should be reviewed for their pertinence to illicit discharges/pollution for potential storm water runoff situations. Existing personnel, policies and hierarchy should provide a framework to integrate new requirements into. Generally speaking, these existing policies apply more to accidental spills dictating immediate response. The nonpoint source pollution observed in various Town watersheds, typical of most other developed areas, is more commonplace and the result of prolonged impacts from man (oils, litter, road salt, ... etc.). The largest task will be to thoroughly field investigate the watersheds and stream corridors due to their vastness. A combination of Town involvement and community volunteerism via a strategic alliance is thought to be a sensible approach to maximize timely monitoring and appropriate prioritizations.

### **4) Construction Site Storm Water Runoff Control**

Status: Substantially developed but requires additional information, requirements and enforcement to ensure compliance to the maximum extent possible. Various recommendations and additions are discussed in later sections of this report.

Implementation This report contains the existing Town storm water policies  
Needs: (Appendix I) and our recommendations towards improving them to enhance storm water quality. The final product will likely involve other parties and pertinent published erosion control standards and BMP's.

5) **Post-Construction Storm Water Management in New Development and Redevelopment**

Status: Partially developed at this time, mainly from a maintenance or lessening of peak flow rate of discharge from post development runoff to pre-development conditions.

Implementation To be determined in initial 24 months of permit period. The greatest

Needs: challenge will be to provide adequate, qualified manpower to properly monitor the numerous areas of potential storm water pollution.

6) **Pollution Prevention/Good Housekeeping for Municipal Operations**

Status: Well developed at the Town's landfill but not necessarily as formalized in most other Town Departments. Although not necessarily documented separately, many relevant existing policies of operation dictate good housekeeping, preventative practices and a consistency of environmental stewardship.

Implementation To be determined in initial 18 to 24 months. This will incorporate

Needs: and centralize appropriate existing and recommended operational practices regarding storm water pollution.

This report and subsequent efforts over the five year permit period discussed herein include these six minimum BMPs and additional BMPs/issues important to the Town's storm water system. Generally, these are watershed specific issues that are related to flooding, maintenance, future storm water management facilities, growth and coordination with neighboring communities.

There are numerous structural and non-structural BMP's to choose from. Examples include silt fencing, storm drainage inlet sediment traps, mulching, prompt turf establishment, oil/water separators, detention basins, infiltration trenches and many others. Filtration devices that can capture suspendable solids, grits, nutrients, oils/grease and heavy metals deserve consideration for high pollutant load establishments such as gas stations and convenience stores where numerous vehicles occupy parking spaces during a day.

The BMP's to be selected will be determined over the next 5 years or more. Full investigation of the watershed areas will likely reveal additional issues and BMP needs.



Issues and problems with flooding are memorable to those who have endured an inundated basement, cessation of utilities and/or power or impassable roads. These waters can also contain pathogens and bacteria from backed-up local sanitary sewer systems. Additional pollutants can sometimes be exposed to storm water where levels rise above their constricted banks and flow overland. Although these occasions of flooding are few and relatively infrequent, storm water can become exposed to:

- 1) Automobiles, equipment and their fuel, lubricant and coolant system residuals.
- 2) Fuels, lubricants and chemicals in buildings or outdoor storage areas.
- 3) Material storage yards adjacent to watercourses.
- 4) Increased sediment loads from increased surficial exposure to the ground from flooding and intense rainfall at otherwise vulnerable areas.
- 5) Increased sediment loads from eroded streambed and streambanks due to high velocity flows.
- 6) Floatable debris within or adjacent to a watercourse including plastics, cans, paper, toys, buckets, tanks/containers, brush, branches, leaves, logs, grass clippings and many other forms of debris. Floatables can often cause or exacerbate clogging of storm water piping or inlet systems in addition to or in combination with silt and sediments.
  
- 7) Components of sanitary sewage. While the Town does not have any known or permitted Combined Sewer Overflow(s) (CSOs), some areas are known to experience sanitary sewer backups (SSO's) during intense flooding events. The Town of Colonie storm sewer system is separated from the sanitary sewer system unlike many older communities which still maintain permitted CSOs.

The succeeding sections of this report definitively identify those conditions of various forms of past or present pollution observed which are likely typical of un-observed areas. Besides identifying these conditions, recommendations, conclusions and corrective strategies are discussed and scheduled within the permit period. As one might suspect, the absence of any pollution in the numerous watersheds shown herein is an impossible condition to achieve. No form of government can expect complete compliance due to the reliance on every resident and occupier of a watershed to eliminate their own forms of pollution.

**V. EXISTING TOWN POLICIES, REGULATIONS AND CODES PERTINENT TO STORM WATER MANAGEMENT**

The existing Town policies regarding storm water are fairly typical of the communities in the capital region. Most of their pertinent content covers what can be discharged to the storm sewer system, planning and design standards, soil erosion and sediment control and the attenuation of peak flows to their pre-development rates. The policies and documents below are maintained and/or updated by the Town of Colonie that involve storm water:

- 1) Town of Colonie Highway and Drainage Standards, last revised June 1997.
- 2) Pure Waters Department Standard Specifications for Sanitary Sewer Connections.
- 3) Latham Water District, Town of Colonie, Standard Specifications for Water Distribution Systems.
- 4) Final Generic Environmental Impact Statements for both the Airport Area and the Lisha Kill/Kings Road area.
- 5) Town of Colonie Watercourse Area Management Local Law.

The Highway and Drainage Standards contain the requirements for soil erosion and sediment controls. Section Three of these standards also contains the requirements for Storm Water Management Plans including peak flow attenuation. Additional requirements and recommended revisions are outlined in the Recommendations and Implementation schedule for the Town of Colonie to consider and perhaps adopt for inclusion. Reference to the NYSDEC Standards and Specifications for Erosion and Sediment Control and the New York State Storm Water Management Design Manual are included herein.

## VI. FIELD INVESTIGATIONS/FINDINGS

During November and December of 2002 numerous areas within the various watersheds were observed and digital photographs were taken. A very informal method of visually checking water clarity was performed at several key stream locations and observations noted. Many of these locations were at significant drainage culverts that convey stream drainage beneath local or major highways. Results of storm water pollution, particularly floatables, are often observed at inlets or the approach channels. Accumulations of oil, as evidenced by surficial oil sheens, were more observable in slow moving waters but often not observed. Signs of erosive forces can also be observed at culverts due to inadequate culvert capacity, inlet clogging, lack of apron or bank stabilization or erosive road

non-



drainage over  
stable road  
embankments.

Erosive damage to streambanks was typically slight within the flat, low slope sections of most streams. Higher slope stream sections experience higher velocities and greater erosion damage. Unfortunately, in severe situations the earthen banks and supportive vegetation are washed away over time and without the full stabilization from the vegetation further damages will occur. This natural process then conveys sediments and debris downstream, often with consequences in stressed stream corridors. A major challenge is applying good judgement to ascertain the difference between natural erosion and sedimentation attributable to the volatile storm records of the 1990's versus

manmade impacts. Some decades experience much larger scale watershed

damages, erosion, sediment deposition and other impacts than others. These fluvial system consequences from sediment/debris deposition include the following:

- 1) Siltation and sediment deposition change the dimensions of the stream channel or sections thereof. This often diminishes the capacity and morphology of the effected stream section.
- 2) Bankfull and sub-bankfull floods can increase in magnitude and frequency.
- 3) Streambanks became barren or significantly exposed from reduction in vegetative cover.
- 4) Significant reductions in aquatic plant and animal life forms both in number and diversity. The sediments can physically smother life forms, habitats, spawning areas and adversely affect the chemical composition of the stream bed.
- 5) Significant clogging or deposition of material at culverts, inlets, pipelines and other components of the storm sewer system necessitating maintenance and further stream disturbances. These conditions can contribute to flooding and/or increased streambank's exposure to potentially erosive forces.
- 6) Reduction in water quality to the point of degradation. Reduction of beneficial vegetation that utilized nutrients can lead to greater algae production thus lowering Dissolved Oxygen (DO) to which most aquatic life is sensitive. Low DO streams often appear lifeless and cloudy. Reduction of vegetation decreases shaded aquatic habitats and increases water temperature in base flow conditions. Most watersheds are micro-ecologic zones that are in a state of equilibrium until impacted by man.
- 7) Creation of impacts in other municipal jurisdictions can affect working relationships and can potentially lead to legal consequences.

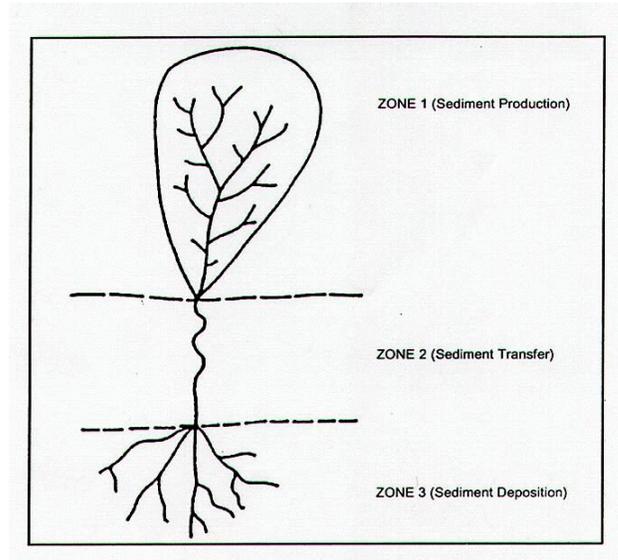
The source of these sediments are not all due to man but a combination of natural erosive and manmade effects. Some sediment in streambeds is not only natural but usually desirable. Too little sediment can lead to channel scour and destruction of habitat dependent on an optimum level of sediment. In lakes, reservoirs and estuaries, insufficient total suspended sediments can lead to increased light levels, resulting in the growth of nuisance algae.



The term *sediment* is broadly used to describe a problem associated with suspended solids, siltation, erosion, weathering, sedimentation, and other factors. Erosion, sediment transport, and deposition are natural processes caused by stresses placed on the earth's surface. Sediment movement is the result of water and air moving against the sediment (gravitation stresses) and natural weathering (molecular and chemical stresses). Because erosion is a natural process and significant quantities of sediments are being moved as a result of natural denudation, it would be unrealistic to expect complete control or elimination of sediment loads to receiving waters. However, it is feasible to control or manage excessive sediment loadings that could be detrimental to the quality

water and to terrestrial

of the receiving bodies of the aquatic and habitat.



The field investigations performed for this report covered approximately 1-10 percent of

the stream corridors and 1-4 percent of the respective watersheds. These investigations were essentially brief walks at key points in the watersheds where evidence of flow problems, flooding or erosion might be detected.

Digital photographs were taken at many of these locations and can help form a basis for future visual comparisons regarding vital conditions. No formal water quality sampling or subsurface investigations were performed. The following discussions summarize our observations and perceived degree of severity at problem areas for the respective individual watersheds.

There are three Town water resources that were previously on the NYSDEC list of impaired waters: Ann Lee Pond, Patroon Creek and the Kromma Kill. NYSDEC's 2002 Section 303(d) list can be found in Appendix F. These waters were previously listed as impaired or some indication of impairment documented, but now require re-assessment based on new methodology. The Ann Lee Pond and Patroon Creek had impairment issues due to urban storm water runoff. The Kromma Kill is listed as having an unknown toxic from industrial sources.

The old Altech Steel, near the Kromma Kill, has a monitoring point at the railroad culvert at Lincoln Avenue and must abide by NYSDEC procedures for sampling and monitoring. The plant itself is being abandoned by its current tenant where demolition and landfilling have been performed over the last 2 years. Presumably NYSDEC has kept tight controls on the procedures involving the industrial complex and its landfill as it relates to runoff issues/storm water pollution. NYSDOT has stated that this plant likely contributed to contaminated sediments at their culvert(s) on Broadway and has yet to remove these sediments.

## LISHA KILL

LOCATION	*ISSUE/SEVERITY CODE	REMARKS
<b>Area 1 (West of Central Avenue)</b>		
1) Cordell Road approx. 1 mile west of Albany Street	fd, dlcp, bp, 3u	Auto repair shop and junkyard with numerous vehicles in apparent dormant storage immediately adjacent to or within drainage course. Whether fluids have been drained or are leaking is unknown. (Photo No. 9)
2) Cordell Road approx. 7/8 mile west of Albany Street	sd, sslcs, 5u	Soil stockpiles of aggregate plant near fence adjacent to Cordell Road are producing sediments and are conveyed by runoff and wind. Fairly significant sediments can be easily conveyed to stream. Other similar issues adjacent to this site are conceivable. (Photo Nos. 10 & 11)
3) Stream at Albany Street and Cordell Road	anf, bp, sscri, 2e	One of the local low points and area of known flooding. Roads require closing due to depth of overflow in streets. Less than optimal culvert entry condition noted. Large woody debris at discharge also noted. (Photo Nos. 6 & 7)
4) Bridge/Dam structure north of Morris Road near stables	sscri, dlcp, sd, fd, nfd, wsmf, 4u	Most significant storm water detention device in Lisha Kill Watershed. Dam likely attenuates significant quantities of Rotterdam and Schenectady runoff. Dam requires some concrete restoration, silt removal and cleanup of many forms of floatable and nonfloatable debris. This Dam used to retain a recreational lake approximately 50 years ago. This may be a site to improve storm water, attenuation. (Photo Nos. 1, 2, 3, 4 & 5)
5) Older neighborhood near Maryland Avenue	anf, sscri, 2u	Area of known flooding due to shallowness of storm water piping and questionable capacities.
6) Drainage ditch on east side of Albany Street southeast of Squire Drive near cemetery	be, sbe, sscri, 4e	Roadside drainage channel being stressed by increased runoff from recent development upstream. Ditch is deepened via erosion. Banks are also eroded and will ultimately de-stabilize road shoulder and possibly create a road hazard if not stabilized. (Photo No. 8)
<b>Area 2 (East of Central Avenue)</b>		
1) Lisha Kill discharge at Central Avenue	be, sbe, sscri, 5e	NYS DOT culvert discharge on north side of NYS Route 5 (Central Avenue) has extensively scoured stream bed affecting streambed, banks and vegetation in addition to creation of sediment load. Area requires energy dissipation and stabilization. Scour may ultimately imperil utilities crossing beneath streambed. (Photo Nos. 16, 17 & 18)
2) Town of Colonie Municipal Golf Course Maintenance Facility	ppo, 1e	Steel dumpster north of maintenance building has a hole in its bottom due to corrosion. Condition was discussed with staff and likely repaired by now by welding a patch over hole.

\* See legend on page 35

## LISHA KILL

LOCATION	*ISSUE/SEVERITY CODE	REMARKS
<p><b>Area 2</b> (East of Central Avenue)</p> <p>3) Equipment washpad at Town Golf Course west of No. 4 blue tee</p> <p>4) Detention basin for new office building west of Route 155 at New Karner Road</p>	<p>sscri, be, sd, 2e</p>	<p>Innovative screening device to capture pollutants and grass residuals washed off maintenance equipment. Appropriate siting of washpad allows runoff opportunity to run through significant vegetation or percolate/evaporate before entering Lisha Kill. Device could be improved by incorporating a boom to retain residuals of lubricants or hydraulic fluids. Staff already employs best pollution prevention by repairing leaky equipment immediately. These fluids kill valuable turf and are intolerable at the course. (Photo No. 14)</p> <p>Localized erosion along flow path(s) within detention basin. Sediment deposition within basin is slight but likely contributing to downstream depositions. Sandy topsoils with low organics, a dry summer and possibly original efforts probably contributed to a lack of effective vegetative cover. Improved vegetation and channel reinforcement would mitigate erosion and sediment transport.</p>

\* See legend on page 35



\* See legend on page 35

<b>VLY CREEK</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) East of Ashtree and Tulip Hill Lane at sanitary sewer crossing of Vly Creek	be, sbe, fd, nfd, sscri, 5e	Erosion at steep drainage channel east of Vly Creek on upstream side of sewer easement embankment. Erosion begins at 12" culvert discharge from west end of Cascade Terrace. Significant source of sediment load. (Photo No. 5)
2) West of Vly Creek at Ashtree/Tulip Hill	po, 2e	Evidence of wet concrete deposition into storm gutter and catch basin observed. Condition is likely attributable to washout of concrete truck, an example of illicit discharge to the storm water system and water quality impact. (Photo No. 3)
3) Immediately downstream of catch basin at end of Ashtree	sbe, sscri, 2e	Significant drop of storm water discharge at end of pipe has eroded slope. Damage is limited by root structure of large Cottonwood tree. Some soil loss noted. Stabilization of slope would not be difficult or extensive. (Photo No. 4)
4) Discharge end of Vly Creek culvert at sanitary sewer crossing	be, sbe, fd, nfd, dlcp, ppo, sscri, 5e	Significant streambed erosion at culvert discharge and minor streambanks erosion noted. Stone stabilization has mostly washed out due to small size. Much refuse observed. (Photo No. 2)
5) Vly Creek downstream of sewer easement embankment	fd, nfd, dlcp, ppo, 3/5u	Significant quantities of refuse in streambed and along banks likely spread well downstream by high flows. Corroding metal byproducts creating slight staining. (Photo No. 1)



## SHAKER CREEK

LOCATION	*ISSUE/SEVERITY CODE	REMARKS
<b>Area 1 (West of Route 7)</b>		
1) Detention basins at end of Wilshire Drive near Stump Pond	sscri, 3e	Wall structure of impoundment retaining wall is tilted since constructed due to overturning forces from temporary surcharges of detained water. This structure requires maintenance. Fortunately, failure of wall is upstream of significant wetland that would somewhat buffer a dam breach. Without fabric, structure may not attenuate any peak flow scenario as intended. (Photo No. 18)
2) William Sanford Library	sd, bp, sscri, 2e	Discharge pipe outlet partially blocked at its discharge ditch from sediment that has re-vegetated itself. (Photo No. 16)
3) Ann Lee Pond south of Albany Shaker Road	sbe, sd, 2e	Sediments running off into Ann Lee Pond from adjacent public parking area. Although gravel is a common choice for such a high traffic area, there are inexpensive ways to reduce sediment intrusion into the lake. (Photo No. 14)
4) Sicker Road near Industrial Park	dlep, sd, sslcs, 5e	Construction material stockpiles next to Shaker Creek tributary without sediment controls. (Photo No. 11)
<b>Area 2 (East of Route 7)</b>		
1) Shaker Creek on east side of Route 7	sbe, sd, sscri, 2u	Streambank erosion noted on sharp bend of creek. Sharp bends like this typically incur erosion from flow concentrations due to

<b>SHAKER CREEK</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
2) Shaker Creek at Mill Road, west side	sbe, sscri, 5e	centrifugal forces. The outside bank at the curve (concave) results in a deeper pool. The inside part of the curve is the convex side which is typically is a point bar. A point bar has not yet formed here but may as the convex side cuts farther and farther into the soil from future flow events. (Photo No. 10)
3) Shaker Creek just downstream of Mill Road	sbe, fd, sscri, 4e	Inlet side of major arch culvert has a deteriorated entry condition exacerbated by road embankment erosion. Significant soil losses have removed support at southwest corner of tapered inlet. Road embankment requires stabilization. (Photo No. 7)
4) Shaker Creek at River Road, south side	sbe, fd, sscri, 3e	Significant streambank erosion generally above native rock at toe of bank. Erosive forces/significant velocities have scoured earthen banks to the extent of exposing many root systems of trees, brush and plants that formerly held removed soil. (Photo No. 6)
5) Shaker Creek at River Road, north side	be, sbe, fd, nfd, sd, 5u	Some streambank erosion near culvert inlet noted. Creek has two significant bends in this area upstream of culvert. Culvert inlet is skewed compared to stream direction. Storm surcharge levels could be lowered at this point by mitering the culverts inlet above its concrete haunch thus increasing its inlet capacity. Less surcharge means less streambanks/overbank exposure to storm water. Water clarity was the most turbid at this point than other locations observed upstream. (Photo No. 3)
		Extensive erosion/scour at discharge of Shaker Creek culvert to Mohawk River. Shoreline scour is probably due more to wind generated wave action from the river than Shaker Creek flow. (Photo No. 2)

<b>FARM BROOK</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) Farm Brook at Wade Road, east side	be, sbe, scl, bp, sscri, 2e	Moderate degree of scour within stream but well vegetated enough near top of banks to stabilize further erosion. Culvert inlets are significantly skewed to main stream channel. Channel has likely changed course over time. Although road has reputedly never been overtopped, the inlet is susceptible to blockage and additional surcharge due to skewed inlet. Inlets should be miter cut to increase inlet area. (Photo No. 5)
2) Farm Brook at Wade Road, west side	be, sbe, sscri, 3e	Moderate degree of scour near discharge point of culverts that requires stabilization. Impact area is confined. (Photo No. 6)
3) Farm Brook west of Golden Bear Indoor Golf	be, sbe, sd, fd, 3e	Stream is meandering or oxbowing due to dynamic stream morphology. Due to low stream gradient and sediment deposition from upstream sources the flow channel is constantly changing. This area is comprised of woodland type wetlands. Hopefully wetland disturbances can be eliminated from ATV intrusions.

\* See legend on page 35

<b>DELPHUS KILL</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) Delphus Kill at Pollack Road, south side	sd, fd, nfd, bp, dlcp, 2e	Inlet side of large diameter culvert conveying stream at sharp turn. Point bar of gravelly sediments observed just upstream of culverts. Vacant land upstream has abandoned vehicles and a large steel tank stored near stream. Potential for large woody debris to partially block culvert. (Photo No. 1)
2) Delphus Kill at Pollack Road, north side	be, sbe, fd, sd, sscri, 5e	Discharge area of stream culvert has been significantly de-stabilized by scour/erosive forces near culvert and bend in creek 100 ft. downstream. Road embankment was de-stabilized by road low-point runoff and re-stabilized with asphalt pavement. Toe of bank(s) stabilization and removal of point bar are required to mitigate erosion and sedimentation issues. (Photo Nos. 2 & 3)
3) Delphus Kill north of Pollack Road downstream of culvert above	sbe, 2u	Some erosion at toe of slopes at bends in stream have de-stabilized streambanks to varying degrees. (Photo No. 4)

SMALL TRIBUTARIES TO THE MOHAWK RIVER		
LOCATION	*ISSUE/SEVERITY CODE	REMARKS
1) Island View Road, west of I-87	sslcs, sd, bp, 3e	Stockpiles of surplus soils and construction materials without containment are source of sediments to drainage system along road. Inexpensive silt barrier(s) would contain sediments and prevent silt intrusion into Mohawk River and Town drainage system. (Photo No. 1)
2) New development south of Town Park, west of Route 9	fd, nfd, sd, bp, sslcs, 5e	Large areas of disturbed land with few silt and sediment containment devices. Finished components of storm drainage system are receiving silt laden runoff. (Photo Nos. 2 & 3)
3) Town landfill along Route 9	wsmf	Inlet end of 54" storm water pipe with bar rack catches floatables before they are conveyed to Mohawk River.





<b>CHERRY CREEK</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) Cherry Creek south of Central Ave. and east of Northway Mall	fd, nfd, dlcp, bp, 5e	Significant refuse within streambed, on streambanks and other parts of ravine. Floatables noted further downstream. Runoff fairly turbid this day due to "first flush" type of rainfall. Colonie Center discharges to Cherry Creek at this point. (Photo No. 1)
2) Cherry Creek near Dorlyn Road	fd, nfd, ppo, bp, 2e	Water quality seemed somewhat impaired. Turbidity and <u>some</u> oil sheen(s) were noted. Source of oil is most likely from vehicle parking lots upstream. (Photo Nos. 2 & 3)
3) Cherry Creek just west of Fuller Road	bp, wsmf	Overflow trash rack roughly screens storm water at outlet of small pond. Town Highway Department frequently racks off screens to retain outlet capacity.
4) Cherry Creek east of Fuller Road	sbe, fd, nfd, sd, 2e	Some bank erosion noted within minor tributary from the west. Debris noted.

<b>SAND CREEK</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) Sand Creek, south side of Osborne Road	fd, nfd,sscri, 2e	Miscellaneous debris noted. Steel culvert pipe protruding from road embankment is corroded at its invert and leaks. Some soil losses below pipe. Replacement of short section exposed such that discharge is over rock stabilization will eliminate further erosion. (Photo No. 1 & 2)
2) Sand Creek west of Everett Road	fd, nfd, dlcp, ppo, 5u	Former dumping area over side of drainage ravine. Staining noted but source was not determined. (Photo No. 4)
3) Major Town Detention Basin west of Russell Road	sd, wsmf, 1e	Detention basin has accumulated some sedimentation. This will ultimately begin to minimize available storage. (Photo Nos. 5 & 6)
4) Major Town Detention Basin west of Russell Road	bp, sscri, 4u	Discharge pipe from outlet works is reputedly partially collapsed between concrete wall and Russell Road. Pipe should be inspected and repaired. (Photo No. 9)
5) Sand Creek east of Russell Road near auto service shop	fd, nfd, dlcp, 3e	Yard waste, tires and other miscellaneous debris noted. (Photo No. 11)
6) Sand Creek culvert at Exchange Street	fd, nfd, sd, bp, sscri, 3e	Culvert would seem to have insufficient capacity when compared to Everett Road culvert which is larger. Evidence of erosion next to headwall could be caused by swirling currents when surcharged. Water main passes through culvert beneath street presenting additional blockage potential. Town DPW aware of this and will likely reinstall water main above culvert. (Photo Nos. 13 & 14)
7) Sand Creek culvert at Exchange Street	fd, nfd, po, bp, 2e	Kitty litter (yes used) observed on streambanks along with yard waste deposited by person(s) needing education on storm water impacts. (Photo Nos. 14 & 15)



\* See legend on page 35



## RED CREEK

LOCATION	*ISSUE/SEVERITY CODE	REMARKS
1) Detention basin at Stonegate Court and Old Birch Lane	sscri, 2u	Fairly large detention basin serving the neighborhood west of Osborne Road. While no adverse issues were noted, this basin could likely provide water quality features with the addition of a sediment forebay and/or more opportunities for infiltration. Whether more storage is desirable or necessary is unknown, the basin needs to be observed during a significant storm. Groundwater levels may be too shallow to consider certain improvements. (Photo No. 1)
2) Red Creek northwest of the end of Amboy Drive	fd, sd, 2u	Narrow impoundment of Red Creek not shown on USGS or Town GIS maps (added to enclosed watershed maps). Water quality was fairly turbid on 11/21/02 when observed. Dissolved oxygen may be low from silt and sediment accumulations. Additional sampling/testing and other investigations are advisable to determine if improvements are achievable (Photo No. 2)
3) Immediately downstream of impoundment above north of Amboy Drive	fd, nfd, dlcp, po, sd, sscri, 5e3e	Partial blockage of stream by willow logs from recent wind storm. A section of metal chain link fence next to these logs is leaching corrosion byproducts to the Red Creek. Greatest significance is on debris causing pollution. (Photo No. 3)
4) Immediately downstream of impoundment above north of Amboy Drive	be, sbe, 2e	Well established ATV trail has eroded soils adjacent to stream and contributed to sediment intrusion into stream. (Photo No. 3)

<b>NUCKLOS CREEK</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) Little Lake at Van Rensselaer Boulevard		No adverse conditions were noted. The outlet device is a drop manhole with a horizontal bar screen to prevent large floatables from getting into the culvert beneath Van Rensselaer Boulevard. Dependent on flooding conditions in Menands, additional attenuation is very conceivable by modifying the outlet controls to take better advantage of the vast storage potential of the lake. Other than the lake itself, the creek is outside of the Town boundaries. (Photo No. 1)
2) East of Van Rensselaer Boulevard		Town of Colonie above ground sanitary sewer main roughly parallel with highway. No leaks were visible and pipeline condition appears fine. This is listed more for recognition of the potential for water quality issues if this sewer main were to leak. Pure Waters inspects this infrastructure routinely.

<b>CEMETERY CREEK</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) Immediately west of Town Hall		Large retention basin behind Town Hall receives drainage from the residential neighborhood southeast of Maxwell at Old Niskayuna. This basin has a screened outlet at it's southern end and provides some level of storm water attenuation. No adverse issues were observed at this location and is included herein as a site for possible additional attenuation via revised outlet controls. Additional investigations would be required to determine its feasibility. This pond is in the optimum location in the Cemetery Brook watershed for storm water management. Water quality structures such as a sediment forebay immediately preceding the pond is possible. (Photo No. 1)
2) Cemetery Brook culvert at Railroad just south of Lincoln Avenue	be, sbe, fd, sscri, 6e	Railroad owned culvert system with severe erosion at outlet. Streambed and streambanks erosion has generated significant sediment load to the receiving Kromma Kill and lowest reaches of the Cemetery Brook. (Photo No. 5)

<b>SALT KILL</b>		
<b>LOCATION</b>	<b>*ISSUE/SEVERITY CODE</b>	<b>REMARKS</b>
1) Tributary to the Salt Kill at Johnson Road	anf, wsmf, sscri, 2e	Scene of previous flooding at adjacent house and around houses west of culvert during significant storms. Additional capacity has been installed and more is proposed. (Photo No. 2)

## KROMMA KILL

LOCATION	*ISSUE/SEVERITY CODE	REMARKS
1) Siena College, east side of Route 9	fd, 5e	Significant development over the last 30 years at Siena's campus has increased the peak flows and frequency of flooding downstream in the Lincoln Avenue area. (Photo No. 1)
2) Siena College, east side of Route 9	fd, sscri, 5e	The College is pursuing enhanced storm water detention utilizing existing basins. Significant debris noted at one pedestrian bridge, mostly floatable cups and cans from the beer crowd. (Photo No. 2)
3) Schuyler Meadows Golf Course, Spring Street		Existing irrigation pond for golf course is a possible site for additional storage and attenuation of peak flows. This concept has been partially analyzed and in deliberation. Club maintenance personnel have installed a silt/sediment barrier in upstream end of pond to limit silt intrusion in area of irrigation intake near dam.
4) East Hills Subdivision, Brighton Place	fd, sslcs, sd, bp, 5e	Soil excavated for a house foundation without silt or sediment barriers. Previously restored surfaces (grass) from infrastructure phase has incomplete coverage in some areas. Even in well restored areas equipment from housing construction and gas/electric installations have disturbed significant land with few effective attempts to limit disturbances and control silt laden runoff. (Photo No. 4)
5) East Hills Subdivision, Brighton Place	sslcs, po, sd, bp, sscri	Severe deposition of silt, clay and muddy deposits within paved road. Unstabilized soil surfaces are virtually everywhere. Hydraulic fluid from equipment observed on ground. Completed drainage system of catch basins and storm piping are <u>totally unprotected</u> and are receiving and conveying silt laden runoff to the stream. (Photo No. 5)
6) East Hills Subdivision, Brighton Place	fd, sd, bp, wsmf, 6e	New detention basin significantly compromised by <u>vast</u> accumulations of silt. Outlet structure and presumably the discharge pipe also partially clogged with silt/sediment and debris. Necessary volume for peak flow has been significantly reduced. Basin needs to be cleaned out to avoid increasing risk of flooding downstream near Spring Street already known to flood. (Photo No. 6)
7) East Hills south of Brighton Place	sbe, 2e	Tributary to the Kromma Kill just downstream of detention basin shown in Photo 6. Water was quite turbid for a low flow day. Significant silt accumulations undoubtedly are the cause. During an intense storm the quantity of Total Suspended Solids (TSS) would be much higher. (Photo No. 7)
8) East Hills south of Brighton Place	be, sbe, sscri, 6e	Severe erosion observed after rock stabilization terminated. It is fairly obvious that detention basin is not maintaining pre-development runoff patterns at this location. (Photo No. 8)
9) Kromma Kill. At Spring Street and Grenada Terrace	anf, sd, bp, wsmf, 2e	Large arch culvert installed in 2002 to supplement drainage capacity in an area of frequent flooding. Barrier in front of new culvert is intended to limit sediment and debris intrusion into new pipeline, especially from unresolved development issues upstream. (Photo No. 9)
10) Lincoln Avenue east of Altyx Steel	fd, nfd, anf, bp, wsmf, 3e	Existing trashrack formerly maintained by others has been recently improved by cleaning, streambed/streambank stabilization and installation of an access road for maintenance of the stream and trashrack. Issue codes reflect potential issues more than issues at date of photo. (Photo No. 10)

## KROMMA KILL

LOCATION	*ISSUE/SEVERITY CODE	REMARKS
11) Kromma Kill immediately west of Broadway in Menands	fd, nfd, dlcp, sd, bp, sscri, 6e	<p>Upstream side of twin NYSDOT culverts with severe sediment clogging from upstream sources. Debris of various types were observed.</p> <p>Capacity is seriously compromised. Town of Colonie has notified NYSDOT of this situation in March of 2001. NYSDOT indicated preliminary sediment sample analysis indicated detectable levels of PCB's and heavy metals. They further presumed that the inactive hazardous waste site a mile upstream (formerly Altech Steel) was the likely source. (Photo No. 12)</p>
12) Kromma Kill immediately East of Broadway in Menands	fd, nfd, dlcp, sd, sscri, 6u	<p>Discharge end of large diameter NYSDOT culverts are submerged. Kromma Kill is full of debris, refuse and sediment. (Photo No. 12 &amp; 13)</p>
13) Kromma Kill west of I-87	fd, nfd, dlcp, po, 5e	<p>Illegal disposal of automotive fluids and collection pans adjacent to stream. It is questionable whether public education could change the irresponsible attitude of the person(s) who performed this act.</p>

## GASHOUSE CREEK

LOCATION	*ISSUE/SEVERITY CODE	REMARKS
1) Beverwyck Lake at Lake Shore Apartments, north of 155 and east of Delatour Road	be, sbe, sscri, 6e	A former water supply reservoir for the City of Watervliet that now provides some storm water attenuation and opportunities for sediment settling and biological uptake of pollutants such as nitrogen or phosphorus. Outlet works/spillway is severely deteriorated and the Owner (Lake Shore Apts. ) is in the permitting phase in their efforts to repair it. Analysis and alternatives for additional peak flow attenuation have been presented. Based on the storage available at this 11 acre lake significant reduction and delay of peak flows would benefit the downstream hamlet of Mannsville, an area of known flooding. (Photo Nos.1 & 2)
2) Gas House Creek at railroad tracks near the former Adirondack Castings Plant west of Mannsville	be, sbe, fd, nfd, anf, bp, wsmf, 3e	Existing inlet of 36" culvert owned by railroad that is susceptible to blockage by debris. Culvert has been overwhelmed by Kromma Kill overflow/diversions and Gas House Creek drainage to the extent of overflowing the tracks and flooding Mannsville. (Photo No. 3)
3) Tenth Avenue at Fourteenth Street in Mannsville	anf, wsmf, sscri, 3u	Hamlet of Mannsville where flooding frequency has increased in recent years. Although significant improvements have been made, additional storm water pipe capacity would limit the flooding frequency to more acceptable levels. Drainage system connects to City of Watervliet Gas House Creek conduit. (Photo No. 4)

\* See legend on page 35

\* The assignment of issue and severity codes is subjective and intended to provide an initial basis for prioritizing watershed needs, further investigations and mitigation efforts. Further investigations and data could change the coding of these observed conditions.

**ISSUE CODES:**

- be - stream bed erosion
- sbe - stream bank erosion
- fd - floatable debris
- nfd - nonfloatable debris
- dlep - debris likely causing pollution beyond debris form itself
- po - pollution observed (liquid form)
- sslcs - stockpiled soil likely causing sedimentation elsewhere
- ppo - possible pollution observed (liquid form)
- anf - area of known flooding
- sd - sediment deposition of significance observed
- bp - culvert blockage or potential
- wsmf - watershed storm water management facility or significant device requiring frequent maintenance
- sscri - storm water system component requiring improvement

- 1 - low impact and not considered to become worse in near future.
- 2 - moderate impact and not considered to become worse in near future.
- 3 - significant impact believed to produce further detrimental impacts at point of observation.
- 4 - significant impact that will worsen in foreseeable future.
- 5 - significant impact at point of observation and deleterious to downstream conditions/water quality.
- 6 - severe impact at point of observation and deleterious to downstream conditions/water quality.
- u - additional suffix to severity codes above to indicate data unknown, requires confirmation.
- e - definitive data or more obvious visual evidence available, coding is more explicit.

**SEVERITY CODES:**

## **VII. WATERSHED MAPPING**

The individual stream watershed maps included in Appendix K are considered one of the most important tools provided by this report for the combined efforts of the Town of Colonie and its community. Focusing the mapping on individual watersheds and the neighborhoods/drainage features they contain will likely enhance the percentage of community participation. The philosophy of Adopt A Watershed has been proven effective in many areas of the country and similar adopt a highway volunteer programs in our area. The main premise is that people will be more involved on issues where their family and friends live and work in.

The maps in Appendix K were derived from a cooperative effort of the Town Management Information Services and our firm. The Town Geographic Information System (GIS) maps provided base mapping of numerous layers of spatial information that was supplemented with the following information:

- 1) Portions of Town drainage areas tributary to th Mohawk River and the Hudson River.
- 2) Additional tributaries and water bodies observed during field investigations.
- 3) Locations of significant dams or detention/retention basins.
- 4) Areas of well drained soils where storm water infiltration systems should be considered.
- 5) Areas of historical flooding.

The Town GIS mapping utilized ArcView Cadd software which was computer translated to Autocad to add the information described above. These watershed maps are not considered to be totally complete since subsequent planned field investigations in areas not yet visited will almost certainly yield more useful data to be added. Ultimately, the completed maps will be additional data layers and part of the Town of Colonie GIS mapping.

Included in the individual watershed maps are the catch basins, piping and culvert inlet/discharge points of the Town's drainage system. The source of information for the drainage system is a combination of GIS field survey and record map information, both performed by Town forces. Certain areas of the Town do not have these systems yet mapped because it has not yet been completed. Additional efforts to perform further surveys and complete the system mapping are

anticipated to be performed over the next five years. As of now this mapping only covers Town owned drainage facilities. A further goal will be to also include significant, privately owned drainage facilities which include several privately owned dams.

Ultimately the completed maps would be returned to the Town (in ArcView format) for their use. The Town may wish to provide even larger scale maps for neighborhoods and sub-watersheds for finer details and as useful tools for cleanup crews. The Lisha Kill and Shaker Creek are large enough where sub-watershed mapping is considered a more effective tool.

## **VIII. RECOMMENDATIONS AND IMPLEMENTATION SCHEDULE**

This report provides a significant portion of the initial steps of a good storm water program and basis to prioritize the subsequent efforts over the five year permit period and beyond. The assessment of watershed conditions, as they now exist, review of existing storm water policies, pertinence of previous studies and recognition of storm water issues related to growth, are only part of the basis of knowledge the Town and the community at large must consider to help achieve water quality goals.

The permit for MS4s requires determination of measurable goals, for example the removal of 1,500 pounds of non-floatable and 400 pounds of floatable debris from the Lisha Kill Watershed during 2007 and 2008, and 500 and 200 pounds, respectively, in the period of 2008 to 2010 as new debris accumulates or other areas are addressed. This report discusses goals in general terms and are considered preliminary at this time due to the lack of complete field data. It is anticipated that subsequent field investigations during 2003 and 2004 will reveal additional issues and a more definitive database by which new information will yield better measurable and prioritized goals. Weight of pollution collected can also spur competition, fun and satisfaction among those involved. Many of these field investigations will hopefully include volunteers. Town personnel will be involved but day-to-day operations will limit their involvement at times. It is anticipated that it will take at least one to two years to formulate a strategy of implementing BMPs with a combination of Town forces, the community and the consulting Engineer.

The issues and observations tabulated in Part VI, Field Investigations/Findings, include some areas that do not require more data and do necessitate more prompt action. Implementation for less severe conditions, complex issues and numerous areas of streambed or streambank erosion has been scheduled beyond the current permit period. The reasoning is that further field investigations will likely dictate further needs best mitigated during similar efforts at the observed areas noted herein. Along with these severe or significant areas of watershed issues are our initial recommended strategies to plan, recruit and implement the six minimum BMPs.

The following recommendations for each individual watershed summarizes the initial efforts and BMPs believed to be priorities:

## LISHA KILL

- 1) **Recommendation:** Meet with representatives of Aggregate Plant and Auto Repair Shop regarding their individual storm water issues. Removal of autos, parts and probably fluid draining/containment are necessary.

Also eliminate intrusions of soils/sediments from Aggregate Plant to Cordell Road by moving piles or stabilizing them. The remainder of the property should also be observed during a runoff event to determine if other storm water issues requiring mitigation exist.

**Implementation Schedule:** This will depend on degree of cooperation of business owners but it is hoped that these tasks can be accomplished before 2007.

- 2) **Recommendation:** Miter cut inlet end of twin culverts at Albany Street and Cordell Road to plane of streambank. This will likely reduce surcharging during high flows by a few tenths of a foot. This area will still experience flooding at the same frequency it does now.

**Implementation Schedule:** Work performed by Town forces could be completed by the Fall of 2005.

- 3) **Recommendation:** Contact land owner of bridge/dam and temporary impoundment along Lisha Kill north of Morris Road to initiate discussions regarding possible improvement of detention capabilities and cleanup of debris. Debris removal would likely involve Town equipment/operator and volunteers. The feasibility of using this structure (or modified version) to control flooding downstream requires further study. Actual surcharge levels possibly observed during recent significant storms or future storms would be quite valuable.

**Implementation Schedule:** This will depend on degree of cooperation of land owner but can likely be addressed by Summer of 2008.

- 4) **Recommendation:** Stabilize drainage ditch on east side of Albany Street near the cemetery to reduce erosion and conveyance of sediment. Rock stabilization is likely.

**Implementation Schedule:** Work performed by Town forces could be completed by Summer of 2005.

- 5) **Recommendation:** Discuss erosion damage at Central Avenue culvert with NYSDOT. Repairs will likely be performed by DOT personnel and involve heavy rock stabilization.

**Implementation Schedule:** Dependent on NYSDOT but is hopefully achievable in 2007.

- 6) **Recommendation:** Repair steel dumpster at golf course maintenance facility.

**Implementation Schedule:** Repairs were completed by course maintenance staff during the summer of 2003.

- 7) **Recommendation:** Enhance innovative equipment washpad with addition of oil retaining boom around last screening device.

**Implementation Schedule:** Boom addition by course maintenance staff by Summer of 2005.

- 8) **Recommendation:** Stabilize base flow channel at new office building's detention basin to reduce erosion and sediment creation.

**Implementation Schedule:** Dependent on cooperation of office building owner but can hopefully be implemented by Summer of 2007.

- 9) **Recommendation:** Clean up trash and debris along Lisha Kill and its tributaries able to be handled with manual labor. This effort would hopefully be led by volunteer and/or civic organizations with input and help from the Highway Department. Town trucks would pick up bagged debris and haul to the Town landfill for weighing and disposal. Weights would be recorded and a Town database would tabulate weights, possibly by watershed or group.

**Implementation Schedule:** See general recommendations for discussions of cleanup activities. These tasks are dependent on community response and willingness to pitch in for the cause.

## VLY CREEK

- 1) **Recommendation:** Repair badly eroded drainage ditch west of Cascade Terrace to limit further damage and reduce sediment intrusion to creek. Repairs would include heavy duty geotextile underlayment and medium rip-rap stabilization.

**Implementation Schedule:** Since the issues in the Vly Creek are somewhat less significant and contained in a smaller area than other watersheds, the Vly Creek is thought to be a good “testing ground” for organizational procedures, education and public participation. Implementation is conceivable by Winter of 2006.

- 1) **Recommendation:** Repair erosion damage at storm drainage pipe discharge at end of Ashtree.  
Repairs would include heavy duty geotextile underlayment and light-to-medium stone filling. Public participation by adults is conceivable.

**Implementation Schedule:** Implementation is conceivable by Winter of 2006.

- 3) **Recommendation:** Replace stone stabilization of Vly Creek culvert east of Ashtree at sewer crossing easement. Use of medium sized stone filling (larger than existing stone) would limit scour observed.

**Implementation Schedule:** Likely performed by Town forces and equipment due to size of stones and remoteness of improvement. Implementation is conceivable by Winter of 2006.

- 4) **Recommendation:** Pick up, collect and properly dispose of floatable and non-floatable debris of significant quantities within the Vly Creek corridor. Effort will likely be a combination of Town and volunteer workers.

**Implementation Schedule:** Implementation is conceivable by Fall of 2006.

## **SHAKER CREEK**

- 1) **Recommendation:** Repair impoundment retaining wall at end of Wilshire Drive. Repair might entail a different approach to the wall instead of gabions.

**Implementation Schedule:** Repair by Town forces and/or Contractor conceivable by Winter of 2009.

- 2) **Recommendation:** Re-define area between parking spaces and water surface adjacent to spillway with plantings and defined pedestrian areas on a stabilized surface.

**Implementation Schedule:** Since the Pond is owned by Albany County the improvements proposed will require discussion with them and thus schedule is unknown at this time.

- 3) **Recommendation:** Ensure construction material stockpiles near Sicker Road are removed and/or stabilized.

**Implementation Schedule:** Completed in 2004.

- 4) **Recommendation:** Repair stream bank erosion on sharp bend of creek just east of Route 7 with grading, sediment removal and vegetative reinforcement. Due to low gradient of stream in this area velocities are such that mitigation by means other than rock stabilization are possible.

**Implementation Schedule:** Private land ownership will require access agreements prior to implementation. Mitigation is conceivable by volunteer forces by Fall of 2010.

- 5) **Recommendation:** Repair metal inlet section of stream culvert at Mill Road and provide a stabilized swale to effectively convey low point road drainage from road surface down embankment to culvert on upstream (inlet) side. Stabilization could be accomplished with pavement, concrete, grouted stone, or articulated block or similar means. Slope is severely steep and a long term solution precludes ungrouted stone or a vegetated approach.

**Implementation Schedule:** Work likely performed as part of maintenance program by Town Highway Department. Mitigation is conceivable by Fall of 2007.

- 6) **Recommendation:** Address stream bank erosion immediately downstream of Mill Road. Stabilization would hopefully benefit native tree and brush root systems that are currently stressed by erosion of soil. Extent of erosion and mitigation required dictates further analysis to determine best method of repair system and type of personnel to accomplish. Observation of stream flow during a significant storm event would benefit this process. Repair by introduction of stabilized vegetation is preferred to maintain a more natural condition, shade for aquatic life and solutions less dependent on large equipment and larger scale disturbances. The scale of the mitigation lends itself to a combined Town and volunteer effort.

**Implementation Schedule:** Dependent on private landowner agreements, access and permitting issues. Mitigation conceivable by Fall of 2009.

- 7) **Recommendation:** Miter cut the inlet end of the Shaker Creek culvert at River Road to increase inlet capacity during flooding events. Proposed cut would begin at concrete support and proceed at a  $45^{\circ}\pm$  degree angle. This would provide some reduction of inlet surcharge levels and minimize over-bank exposure to stormwater. Proposed work would be performed by the Town Highway Department.

**Implementation Schedule:** Mitigation is conceivable by Fall of 2009.

## **DELPHUS KILL**

- 1) Recommendation:** Remove point bar of gravelly sediment deposits 50 feet upstream of Delphus Kill culvert at Pollack Road. Sediment removal would hopefully reduce sediment deposits inside the road culvert. Removal of dead large woody debris in immediate vicinity is also advised.

**Implementation Schedule:** Likely performed by Town Highway Department. Access agreements with land owner will be necessary since deposits are at least partially outside of the road right-of-way. Conceivably accomplished by Fall of 2010.

- 2) Recommendation:** Miter cut inlet end of Pollack Road culvert to limit surcharge levels and over-bank exposure to storm water. This improvement will somewhat buffer the energy loss from the severe stream to culvert skew angle.

**Implementation Schedule:** Mitigation would be performed by Town Highway Department and is conceivably accomplished by Fall of 2007.

- 3) Recommendation:** Mitigate stream bank erosion at toe of slopes near Pollack Road culvert by selective placement of large stone stabilization. Further analysis and timely observation of stream hydraulics during a high flow event are deemed necessary to determine appropriate cost effective approach with minimum disturbances to stream and surrounding areas. Channel realignment is conceivable. Regulatory requirements could be significant.

**Implementation Schedule:** Believed to be accomplishable by Spring of 2010.

## **SMALL TRIBUTARIES TO THE MOHAWK RIVER**

- 1) **Recommendation:** Remove stockpiles of earthen material south of Island View Road or contain them with silt fence material. Clean out sumps of receiving catch basins.

**Implementation Schedule:** Mitigation conceivable by Fall of 2006.

- 2) **Recommendation:** Require improvement of erosion and sediment control of active residential subdivision south of Town Park. Adherence to current state and local requirements are necessary to reduce silt intrusion into adjacent watercourses.

**Implementation Schedule:** Dependent on cooperation levels of Owner and Contractor but should

- 3) **Recommendation:** Improve water quality of runoff from composting pad at Town landfill. Strategies have been proposed involving simple, above grade filtration devices to reduce the total suspended solids (TSS) and thus other inherent contaminants typical to yard waste affected runoff.

**Implementation Schedule:** An individual SPDES permit application has been submitted to

## **CHERRY CREEK**

- 1) Recommendation:** Remove significant quantities of floatable and non-floatable debris from the creek beginning at the drainage ravine west of Central Avenue and to the Town boundary towards Albany. This effort would likely involve Town forces and volunteers. Collected debris should be sorted for recyclables and refuse and taken to the Town Landfill. Debris collection includes residential properties around Shiffendeckers Pond.

**Implementation Schedule:** Contingent on volunteerism and ability to organize. Due to quantity involved, certain areas should be prioritized and accomplished in segments. Completion is conceivable by Fall of 2009.

## **SAND CREEK**

- 1) Recommendation:** Replace exposed and corroded section of culvert pipe on south side of Osborne Road. Supplement heavy stone stabilization as necessary. Remove debris/refuse in immediate area.

**Implementation Schedule:** Debris cleanup in this area is relatively minor and would likely be performed by first group there. Town Highway Department would repair culvert pipe. Mitigation conceivable by Fall of 2008.

- 2) Recommendation:** Repair outlet pipe from major storm water detention basin at Russell Road that has partially collapsed.

**Implementation Schedule:** Extent of repairs or possible replacement may dictate TV inspection of pipeline to open discharge east of east of Russell Road. Repairs are likely accomplished by Fall of 2006.

- 3) Recommendation:** Remove tires, brush cuttings and other debris from stream at discharge end of Russell Road culvert. Ask adjacent property owners to be mindful that the creek is to be no longer used as a landfill.

**Implementation Schedule:** To be performed by Town forces and/or volunteers. Debris to be brought to the Town Landfill. Mitigation is conceivable by Fall of 2006.

- 4) Recommendation:** Re-install water main at Exchange Street. Current installation is through box culvert and is a clogging potential as well as an undesirable sanitary health condition. DPW is aware of situation.

**Implementation Schedule:** Completed summer of 2004.

## **RED CREEK**

- 1) Recommendation: Perform water quality tests within narrow pond northwest of Amboy Drive to determine TSS, DO, oil/grease quantities and various other characteristics. Further study and analysis are considered necessary to determine if there are real issues necessary to mitigate.

**Implementation Schedule:** Complete sampling and analysis by Winter of 2009.

- 2) Recommendation: Remove willow logs, chain link fence and other miscellaneous debris.

**Implementation Schedule:** Mitigation could be completed by Summer of 2006.

- 3) **Recommendation:** Post signs to warn users of ATV's, motorcycles and off road vehicles of illegality of crossing protected streams. Signs could be made by Town forces. Hopefully education of public would curtail these offenses of Town Code, Section 184.

**Implementation Schedule:** Signs could be posted by Summer of 2005.

## **NUCKLOS CREEK**

- 1) **Recommendation:** Continue to monitor sewer trunk main parallel to Van Rensselaer Boulevard for leaks or maintenance needs, particularly the above grade portion carried over the creek on a trestle.

**Implementation Schedule:** Already being performed.

- 2) **Recommendation:** Communicate with Village of Menands concerning the perceived ability of Littles Lake to provide additional storm water attenuation. The Village does experience flooding problems along Broadway.

## **CEMETERY CREEK**

- 1) **Recommendation:** Observe large retention basin behind Town Hall during significant storms to ascertain if there are opportunities for additional storm water attenuation capabilities by revising outlet controls. Significant erosion is occurring downstream of railroad tracks. Further analysis is required to also determine if a sediment forebay to this pond is feasible to capture sediments.

**Implementation Schedule:** Complete observations and analysis by Winter of 2008. This assumes that the significant storms (10 year or 25 year) will occur in the next five years.

- 3) **Recommendation:** Address severe erosion of Cemetery Creek at railroad culvert and points downstream. Appropriate storm water management upstream may reduce stress but severe damage has already been done to streambed and streambanks. Likely solution will encompass the Railroad Company, private landowners, access issues, Town or Contractor forces, regulatory agencies, volunteers and possibly environmental associations. Stabilization of stream would likely include rock and vegetative techniques.

**Implementation Schedule:** Further observations and analysis are required to determine most cost effective and feasible mitigation. Analysis and mitigation determination is conceivable by Winter of 2007.

## **SALT KILL**

- 1) **Recommendation:** Install additional storm drainage culvert at Johnson Road to reduce flooding of properties prone to localized inundation. Most severely impacted property was constructed immediately adjacent to Salt Kill tributary which would not be allowed, and rightly so, under the current Town watercourse protection policy.

**Implementation Schedule:** Completed in Summer of 2004.

- 2) **Recommendation:** Require significant detention requirements for new development north of Columbia Street Extension. Although storm drainage system components on the Salt Kill itself currently perform adequately the increase of peak flows from future development may become problematic in the Town and City of Cohoes.

**Implementation Schedule:** Essentially a policy change to incorporate into development scenarios in this upstream part of the watershed and accomplishable by Summer of 2005.

## **KROMMA KILL**

- 1) Recommendation:** Ensure Siena College follows through with meaningful detention at Maloy Road detention basins on Northeast side of campus. Peak flows in Kromma Kill have created significant erosive forces and creation of sediments and sediment deposition near Broadway.

**Implementation Schedule:** Dependent on schedule of college but hopefully will be performed by Summer of 2006.

- 2) Recommendation:** Remove litter and miscellaneous debris upstream of golf course. Hopefully volunteer college students might be recruited to clean up floatable and non-floatable debris.

**Implementation Schedule:** Effort involves coordination with College officials and recruiting volunteers. Effort is probably best managed and performed by student and/or campus forces.

- 3) Recommendation:** Raise dam at Schuyler Meadows Golf Club irrigation pond and revise outlet controls to provide additional storm water attenuation. Proposal has been presented to club hierarchy but has apparently stalled.

**Implementation Schedule:** Unknown.

- 4) Recommendation:** Improve sediment capture and dramatically reduce exposure of storm water drainage system and drainage courses to silt laden runoff at the East Hills Subdivision. Clean out system of catch basins, pipes and detention basins before proceeding with additional phased residential construction.

**Implementation Schedule:** Necessity demands action by Summer of 2005.

- 5) Recommendation:** Frequently inspect existing culvert inlets at Grenada Terrace and trash rack at railroad for debris accumulations. Remove debris to ensure inlet capacity. Inspect after each event equivalent to 1" of rainfall in 24 hours or two months, whichever occurs first.

**Implementation Schedule:** Currently occurring at regular intervals. Maintenance activities utilize newly constructed access road.

## **KROMMA KILL**

- 6) **Recommendation:** Clean out significant quantity of sediments in the Kromma Kill upstream and downstream of Broadway. NYSDOT culverts are substantially blocked, which they have been made aware of. NYSDOT indicated that preliminary analysis of sediments indicated detectable contaminants and have delayed culvert and channel cleaning. Town officials continue to inquire about status to NYSDOT.

**Implementation Schedule:** NYSDOT has appropriately taken the lead on this task but has yet to proceed. Mitigation schedule is unknown.

- 7) **Recommendation:** Remove miscellaneous floatable and non-floatable debris along banks of Kromma Kill. Due to potential of contaminated sediments in creek, removals by volunteers, should be limited to non-contaminated overbank areas.

**Implementation Schedule:** Sheer volume dictates doing it in sections and is potentially achievable by Fall of 2011.

## **GAS HOUSE CREEK**

- 1) Recommendation:** Continue to stay involved with Dam owner at Beverwyck Lake to ensure an opportunity to provide additional storm water attenuation is realized. This is particularly important since this watershed is tributary to the Mannsville neighborhood which has experienced severe flooding. Improvement of attenuation capabilities is also crucial since land north and west of the lake is in the planning stages for residential development. The Town is contemplating taking over ownership and maintenance of the Dam.

**Implementation Schedule:** This Dam requires repair and its owner has applied for Dam safety permits to NYSDEC. The Town is currently involved already via its watercourse protection permitting process and review of a proposed apartment complex at the north end of the lake.

- 2) Recommendation:** Pursue storm water diversion at Watervliet Arsenal proposed in previous report entitled “Flooding Issues and Storm Water Analysis for the Mannsville Area of Colonie” dated May 2001. This will redirect a modest amount of flow to the Kromma Kill instead of conveyance through Mannsville and the City of Watervliet’s Gas House Creek conduit.

**Implementation:** Likely performed by an outside contractor after agreement with Arsenal is finalized . Schedule is not known at this time but hopefully achievable by Fall of 2010.

- 3) Recommendation:** Continue discussions with City of Watervliet to connect an additional storm drainage pipe out of Mannsville along Tenth Avenue to the City’s Gas House Creek conduit.

**Implementation Schedule:** The capacity of the City system has its limits and is a sensitive issue. It is hoped that completion of the previous two recommendations will help the Town and City come to an agreement to allow a new connection to the Gas House conduit. This may occur by the Fall of 2009.

## GENERAL RECOMMENDATIONS

### Educational Programs

- 1) Review available information and discuss attributes of existing programs of communities in New York and other states. Data within Appendix F provides leads and websites to various State and EPA websites where additional information regarding implementation are available. NYSDEC will likely provide assistance if requested. Grants and funding assistance, although limited, are reputedly available.
  
- 2) Prioritize target groups to educate. Although all Town residents should have information available via the Town website and Town newsletter, the persons most able to shape policy, monitor progress, and program implementation are likely the following:
  - 1) Town personnel including Highway, Engineering, Public Works, Attorney, Parks and Recreation, Environmental Services, Pure Waters, Water and Planning and Economic Development. Persons from these departments are often the first to interface with the public to solve problems and are among the first group of people to appreciate the issues and history involved.
  
  - 2) Existing committee's and boards that deal with Town environmental issues including, but not limited to, Town Board, Planning Board, Significant Environmental Areas Management Appeals Board (SEAMAB) and the Conservation Advisory Council (CAC).
  
  - 3) Volunteers who have previously assisted in cleanup efforts along Town highways and parks should be asked to participate again. Unfortunately, volunteerism is typically not highly contagious and a familiar small percentage of the public chooses to become involved.
  
  - 4) Neighborhood Associations are also organizations to reach out to, particularly since they may be contained in the various individual watersheds delineated herein. These associations already have working relationships, common bonds and interests and, hopefully, a history of

accomplishing goals.

- 5) Children and young adults are often a community asset and can earn volunteer credits that can assist in their future applications to college and/or careers. Schools and youth organizations provide “captive” audiences and often a high degree of involvement, particularly with issues that relate to their future roles as stewards of the environment. Adult participation is often increased in households where children are involved in worthy causes of watershed cleanup and protection.

The Town should consider utilization of organizations such as the Center for Watershed Protection ([www.cwp.org](http://www.cwp.org)), American Public Works Association([www.apwa.net/education /](http://www.apwa.net/education/)), Hudson Basin Riverwatch , Audubon Society of New York ([www.audubonintl.org](http://www.audubonintl.org)), Environmental Clearinghouse of Schenectady ([www.members.global.2000.net/~ecos/home.html](http://www.members.global.2000.net/~ecos/home.html)) and Scenic Hudson, Inc. ([www.scenichudson.org](http://www.scenichudson.org)) for advice, educational programs, volunteer assistance and monitoring. Local streams in Coeymans and Schenectady have already had monitoring and cleanup activities initiated utilizing groups like these.

A discussion of safety procedures should be included in the education program pertaining to refuse/recyclable removals and avoidance of dangerous materials that could be encountered. Again some of the existing groups and alliances have a wealth of experiences to share to ensure involved personnel work safely and obtain satisfaction through their efforts.

### **Storm Water Management Policy**

The following revisions should be considered for the various operational policies utilized by their respective departments to limit the impacts of runoff to protected streams and water quality.

#### **2) Standard Specifications for Water Distribution Systems:**

Under Section 11E Disinfection, add language to encourage use of directing hydrant flushing flows through de-chlorination devices (netted bag of Sodium Thiosulphate tablets or equivalent) to reduce chlorine content and/or directing discharge to vegetated area at least 200 feet away from catch basins, culverts, flowing ditches and water courses or protected streams. The quantity of tablets

and location in the discharge of flow and the flow rate dictate whether the dose is appropriate or excessive. The existing goal of a chlorine residual less than 0.05 milligrams per liter at the point of discharge is

appropriate. Flushing mains that have been super-chlorinated such as new main installations or water main breaks, dictate higher de-chlorination doses and greater consideration of where to direct the discharge. Discharge concentrations of chlorine or de-chlorination agents may have detrimental effects on vegetation and aquatic life.

The new language discussed above is consistent with existing policy but attempts to clarify how it is accomplished. Similar language could be stated in the Town's subdivision regulations.

### 3) **Standard Format for Storm Water Management Plans and Reports**

Materials to be submitted: Consider adding the following to the respective sections:

Section II:

- 1.) g - Photographic log of pre-development existing drainage features including significant culverts, ditches, drainage courses, streams and storm water management facilities. These components should include those features on the property to be developed and those offsite in the vicinity. Our definition of vicinity would include all sources of tributary drainage onto the site from lands upstream (run-on) and features downstream of project within 1,000 feet of property or the nearest publically owned storm culvert, whichever is the greater length. Include enough photographs, preferably digital, to accurately depict streambed, streambanks, vegetation, sediment deposition, extent of erosion and conditions of downstream storm water facilities due to be impacted by the proposed action. Significant upstream drainage features include those that convey more than 1 CFS during the 5 year storm.
  
- 1.) h - Copy of NYSDEC or other regulatory Notice of Intent and permits associated with storm water management, wetlands, mining and grading including permit conditions. Include Storm

Water Pollution Prevention Plans to document means of protecting watercourses from manmade impacts.

- 2.) f - Statements or table(s) quantifying increase of storm water runoff volume attributable to proposed action for the 10 year, 25 year, 50 year and 100 year storm events in a 24 hour period. Volume still remaining in detention or retention basins after 24 hours need not be included.
- 3.) e - Surcharge elevation due to pipe entry condition for the 10 and 25 year storm of any culverts at run-on, discharge and other points significantly affected by tailwater conditions. Tailwater conditions, where applicable, should be considered.
- 4.) f - Statements indicating anticipated maintenance requirements of storm water management facilities including sediment removals from basins, inlet/orifice clogging potential, BMP's, sump/sediment basin cleaning, silt fence cleaning/replacement ... etc. Include a narrative describing BMP's selected and duration expected to be maintained that considers the infrastructure installation, surface restoration, erosion controls, grading, road construction, building and closeout phases of the project. Discussion should also include the impacts of multi-phases and measures to protect previously installed storm water features on and off the site. Project sponsors should coordinate appropriate measures during construction with power, gas and telephone installation to ensure SWPPP goals are maintained.
- 5.) Include discussion of drainage system weaknesses or known flooding potential of downstream features within specified limits. Reference should be made to Town maps of historical flooding and Town correspondence of troublesome areas known to exist. Town personnel should notify development sponsors and owners of known problem areas early on in process and verify applicable detention requirements, particularly where elevated requirements such as the Lisha Kill, Shaker Creek, Dry River, Salt Kill and Gas

House Creek are either currently mandated or recommended to herein. Include copies of all storm water related correspondence from involved agencies in the report.

### **Pre-Construction Meeting**

Include a thorough discussion of the storm water management plans SWPPP, sensitive watershed conditions, photographic log, degree of existing downstream sedimentation (and not to increase as a result of proposed action), enforcement and penalties for failure to comply and possible mitigation of protected watercourse impacts of significance. The essential message to get across is that a thorough SWPPP appropriately executed takes time and effort but is vastly less expensive than non-compliance. Compliance will require coordination with Town personnel, consultant construction observers, contractors, utility companies and project owners to ensure water quality objectives are met.

### **Town Code**

NYSDEC still retains its role as New York State's regulatory oversight on issues of State Environmental Law, permitting, coordination with other State, Federal and Local agencies and enforcement. The MS4 and construction activity permit and NYSDEC's Phase I and II programs increases the responsibilities of the municipalities in New York similar to the other States, Tribes and Territories in the USA. The local entity becomes the first layer of enforcement but not the only one. The Town fulfills these roles currently but may have to adjust the Town code language to reference more significant enforcement actions, penalties and procedures for non-compliant activities. Review of legal issues goes without saying. The Town planners and building inspectors will likely have more active roles regarding construction activities and SWPPP implementation.

The grading law has been through an initial revision to reflect runoff and restoration requirements to assist stormwater permit compliance.

### **Town Owned Properties**

The core of an appropriate and thorough SWPPP is to use good housekeeping

practices for the operations and occupancy on properties owned by the Town. The Town is to be commended on the cleanliness, storage techniques and storm water management practices already accomplished on a day-to-day basis. The Town of Colonie uses a street sweeper on every single street each year. Typically performed after winter melt, this removes salts, grits, sediments, sands and similar particles that contain oil, fuel, coolant byproducts and other contaminants that attach themselves by physical and chemical processes. The Town has employed the Compuspread system of computer sensed salt application to ensure effective salt application using the least amount necessary. Chemicals are stored appropriately and effectively managed. The Town participates in regional emergency response units and utilizes pre-ordained chain of command(s) for situations such as spills, hazardous wastes, fires and similar incidents.

No municipality can expect to achieve perfection and improvements will likely be realized as Town personnel utilize additional BMP's. The Town properties that have storm water issues that could be improved are as follows:

- 1) The composting pad at the Town landfill unavoidably results in storm water contact with composted mulch made from yard waste. These facilities involve large areas utilizing large equipment. Sheer size and ventilation requirements preclude building a roof over the operation. The Town is currently in the permitting process for an individual SPDES permit whereby pile orientation and surface filtration devices are proposed to improve compost influenced runoff. Implementation will follow the permitting process.
- 4) The former Town Highway Garage on Watervliet-Shaker Road has stockpiles of recycled pavement products and soils reclaimed from highway operations. Runoff quality could be improved by encircling these stockpiles with sediment filter devices. Materials should be stockpiled at high point of yard and avoid low points such as the pile at concrete bunker where long term exposure to water occurs.
- 5) Stockpiles of recycled pavement products, soils and aggregates north of the Highway Garage should be encircled with silt fencing/sediment barriers. Silt fencing is thought to be preferable since it is easier to reposition than hay bales to

allow adding or removing products from piles. These stockpiles are actively used. Nearby tributaries to the Shaker Creek would benefit by receiving lower levels of sediments. Although some reuse of street sweeper fines is conceivable in low surface or groundwater exposure conditions, most or all swept fines should be considered for disposal at the landfill. These fines could supplement other soil and applied film products used for covering refuse each day. These overlays help keep birds and other vectors away from refuse.

## **Flood Control**

Analyze opportunities for large scale storm water attenuation in the Lisha Kill (Morris Road Dam), Gas House Creek (Beverwyck Lake), Cemetery Creek (Town Hall basin and or Route 9 at Springwood Manor Drive), Kromma Kill (Siena and Schuyler Meadows) and the Salt Kill (Columbia Street Extension). Detention at Littles Lake in the Nucklos Creek watershed may interest the Village of Menands.

## **IX. CONCLUSIONS**

The NPDES Phase II permitting process regulated by NYSDEC attempts to improve water quality in waters of New York State by addressing non-point pollution contained in storm water runoff. Of the six minimum BMP's discussed in section IV the first two are targeted to include the public. This is very appropriate since many of the sources of storm water pollution are directly or indirectly related to the public. The education of community residents and businesses through various forums will increase the opportunities to eliminate or reduce sources of pollution and how to improve surface water quality. Many of the successful storm water programs in other states have focused on a watershed-by-watershed approach that maximizes community participation and "common sense" approaches that often employ low technology or simplistic actions to reduce pollution at the source.

Essentially all of the six required BMP's for MS4's involve having adequate storm water policies and a hierarchy to educate, plan, monitor and provide enforcement for land use, land development and municipal activities. The effectiveness of this program will be difficult for New York State to measure over the five year permit period and even beyond. Different municipalities and different owners involving construction activities will apply a varied range of effort and importance towards the NYSDEC's goals of improved water quality. The focus of educating the public is the appropriate beginning towards reaching the State's goals.

To eliminate all forms of storm water pollution and keep it that way is impossible and likely always will be. Even with stiff penalties now enforceable, individuals and various entities knowingly pollute because it saves them money or they lack the ambition to do what is right. If many of the attitudes of polluters who litter, change their oil over a catch basin, dump yard waste into a stream or condone poor business practices related to water quality can be changed it would represent a significant achievement and result in water quality improvements.

It is difficult to predict what measurable goals are obtainable in the initial permitting period of 5 years due to numerous factors. The level of cooperation of the public to participate in the educational programs and become involved in the program are unknown at this time. The Town of Colonie is quite progressive and has had successes with volunteer organizations with highway and park cleanups. Essentially, the Town of

Colonie will implement the six minimum BMP's and other related tasks pertinent to their storm water system in the five year permit period and beyond.

It would seem that New York State will also have to address storm water issues themselves to achieve meaningful improvements of water quality. The author suggests the following two subject areas that the state should consider:

- 1) Significantly increase the typical limit of 100 feet of stream disturbance in the Memorandum Of Understanding (MOU) that NYSDEC has with municipalities. As it exists now, extensive permitting requirements and time are required to mitigate detrimental stream conditions that total over 100 feet. Since the MS4 permit affirms mitigation procedures that will follow state guidelines such as the NYS Storm Water Management Design Manual and also increases the local responsibilities it would seem important to reduce restrictions to affect more timely mitigation scenarios.
  
- 2) Implement more storm water infiltration and detention facilities associated with new and existing NYSDOT highway infrastructure. Current design strategies tend to size culverts to carry the flows from intense storms and convey them quickly downstream, often with consequences. Inlet control and use of strategic storage could help control local flooding and limit erosive stresses on stream corridors. The Town of Colonie storm water drainage system conveys runoff from portions of I-87, I-90, 787, Route 9 and other state highways. These major highways incorporate many lane-miles of impervious surfaces, similar to other municipalities, making NYSDOT an integral part of the goal to improve water quality and reduce flooding.

**APPENDIX A**

**HUDSON RIVER AND MOHAWK RIVER WATERSHED MAP**

**APPENDIX B**

**TOWN OF COLONIE WATERSHED/STREAM MAP**

**APPENDIX C**

**TOPOGRAPHIC MAP OF TOWN OF COLONIE**

**APPENDIX D**

**AREAS OF HISTORICAL FLOODING MAP**

**APPENDIX E**

**PERMEABLE SOIL AREAS TO CONSIDER  
STORM WATER INFILTRATION**

**APPENDIX F**

**EXCERPTS FROM NYSDEC, NYSDOT, ARMY CORPS OF ENGINEERS,  
EPA AND MISCELLANEOUS DOCUMENTS**

**APPENDIX G**

**NYSDEC SPDES GENERAL PERMITS AND NOIs**

**APPENDIX H**

**TOWN OF COLONIE PROTECTED WATERCOURSE AREA MAP**

**APPENDIX I**

**EXCERPTS FROM TOWN STORM WATER POLICIES,  
REGULATIONS AND CODES**

**APPENDIX J**

**PHOTOGRAPHIC LOG**

**APPENDIX K**

**STREAM WATERSHED AND STORM SEWER SYSTEM MAPS**