## COVER SHEET

| | |
|---|---|
| Title: | Final Generic Environmental Impact Statement on the Manor Kill Watershed in the Towns of Conesville and Gilboa, Schoharie County, NY |
| Lead Agency: | Town of Conesville Town Board<br>Town of Conesville Town Hall<br>1306 State Route 990V<br>Gilboa, NY 12076 |
| Project Location: | All lands included in the Town of Conesville and that portion of land in the Town of Gilboa located within the Manor Kill Watershed. |
| Prepared by: | Community Planning & Environmental Associates, Berne, NY in collaboration with Sterling Environmental Engineers, PC, Latham, NY, Schoharie County Planning & Development Agency, Cobleskill, NY, and the Schoharie County Soil and Water Conservation District, Cobleskill, NY |
| Lead Agency Contact:<br>DGEIS Preparer Contact: | Supervisor Mike Brandow, Town Hall: 607-588-7211<br>Nan Stolzenburg, AICP<br>CP & EA<br>152 Stolzenburg Road<br>Berne, NY 12023<br>518-872-9753 |
| Comment Period: | September 25, 2009 to November 11, 2009 |
| Acceptance Date: | September 9, 2009 |

A public hearing will be held on October 14, 2009 to receive comments on this DGEIS. Written comments will be received by the Lead Agency until the end of business day, November 11, 2009.

# TABLE OF CONTENTS

**List of Maps**



**List of Figures**



**List of Tables**

## EXECUTIVE SUMMARY

The Town of Conesville was awarded funding from the Catskill Watershed Corporation's Schoharie Watershed Impact Statement Program to assess the impact of future development on water quality in the Manor Kill Watershed. This GEIS covers the entire Manor Kill Watershed including the Town of Conesville and a part of the Town of Gilboa. This GEIS evaluates the potential environmental impacts of the following actions:

A. Activities Evaluated in GEIS.

Chapter 1 provides detailed information on environmental resources of the Manor Kill Watershed. It includes detailed descriptions on topography, slope, soils, surface waters, ground water, geology, wildlife, land cover, land uses, and land use planning and regulatory frameworks within the watershed. This chapter provides background information as to why the resource is important or relevant to water quality as well as the specific character or status of that resource in the Manor Kill. It provides the background information upon which a Lead Agency can understand current conditions and evaluate what changes might occur as a result of a future action.

The following activities are feasible land uses that do, or could occur, in the foreseeable future in the Manor Kill Watershed:

- Cell Towers
- One Lot Single Family New residential development of 1 to 4 units
- Major subdivisions of 5 or more units
- Commercial, non-residential or intensive outdoor recreational Use
- Removal of Vegetation > 1 acre
- Removal of vegetation < 1 acre
- Roads: widening, new sections, paving gravel, changes to culverts
- Grading
- Building in 100-year Floodplain
- Construction on slopes >20%
- Construction on slopes 10-20%
- Construction on exposed bedrock or shallow soils
- Storage of petroleum or other chemicals
- Wind Turbine
- Mine Construction or Expansion
- Forest Harvesting

B. Resources Potentially Affected.

The following were identified as significant issues facing or potentially facing the Manor Kill Watershed:

1. Groundwater : Risk of water contamination, modification of water quantity

2. Streams, lakes, ponds: Risk of water contamination, increased sediments, loss of wildlife habitats, loss of recreation

3. Wetlands: Loss of flood control, decrease in water quality and quantity, loss of open space and wildlife habitats

4. Floodplains: Decreased capacity to hold water, increased flow velocities, increased flood waters, decreased safety, increased erosion and sedimentation

5. Stream-Side Vegetation and Soils: Increased stream water temperature, increased erosion and turbidity, loss of wildlife habitats
6. Agriculture and Prime Soils: Loss of open space, loss of wildlife habitats, loss of community character, loss of local food and economy

7. Wildlife: Loss of biodiversity, loss of recreation

8. Forests: Loss of wildlife habitats, fragmentation of forest, loss of forestry opportunities, loss of recreation, loss of community character

9. Road & Street Conditions/Traffic: Increased erosion and sedimentation, change in community character, increased impervious surfaces

10. Public Water Supply: Decreased drinking water quantity

11. Public Water Quality: Decreased drinking water quality

Table 18 provides a detailed matrix summarizing the potential impacts of each activity on each resource. Table 19 provides a detailed matrix summarizing the potential magnitude, duration, extent and likelihood of these impacts.

C. Mitigations to Address Negative Impacts.

A variety of mitigation measures are proposed including:

1. Preserve undisturbed areas
2. Preserve existing buffers or create new setbacks for disturbed areas
3. Reduce clearing and grading and
    - Establish limits of disturbance for all development activities
    - Use site foot-printing to minimize clearing and land disturbance
    - Limit site massive grading approaches.
    - Use alternative site designs that use open-space or conservation subdivision layouts for large developments.
4. Locate sites in less sensitive areas
5. Reduce roadway and driveway lengths and maintain with pervious surfaces
6. Reduce building foot-print size or other impervious surfaces
7. Reduce parking lot size and maintain with pervious surfaces
8. Use Low Impact Design Stormwater Control Practices
9. Maintain Forested riparian buffers
10. Preserve prime agricultural soils and active farmlands
11. Preserve Forested and Open Wildlife Habitats
12. Use Best Management Forestry Practices
13. Evaluate Groundwater Needs and Impacts Prior to Project Approval
14. Effectively Use SEQRA such as by adopting a local Type I list of actions that could have significant negative impacts on the environment (See Criteria and Thresholds Chapter), designate certain areas as a Critical Environmental Area
15. Inventory and mitigate visual impacts
16. Evaluate traffic impacts
17. Remediate Septic System Impacts

D. Alternatives.

The GEIS considered a “no action” alternative and analyzed the future buildout of the watershed based on current land use regulatory conditions (See Section 2.1). The full buildout would be the consequence of no action taken by the towns or any other regulatory agency to change the development potential within the watershed. The Buildout estimates the number, and general location of new residents under this “no action” alternative. Further, the N-SPECT erosion modeling evaluated the consequences of the no action alternative by determining the erosion potential that would result (See Section 2.2).

Chapter 4 outlines a variety of mitigations that could be implemented to reduce environmental impacts to water quality in the watershed. Each of these recommended mitigations represents another alternative to be considered by the towns of Conesville and Gilboa. Each mitigation was considered individually (See Chapter 4). The full application of all the mitigations was not analyzed specifically as there would be too many permutations to compare. Each mitigation technique is focused on avoiding a particular negative impact or set of negative impacts.

3. Matters to be Decided.

Chapter 6 of this GEIS outlines specific thresholds and criteria to be used for future environmental evaluation and decision making. Local officials responsible for reviewing a future action (Lead Agency) should use Table 18 to determine an action’s potential negative environmental impact and Table 19 to determine the significance of that impact. This GEIS outlines specific thresholds that if exceeded, should prompt an additional evaluation of the action via use of a Full Environmental Impact Statement or a Supplemental GEIS. Upon determining that a potential negative impact of an action, the Lead Agency should use Chapter 4 to identify appropriate mitigation measures.

## DESCRIPTION OF PROPOSED ACTION(S), PURPOSE, PUBLIC NEED AND BENEFITS

The Town of Conesville was awarded funding from the Catskill Watershed Corporation's Schoharie Watershed Impact Statement Program. This grant project funded development of a Generic Environmental Impact Statement (GEIS) to assess the impact of future development on water quality in the Manor Kill Watershed. New York City DEP, Greene County Soil and Water Conservation District, the Schoharie County Planning Department and the Schoharie County Soil and Water Conservation District initiated work together to complete a Manor Kill Stream Management Plan. The two projects were designed to complement each other and provide Conesville with a comprehensive assessment of both the stream corridor and the entire Manor Kill Watershed.

In 2007, the Town of Conesville adopted a comprehensive plan as per NYS Town Law 272-a, that established six long-term community goals ranging from promoting orderly growth to protecting the character and function of town roads. Among the six goals are three that specifically relate to the Manor Kill Watershed. These are:

- Make the Town secure from the dangers of flooding, fire and other dangers.
- Protect surface and groundwater quality, maintain high quality physical environments and preserve wildlife habitats through effective design.
- Provide for those agricultural, forestry, tourism, and similar businesses with potential to improve local incomes and preserve working landscapes.

The Comprehensive Plan outlines a variety of strategies and tools to help the Town attain these goals. This plan establishes the public need to protect the Town and its residents from flooding, protect surface and ground water resources, environmental features, and working landscapes – all of which have direct relationships to the Manor Kill and its watershed. This GEIS provides the Town with a comprehensive evaluation of the Watershed and offers specific tools such as maps, evaluation of potential impacts to these resources, and actions that the Town and private individuals can take to mitigate negative impacts.

A GEIS is a type of environmental impact statement (EIS) that is more general than a site-specific EIS. It is a written document that provides a way for governments, agencies, and the public to systematically consider significant adverse environmental impacts of projects, actions, or future scenarios, and details alternatives and mitigation to prevent such impacts. A GEIS is often used to consider broad-based actions or related groups of actions that may occur in the future. The broader focus of a GEIS also helps in the identification and analysis of the potential cumulative impacts on an area. In this case the GEIS is being prepared to examine long term impacts of changes and trends facing the Manor Kill Watershed on water quality and the environment.

A GEIS should not be confused with the Town of Conesville or Gilboa's comprehensive plans. Although some components of the two are similar, the comprehensive plan is a legally adopted document that sets policy for the municipality. This GEIS, on the other hand, evaluates and describes the watershed's environmental setting, its current and potential land uses, potential environmental impacts that could occur in the future, and offers a set of mitigation measures that could be taken to avoid those impacts.

Based on public scoping (April 2008), other public meetings, and discussions with the Town Board, the following topics related to the Manor Kill Watershed were identified as having significant concern to the community. These topics are analyzed and discussed in this GEIS.

1. Loss of wildlife habitats.
2. Loss of recreational opportunities.
3. Increase in flooding, and flooding severity. Changes in stream channels, and associated scouring/deposits.
4. Loss of land due to flooding/scouring. Stream banks instable.
5. Loss of farm fields due to flooding and deposition of debris and stream material.
6. Change in water depth.
7. Change in land use from much more open to wooded/shrub as farms have gone out of business.
8. Road maintenance; culvert and ditches not maintained, cleaned or sized correctly.
9. Wind development.
10. Turbidity and erosion.
11. New York City Land Purchases and Easements.
12. Identification of new or expanded hamlet areas (as per NYC DEP)

The questions posed below more clearly define the significant aspects analyzed in this GEIS:

1. What are the current environmental conditions in the watershed, what are vulnerable resources, and how might they be changed or influenced by future actions and activities?

2. What are the current economic, demographic, housing, infrastructure, and land use conditions, what trends are likely to occur, and how might these changes impact the water quality and the environment.

# 1.0 ENVIRONMENTAL SETTING

**Purpose of Section:** The purpose of this section is to understand the resources, land uses, influences, and character of the Manor Kill Watershed and to have data that can help identify sensitive or stressed resources as well as trends or issues in the watershed that may affect the environment. This section is an inventory and offers short summary descriptions of the environmental resources, infrastructure, and land uses in the watershed.

## 1.1 DESCRIPTION OF THE MANOR KILL CREEK AND WATERSHED.

The Manor Kill Watershed encompasses about 34 square miles of land in the Towns of Conesville and Gilboa, located in the south-eastern corner of Schoharie County. The Towns border Delaware, Greene and Albany Counties and the Schoharie County towns of Blenheim, Broome, Fulton, and Jefferson (See Roads and Property Boundaries Map). The Manor Kill Stream Management Plan (SMP) was designed as a comprehensive review of stream characteristics, data and maps. The reader is referred to that document (Appendix 6.5) for more specific details.

The Manor Kill drains approximately 34.4 square miles in the Town of Conesville[1.] The main stem of the Creek begins upstream of the Schoharie Reservoir in the town of Conesville and flows west, entering the Schoharie reservoir near County Route 990V. Through its path, the Manor Kill drains approximately 92% of the Town of Conesville and a small part of Gilboa. Traveling from north to south, the Bear Kill (total drainage area is 6.15 $m^2$) is a large tributary that drains into the Manor Kill (Total drainage 34.4 $m^2$). The Manor Kill flows east to west for approximately 8 miles before exiting into the Schoharie reservoir where the Schoharie Creek turns north on its path to the Mohawk River. The Manor Kill and NYS Route 990V (which becomes Potter Hollow Mtn Rd) parallel each other through the Town of Conesville. Route 990V is a primary route through this rural section of Schoharie County.

Regional Setting

The Manor Kill is part of the Schoharie Basin, which encompasses 316 square miles, and receives waters from other creeks such as the Batavia Kill, West Kill and East Kill. The entire

1 Text adapted from the Manor Kill Management Plan.

Schoharie Basin (above the reservoir) also includes the towns of Windham, Ashland, Jewett, Hunter, Prattsville, Roxbury and Lexington. Approximately 75% of the Schoharie Basin is located within the Catskill Park. The entire Schoharie basin (including reservoir) contains approximately 706 miles of stream.

A dominant characteristic of the Manor Kill watershed's regional setting is its location within the 2,000 square-mile New York City Watershed. The NYC Watershed is the largest unfiltered water supply in the U.S., providing 1.4 billion gallons of clean drinking water each day to over nine million residents in New York City and some smaller municipalities (nearly half the population of New York State) (Catskill Center2, 2006).

### 1.1.1. TOPOGRAPHY AND SLOPE

| | |
|---|---|
| Map Reference: | Topography<br>Steep Slopes |
| Why This is Important: | Topography and slopes highly influence locations and quantities of water runoff. Soils on steep slopes can be highly erodible. Land uses can alter both topography and slope which can lead to erosion and increased turbidity in the stream. Building on steep slopes poses many difficult problems that make construction economically unfeasible and environmentally unacceptable. Steep slope construction can lead to erosion and sedimentation which degrades streams and lakes. Slopes greater than 20% are very constrained. Slopes between 15% and 20% are less constrained but still pose difficulties for land uses. |

In the Watershed: Elevations in the Manor Kill watershed of the watershed vary from a high of approximately 3,432 feet above sea level at Huntersfield Mountain in the southwest corner of the watershed, to a low point of 1,140 feet above sea level at the Schoharie reservoir. The average elevation of the watershed is approximately 1,808 feet above sea level. The Manor Kill starts as a forested wetland dropping approximately 160 feet in its first mile, but then reducing in slope to an average of 70 feet/mile to its approximate midway point. From this midway point to the reservoir, the stream slope drops approximately 45 feet/mile. The more notable high peaks (> 2,500') that form the Manor Kill watershed are High Knob and Steenburg Mountain in the northeast and Ashland Pinnacle, Richmond and Huntersfield Mountains (>3,000') running along the southern boundary of the town.

A substantial portion of the land in the Manor Kill Watershed is limited by steep slopes. About 38% of the watershed area or 8,300 acres have slopes greater than 15%.

### 1.1.2 SOIL SUITABILITY FOR SEPTIC SYSTEMS

| | |
|---|---|
| Map Reference: | Soils: Limitations for Septic Systems.<br>Soils: Shallow Depth to Water Table<br>Soils: Erodibility Factor<br>Soils: Ponding Frequency<br>Soils: Flooding Frequency<br>Soils: Drainage Class<br>Soils: Hydric |
| Why This is Important: | Soils influence the kind of vegetation that grows in an area, water runoff, water quality and quantity, land uses, and wildlife habitats. Soils also dictate the location and design of on-site septic systems. Some soils are very limited for certain land uses such as building or septic systems. Other soils are highly erodible and contribute to the turbidity in the Manor Kill Stream. Soils are important to examine to understand land use limitations and potential negative environmental impacts in the watershed. Soils not considered amenable for placement of a standard septic system can place severe limitations on the location and affordability for development within the watershed. |

Consider This: The performance of on-site wastewater treatment systems (septic systems) is dependent on the type of soils in which the septic tank absorption field is located. A typical on-site wastewater treatment system consists of a septic tank followed by an absorption or leach field. The septic tank provides primary treatment by equalizing flow and removing solids through sedimentation. The absorption or leach field typically consists of a system of perforated pipes imbedded in sand or natural soils. The wastewater is evenly distributed within the leach field where it seeps into the soil. A bacterial film develops in the soil that absorbs the waste materials and nutrients. The waste materials are converted to energy and bacterial mass. Some nutrients are also absorbed into this mass. Oxygen in the pores of the soil helps to aerate the wastewater, and aids in the biological breakdown of the wastewater constituents. In a properly designed and constructed absorption or leach field system, the waste contaminants are removed by the time the wastewater infiltrates below the treatment zone and enters the groundwater. There are some nutrients, such as phosphorus, that are not completely removed by the treatment process.

To ensure that on-site wastewater treatment systems will operate properly, a range of conditions must be present in the soil. If the permeability of the soil is too high, the wastewater will infiltrate through the soil too quickly for adequate treatment to take place,

potentially contaminating the groundwater. If the soil permeability is too low, the water will not enter the soil fast enough. The under-treated wastewater could emerge at the ground surface where it potentially creates an exposure risk to people and animals, or it could migrate and contaminate surface water. Also, since a saturated condition can result, all of the soil pore space becomes filled with water. This prevents air or oxygen from being available to the bacteria, and odor problems can occur.

In soils where the groundwater is characteristically high, the wastewater may enter the groundwater before it is fully treated, causing pollutant migration and possible contamination of drinking water supplies. High groundwater may also prevent the optimal air concentration from entering the treatment zone, which will slow treatment or prevent adequate infiltration. Similarly, if the soil layer is thin and over shallow bedrock the wastewater may enter the groundwater before it is fully treated.

The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, has surveyed the soils in Schoharie County. It is a web-based survey dated 2007 that evaluates soil types for a range of purposes, including suitability of the soils for use in septic tank absorption fields. The NRCS rates the suitability of each soil type as presented below with the note that the ratings are not to be used as a substitute for actual testing. The permeability of the soil in a particular location can vary substantially from that expected from the rating.

Based on the NRCS rating system, somewhat limited indicates that the soil has some of the above features to an extent that makes it only moderately favorable for use as an absorption field. These limitations can sometimes be overcome or minimized by special planning, design, and installation. Nevertheless, only fair performance should be expected. Soils rated as very limited indicate the presence of one or more of the above features to an extent that makes the soil unsuitable for use as an absorption field. These limitations generally cannot be overcome without expensive installations and soil reclamation. Systems constructed in these soils can be expected to have poor performance and high maintenance.

In the Watershed: The NRCS soil survey reported 48 different soil classifications within the watershed (see Soils: Limitations for Septic Systems map). Of these, 27 soil types were listed as very limited, 19 were listed as somewhat limited, and 2 were not rated.

Results of Categorization of Soils

**Table 1: Areas of Soils in Watershed Suitable for Septic System Absorption Fields**

| NRCS Soil Suitability Rating | Percent of Total Watershed |
|---|---|
| Not Limited | 0 |
| Somewhat Limited | 15.4 |

| NRCS Soil Suitability Rating | Percent of Total Watershed |
|---|---|
| Very Limited | 84.4 |
| Not Rated | 0.2 |

As presented in the table above and depicted in the Soils: Limitations for Septic Systems Map, more than half of the area of soil within the Watershed is classified as being very limited for use as an absorption field. The remaining soil is considered almost all somewhat limited, with no soil type being classified as not limited. Some of the reasons for poor absorption field suitability are as follows:

- High ponding or flooding potential
- Unacceptable seepage rates (too fast or too slow)
- Shallow depth to saturated zone
- Shallow depth to bedrock or other dense material
- Steep Slope
- Poor filtering capacity

### 1.1.3 AGRICULTURAL SOILS

Map Reference: Farmland

Why This is Important: Prime farmland soils and soils of statewide importance are especially important for the production of food and crops.

Consider This: Prime farmland is defined by the United States Department of Agriculture, Natural Resources Conservation Service as those soils that are particularly suited and best used for agricultural purposes. This is land that has the best combination of physical and chemical properties for producing food and other crops. It must also be available for these uses. Prime soils generally have the soil quality, growing season, and moisture supply needed to produce economically sustained high yield of crops. These soils are not excessively erodible or saturated with water for a long period of time and do not flood frequently or are protected from flooding. See Farmlands Map.

Soils of Statewide Importance are lands defined specifically for New York State and are of statewide importance for the production of food and other crops. Some farmlands of statewide importance are nearly prime farmland and can produce high yields of crops in an economic manner when treated and managed according to acceptable farming methods. See Farmlands Map.

In the Watershed: In the Manor Kill Watershed, there are very few prime farmland soils and these are only located in a narrow corridor along the Manor Kill stream. Soils of statewide importance are located throughout the area but probably reflect soils often found on steep slopes. Most of the farms are located in the valley area of the Manor Kill and not on these soils of statewide importance. Most of the roads and settlements in the Watershed are also found in the Manor Kill valley as these soils also have good characteristics for septic systems.

### 1.1.4 OTHER SOIL CHARACTERISTICS

Map Reference:
Soils: Erodibility Factor
Soils: Shallow Depth to Water Table
Soils: Ponding Frequency
Soils: Flooding Frequency
Soils: Drainage Class
Soils: Hydric

Why This is Important: Soils have observable characteristics that vary over the landscape and these soil characteristics have a great influence on water movement, vegetation, and erosion. These soil characteristics act to create or ameliorate alterations to the land and the influences of development.

Consider This: The soil erodibility factor summarizes how susceptible the soil particles are to detachment and transport when subjected to rainfall and stormwater runoff. The factor is important as different soils erode at different rates when the other erosional factors (e.g., infiltration rate, permeability, total water capacity, dispersion, rain splash, and abrasion) are the same. Soil texture principally affects the factor, but structure, organic matter, and permeability also contribute. The soil erodibility factor ranges in value from 0.02 to 0.69 (National Soil Survey Handbook, USDA).

A shallow depth to water table illustrates where the soil cover over the bedrock is thinner than elsewhere. A thin layer of soil over bedrock may not be able to store the runoff as groundwater completely or can cause the overlying soils to be more saturated than elsewhere. Areas with shallow bedrock are not suitable for standard septic system construction due to regulatory constraints. Further, exposed bedrock or shallow soils pose limitations for construction of subgrade foundations and buried utilities.

A high ponding frequency shows a tendency for infiltrating rainfall and runoff to have difficulty in entering soil. The susceptibility of soils to ponding is important for homes, building sites, and septic system leachfields. Time and duration of the ponding are critical factors determining plant species. Ponding during the dormant season has few if any harmful effects on plant growth or mortality and, may even improve growth.

The susceptibility of soils to flooding is an important consideration for building sites, septic system leachfields, and other uses. Floods may be less costly per unit area of farmland as compared to that of urban land, but the loss of crops and livestock can be disastrous. Drainage class identifies the natural drainage condition of the soil. Drainage classes provide a guide to the limitations and potentials of the soil for field crops, forestry, range, wildlife, and recreational uses. The class roughly indicates the degree, frequency, and duration of wetness, which are factors in rating soils for various uses. They also correlate with the soil's ability to absorb rainfall and runoff.

The definition of a hydric soil is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soils support the growth and regeneration of hydrophytic vegetation. A soil being hydric is one of three criteria that may determine an area to be a wetland. The other two criteria are vegetation and hydrology and two or more of the criteria being met determine an area to be a wetland.

In the watershed: A substantial portion of the watershed area has soils that have shallow depths where the water table is close to the surface, with many areas less than 46 centimeters and others less than 18 centimeters. See Soils: Shallow Depth to Water Table map.

Much of the town is moderately susceptible to erosion. However, within the immediate stream corridor of the Manor Kill, substantial areas exist where the erodibility factor is quite high. One significant area with a high potential for erosion is where the farm fields exist along Potter Mountain Road between South Mountain Road and Beaver Hill Road. See Soils: Erodibility Factor Map.

Much of the watershed has soils that are well drained to moderately well drained (See Soils: Drainage Class Map). Tributaries to both the Manor Kill and Bear Kill have areas of somewhat poorly drained soils. Poorly drained to Very Poorly Drained soils exist in specific locations along the Manor Kill (See Soils: Drainage Class Map). Hydric (wet) soils correspond directly to these areas of poorly drained soils, streamside wetlands, and floodplain areas (see Soils: Hydric Map). There are hydric soils in concentrated locations throughout the watershed that are not associated with the streams. These are wetlands or vernal pools (temporary wetlands often located within forested areas).

### 1.1.5. SURFACE WATERS

| | |
|---|---|
| Map Reference: | Water Features |
| Why This is Important: | Lakes, streams and wetlands have many important natural functions. They are important open spaces and wildlife habitats. |

| | |
|---|---|
| | They also contribute to groundwater sources and water quality. Stream banks and stream-side vegetation protect valuable ecosystems, control floods, and are aesthetically valuable to many people. Protecting lake, stream and wetland resources are important for minimizing and mitigating the impacts of development or land use activities on water quality.<br><br>Freshwater wetlands and adjacent areas are valuable resources for flood control (runoff and flood water storage), wildlife habitats, ground and surface water quality protection, water resources, shoreline stabilization, open space, recreation, research, education, and aesthetics. Wetlands remove pollutants such as soil particles, fertilizers, pesticides, heavy metals, and petroleum products, which contributes to the protection of downstream surface water and underlying groundwater. Water stored in wetlands during wet periods recharges groundwater and maintains stream flow during dry periods, thus protecting stream ecosystems. |
| Consider This: | Each of these resources is discussed separately below. |

## A. STREAMS

In the Watershed: The Manor Kill has classifications ranging from A(t), C(t) and C(ts) and the Bear Kill has classification C(ts). The majority of tributaries to both are classification C. One (1) unnamed second order tributary of the Manor Kill, and the two (2) unnamed first order tributaries of the Manor Kill feeding this unnamed second order tributary are all located in the western portion of the Manor Kill Watershed (near Briggs and Bull Hill Road) and are classification A.

NYSECL Section 24 and regulations at 6 NYCRR Part 701 define the best usages of Class A freshwaters are for drinking, culinary purposes, primary and secondary contact recreation, and fishing. The A classification for fresh surface waters may be assigned to, “those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to remove naturally present impurities, meet or will meet [NYSDOH] drinking water standards, and are, or will be, considered safe and satisfactory for drinking water purposes.”

Class C fresh surface waters are suitable for fishing. The regulation states that the Class C waters are suitable for primary and secondary contact recreation, however, other factors not listed may limit these uses. Class A is suitable for fish propagation and survival. Additionally,

surface waters identified as trout habitat or trout spawning areas carry the additional classification of (t) or (ts), respectively.

Turbidity and water temperature are important measurements of the health of the stream. Turbidity refers to the amount of sediment in the water and is measured in nephelometric turbidity units (NTU is a measurement of light scattering by the particles in the water that cause turbidity.) The Manor Kill had an annual median turbidity of 1.4 NTUs through the period 1998 through 2007. The WHO (World Health Organization), establishes that the turbidity of drinking water shouldn't be more than 5 NTUs, and should ideally be below 1 NTU. The NYSDEC limit for Turbidity in groundwater is also 5 NTUs. There is no direct NYSDEC surface water standard in turbidity units. There are indirect limits on turbidity in surface water. One such indirect limit by the NYSDEC is the limit on dissolved solids, since dissolved solids can cause an increase in turbidity. Another indirect limit by the NYSDEC that reduces the stream turbidity is that discharges must cause no increase that will cause a substantial visible contrast to natural conditions. In effect, this means that the discharge must not be more visibly turbid than the stream it is discharging into. This limitation is an important compliance condition that is adopted verbatim into the NYSDEC SPDES General Permit for Construction Activity, GP-0-08-001. Turbidity is a significant issue in the West-of Hudson Watershed, in that the USEPA considers that the turbidity of the drinking water supply to New York City must remain in below an acceptable threshold (1 NTU at the Croton Reservoir entrance to the water distribution system) or filtration will have to be instituted. A filtered flow of the magnitude to supply New York City would require a multi-billion filtration plant, along with hundreds of millions of dollars in operating costs.

The annual median water temperature of the Manor Kill from 1988 to 2007 varied from 4.4 degrees C (40°F) in 1988 to 11.7 degrees C (53° F) in 1995. The median temperature during the summer months was 17.25 degrees C (63°F), which was similar to the East and West Kills. Annual fluctuation of temperature in a stream may drive many biological processes, for example, the emergence of aquatic insects and spawning of fish. Even at a given air temperature, stream temperature may be variable over short distances depending on plant cover, stream flow dynamics, stream depth and groundwater inflow. Water temperatures exceeding 77° Fahrenheit cannot be tolerated by brook trout, and they prefer water temperatures less than 68° Fahrenheit (TU, 2006).

Regulation of Streams: Stream quality is, in part, protected by NYSECL Section 24 and regulations at 6 NYCRR Part 703, where surface water quality standards are established for each class. These regulations include narrative standards (turbidity; suspended, colloidal, and settleable solids; oil and floating substances; thermal discharges; taste-, color-, and odor-producing, toxic, and other deleterious substances), pH, dissolved oxygen, dissolved solids, odor, color, and coliforms. The actual quality standards to be observed for each surface freshwater class are listed in Parts 703.2, 703.3, 703.4, and 703.5. Part 701.1 states that the discharge of sewage, industrial waste or other wastes shall not cause impairment of the best

usages of the receiving waters as specified by the water classifications. The standards outlined in Part 703 should be used as the threshold criteria for evaluating new development. The NYSDEC has the ability to, on a case-by-case basis, set more stringent groundwater standards or limitations under certain circumstances and sometimes groundwater discharges to streams and thereby impacts surface water quality.

The NYSDEC State Pollutant Discharge Elimination System (SPDES) program and the NYCDEP Watershed Rules and Regulations control the discharge of wastewater and stormwater, including point source discharges to groundwater and surface water. The controls developed through these programs are designed and utilized to ensure the surface waters meet their respective classifications under Part 703 regulations.

In addition, the NYSDEC regulates change or disruption in the channel, bank or bed of certain streams, ponds or lakes; dredging or filling in navigable waters; and construction of dams or docks in certain waters.

The NYCDEP regulates activities within the NYC Water Supply Watershed with the intention of minimizing the discharge of pollutants into the source waters from point and non-point sources, minimizing the impacts of erosion and limiting the discharge of phosphorous to source waters which may accelerate the eutrophication process. The 1997 New York City Rules and Regulations (Chapter 18 Final Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Its Sources,) prohibit the following activities from taking place within 100 feet from a watercourse[2]:

- Installation of new storage facilities or new tanks at an existing facility for the storage of hazardous substances;
- Installation of new aboveground and underground petroleum storage tanks or expansion of existing aboveground and underground petroleum storage tanks which require registration under 6 NYCRR Part 612;
- Installation of new home heating oil tanks not requiring registration under 6 NYCRR Part 612 underground;
- Installation of non-home heating oil tanks of 185-gallons or more, not requiring registration under 6 NYCRR Part 612 aboveground or underground (prohibited within 25 feet from a watercourse);
- Any part of a seepage unit or absorption field for a subsurface discharge from a wastewater treatment plant;

2 As per the New York City Watershed Regulations, watercourse means a visible path through which surface water travels on a regular basis, including an intermittent stream, which is tributary to the water supply. A drainage ditch, swale or surface feature that contains water only during and immediately after a rainstorm or a snowmelt shall not be considered to be a watercourse.

- Any part of an absorption field for a new subsurface sewage treatment system;
- Any part of a raised sewage treatment system;
- Construction of an impervious surface;
- Construction of a new individual residence in a subdivision;
- Widening of an existing road on the side closest to a watercourse;
- Siting or horizontal expansion of a junkyard or a municipal solid waste landfill (prohibited within 250 of a watercourse);
- Discharge of solid waste directly into any watercourse;
- Discharge from the washing of fertilizer application equipment into any watercourse; and
- If feasible, disposal of removed snow directly into any watercourse.
- Land excavation, clearing, and grading operations with 100ft of watercourse

## B. WETLANDS

In the Watershed: Several New York State and Federally protected freshwater wetlands are present within the Manor Kill Watershed (See Water Features Map). According to DEC maps, there are nine NYS DEC designated wetlands in the Manor Kill watershed covering 152.2 acres. Of these wetlands, 44.4% are Class 2, 44.4% are Class 3, and 11.1% are Class 4. Most of these wetlands are located in the town of Conesville. These wetlands are primarily located along the Manor Kill and its tributaries but some are located in the northern part of the watershed near the Gilboa/Conesville border. The Water Features map presents freshwater wetlands designated by the NYSDEC pursuant to NYSECL Section 24 (January 5, 1988) and National Wetlands Inventory (NWI) within the Manor Kill Watershed. The wetlands in the Manor Kill Watershed and its tributaries that are not located along the Manor Kill are frequently associated with solitary lakes and ponds.

Wetlands may be impacted by land use activities through altered surface and groundwater flow patterns, filling activities, and the introduction of point and non-point pollutants. Development has the potential to affect wetlands by altering surface water and groundwater flow patterns, introducing pollutants, and filling wetland areas resulting in the destruction of habitat. Alteration of groundwater or surface water flow can also result in an increase or decrease in the volume of water in a wetland area, thereby impacting the aquatic biota and fauna. Pollutants from point and non-point discharges associated with development also have the potential to impact aquatic wildlife. Additionally, wetlands filter and absorb certain contaminants. Placement of fill in wetlands destroys the wetland habitat and may also alter flood storage and surface and groundwater flow patterns. Severe impacts can result from construction on adjacent lands as well if erosion and sediment runoff damage the quality of the wetland area.

Regulation: Either New York State or the Federal government protects all wetlands in the region from impacts of land use. Parties interested in wetland use and permitting should consult the USEPA, USACOE, NYSDEC, and local government.

In general, to be protected under the NY Freshwater Wetlands Act, a wetland must be at least 12.4 acres. Smaller wetlands may be protected by the NYSDEC if the Department Commissioner determines that they are important locally in terms of the benefits listed in the above paragraphs. The NYSDEC boundaries shown in Map 4 are approximate and are intended by the NYSDEC for qualified reference only. National Wetland Inventory (NWI) wetland areas shown on the Water Features Map are potentially less reliably mapped than the NYSDEC wetland areas. NWI mapping relies primarily on aerial photographs that have not been entirely ground-truthed, while NYSDEC maps are more thorough and have been verified at one or more points in time. Areas within 100 feet of NYSDEC wetland boundaries (termed adjacent or buffer areas) are subject to regulation pursuant to the Freshwater Wetlands Act; however, a local authority or the NYSDEC Commissioner, based on site-specific mapping and conditions, may extend these adjacent areas.

New York State

Regulated activities within NYSDEC designated wetlands and adjacent areas include direct or indirect draining, dredging, mining, excavation, dumping, and filling. Building, road construction, pile driving, and placement of any obstruction whether or not it changes the water flow are also regulated. Additionally, any activities that could result in pollution are regulated. These activities include, but are not limited to, septic tank installation, placement of sewer outfalls, discharging sewage treatment effluent or other wastes into or so as to drain into a wetland, and pesticide application. Finally, any other activity that substantially impairs any of the several functions or benefits of wetlands is regulated. New York State has a joint application procedure for wetland permits. When an application is filed with the NYSDEC, a copy of the application is automatically forwarded to the USACOE. For wetland areas not regulated by the NYSDEC (wetlands smaller than 12.4 acres), an application must be filed directly to the USACOE (USEPA, 1993, EPA-902-F-93-001).

Federal Government

The USACOE regulates activities involving the discharge of dredged or fill material in the water of the U.S. under Section 404 of the Clean Water Act (CWA) and the placement of structures in navigable waters of the U.S. under Sections 9 and 10 of the Rivers and Harbors Act of 1899. The USACOE has no size limitations to jurisdictional wetlands; therefore regulatory requirements exist for wetlands that are not protected by the NYSDEC. A NYSDEC Water Quality Certification (WQC) may be necessary if only a USACOE wetlands permit is required. A WQC is required for projects which include the placement of fill or result in a discharge to waters of the United States, unless the activities have been deemed insignificant by the USACOE.

New York City

The NYC Water Supply Watershed relies heavily on the Federal and State laws to protect wetlands and buffer areas. The principal Federal laws that regulate wetland and buffer area activities include Sections 401 and 404 of the Clean Waters Act, Section 10 of the Rivers and Harbors Act, the National Environmental Policy Act, and the Swampbuster provision of the Food, Agriculture, Conservation, and Trade Act of 1990. New York State regulations controlling activities in and around wetlands in the Watershed include the Freshwater Wetlands Act, State Environmental Quality Review Act (SEQRA), and the Use and Protection of Waters Program. The NYC Water Supply Watershed adheres to the USACOE and NYSDEC regulations because they do not have specific regulations controlling development activities in or around wetlands. The NYC Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its Sources (Watershed Regulations) prohibits certain activities within 100 feet of New York State regulated freshwater wetlands.

## C. FLOOD PLAINS

Map Reference: Soils: Ponding Frequency
Soils: Flooding Frequency
Water Features

In the Watershed: Areas located adjacent to the Manor Kill and the Bear Kill frequently pond as shown on Soils: Ponding Frequency map. There are two locations in the Leroy Road area that has a very high ponding frequency but these correspond to wetlands in that area. The Soils: Flooding Frequency map shows the locations of occasional and frequent flooding events along the Manor Kill and Bear Kill streams. Very few other locations within the watershed have flooding or ponding. A ponding frequency of 15 to 49 percent occurs in the soils around the Manor and Bear Kills as well as in isolated areas primarily in the western and central portions of the Watershed. Two isolated areas of soils in the northwestern portion of the site pond more frequently, between 75 to 100 percent of the time.

Floodway and floodplain boundaries are plotted on the Flooding Frequency map. The Flooding Frequency map displays the zone designations according to flood hazard areas. The majority of these areas are located along the Manor Kill and Bear Kill and are between one-eighth (1/8) and one-half (1/2) mile wide. Occasional and frequent flooding has been reported along the Manor Kill and Bear Kill in the western and central portions of the Watershed.

Much of the area designated as floodways and floodplains is also designated as wetlands. As such this land is protected from development by the wetland regulations. Additionally, large portions of the floodplains and floodways are classified as agricultural property, which traditionally is undeveloped land, except for agricultural practices, and does not typically contain appreciable impermeable areas.

Land use in a floodplain can interfere with the natural functioning of the area by reducing the capacity of the floodplain or floodway to hold and move water. Construction here can increase water flow velocities, increase floodwaters, and pose safety and property damage issues. The Water Features Map shows the mapped flood hazard area for the Manor Kill. No other tributaries within the Manor Kill Watershed have mapped and regulated floodplains. There are no mapped floodplains past the Durham Road/Potter Mountain Road area, towards the upper reaches of the Manor Kill. The Manor Kill Stream Management Plan makes recommendations to protect floodplain areas. Some of these recommendations include improvements of roadway drainage features, maintenance and operation of flood control structures, and creation of a flood damage reporting system.

Impacts from development on floodplains potentially result from projects that restrict or reduce the capacity of the floodplain and floodway. The placement of fill or structures within the floodplain can alter flow hydraulics and cause impacts such as increasing floodwater flow velocities, erosion, and the level of the flood stage. Flooding and associated insurance problems are avoidable by encouraging new development and building outside of flood hazard areas. Floodways should be unobstructed by new buildings and fill placement to maintain the natural floodway.

### 1.1.6. GROUND WATER

| | |
|---|---|
| Why This is Important: | Groundwater plays a number of very important roles in the environment and in our economy. It supports our streams and wetlands, especially through dry months where there is little direct input from rainfall. The flow of groundwater into streams as seepage through the stream bed, known as baseflow, can be essential to the health of wildlife and plants that live in the water. Most residents use wells for drinking water, thus this is a critical public health resource. Because of the geological character of the Manor Kill area, certain locations have groundwater that is very shallow to the surface of the ground. That can cause ponding and flooding. Certain land uses can deplete or negatively impact groundwater resources. |

In the Watershed: Depth to groundwater in the Manor Kill Watershed (Watershed) is generally shallow. Depth to water ranges from 0.6 to 4.5 feet below ground surface (bgs). Groundwater is generally shallower in the northern half and slightly deeper in the southern half of the Watershed.

Source water assessments were completed for two (2) non-community public water systems within the Town of Conesville. Non-community public water systems have their own drinking water source and serve water to the public. The systems are located at Nick's Waterfall House, LLC and Ma & Ots Country store in the Town of Conesville.

The non-community public water system located at Nick's Waterfall House, LLC contains one (1) six (6)-inch well that draws from an unconfined bedrock aquifer of unknown hydraulic conductivity. According to the well construction log, the well is approximately 540 feet deep and produces approximately seven (7) gallons per minute. Contaminants of concern for this public water system include halogenated solvents, petroleum products, enteric bacteria, and enteric viruses. A medium susceptibility risk was determined in the source water assessment for all contaminants of concern in this system. Surface water is not considered to influence water quality in the well.

The non-community public water system located at Ma & Ots Country Store contains one (1) six (6)-inch well that draws from an unconfined bedrock aquifer of unknown hydraulic conductivity. No well construction log is available for this system and therefore well depth and yield are unknown. Contaminants of concern for this public water system include nitrates and enteric viruses. Both contaminants of concern were identified as having a medium susceptibility risk in the source water assessment. Surface water is not considered to influence water quality in the well.

According to the NYSDEC Water Well Online Database, six (6) water supply wells are registered with the NYSDEC in the Town of Conesville. All of the wells draw water from the bedrock aquifer. Well yield for the six (6) registered wells ranges from three (3) to seven (7) gallons per minute.

### 1.1.7. SURFACE AND BEDROCK GEOLOGY

| | |
|---|---|
| Map Reference: | Surficial Geology<br>Bedrock Geology |
| Why This is Important: | Surface and bedrock geology in the Manor Kill Watershed formed as a result of glacial activity in the area. The geology of the area highly influences water quantity, water flow, land uses, recreation and erosion and sedimentation of the streams in the watershed. The type of material forming the ground surface affects, for example, agricultural practices, how and where we build roads and buildings, and the flow and quality of surface and groundwater. |

Consider This: Each of these is considered below.

## A. BEDROCK:

Map Reference: Bedrock Geology

In the watershed: The Manor Kill Watershed is located in the northeast section of the Allegheny Plateau, which formed from the erosion of materials from the Acadian Mountains to the east that were deposited in an ancient inland sea and formed the Catskill Delta sedimentary formation. The bedrock underlying most of the Manor Kill Watershed is identified as the Oneonta Formation. This sedimentary rock unit was deposited during the middle to late Devonian Period, approximately 375 to 407 million years ago. The unit is composed of red, green, and gray mudstones with secondary red to gray, very-fine to fine grained sandstones and tertiary conglomerates. The Oneonta formation is part of the Genesee Group and overlies the Unadilla formation described below. Exposed bedrock or shallow soils pose limitations for construction of sub-grade foundations and buried utilities. They are also not suitable for standard septic systems because there is not enough soil for adequate treatment of waste. The ridgelines surrounding the entire watershed have shallow soils or exposed bedrock (See Surficial Geology map).

A second bedrock formation, identified as the Unadilla formation, underlies a linear area in the southwestern and central portions of the Manor Kill Watershed. This sedimentary unit was deposited during the middle Devonian Period, approximately 392 to 407 million years ago. The formation is comprised of two (2) to six (6) meter thick sandstone strata interbedded with thinner mudstone-dominated layers. The Unadilla formation gradationally underlies the Oneonta formation in the Genesee Group.

Higher elevations are comprised of glacially scoured and scraped sandstones and conglomerates with virtually no overburden material overlying the bedrock. The coarser grained layers of bedrock are erosion resistant and are defined as bedrock ridges present in the Manor Kill Watershed.

## B. SURFACE GEOLOGY:

Map Reference: Surficial Geology

In the watershed: Most of the watershed is comprised of glacial till. Kame and lacustrine deposits are found throughout the Manor Kill stream corridor.

Glacial Till: The surficial geology deposit overlying the bedrock in most of the Manor Kill Watershed is identified as glacial till (till). Till is characterized by a dense unit of variable textures, including an unsorted mix of clay, silt, sand, gravel, and boulders, which were

deposited beneath the glacier ice. Till generally has a low capacity to transmit water because of the high clay and silt content and the high degree of compaction.

Lacustrine Sand: A surficial geology deposit overlying a linear area in the southwestern and central portions of the Manor Kill Watershed is identified as lacustrine sand. Lacustrine sands are typically deposited as moderately well sorted layers of sand near the shores of lake environments. This unit was likely deposited in a pro-glacial lake following the last glacial period that occurred approximately 10,000 years ago.

Kames and Kame Moraines: Local deposits of Kames and Kame Moraines occur in the southern portion of the Manor Kill Watershed. Kame deposits are low mounds of glacial deposits composed of stratified coarse to fine gravel and/or sand. Kame Moraines are a group of Kame deposits that formed at the margin of a stagnant or receding glacier. Kames and Kame Moraines are generally more permeable than till, however, calcareous cement present in certain locations may substantially reduce permeability.

### 1.1.8. WILDLIFE, PLANTS AND IMPORTANT HABITATS

| | |
|---|---|
| Map Reference: | Appendix: Fish and Macroinvertebrate Sampling Sites<br>Land Cover |
| Why This is Important: | Wildlife has great ecological, social, and economic importance. - Bacteria, plants, algae, fungi, and invertebrates are involved in essential ecological processes, such as oxygen generation, nitrogen fixation, nutrient cycling, waste decomposition, water cleansing, and soil formation. Industries such as fisheries and forestry depend upon wild animals and plants for their continued existence. Recreational activities, including fishing, hunting, and wildlife study and photography provide much enjoyment and substantial economic benefit regionally. The ecosystem is highly complex and interrelated; the disturbance or removal of just one species may disrupt the balanced functioning of the entire ecosystem. Terrestrial and aquatic wildlife habitats are characterized by an intricate combination of living (biotic) and non-living (abiotic) features. Habitat conditions, on the land and in the water, must be present in the proper form, quantity, and location to support self-sustaining populations of wildlife species. Stream and stream-side (riparian) habitats provide important shelter, breeding grounds, corridors for movement, and food sources for wildlife. Stream and riparian habitats are dynamic in |

nature and may change due to the forces of weather, climate, fire, forest succession, or development pressure.

## A. FISH

In the watershed: A study was conducted by SUNY Cobleskill to determine the fish distribution, and water quality of the Manor Kill. Historically, the Manor Kill was stocked with brown trout (*Salmo trutta*) and brook trout (*Salvilinus fontinalus*) by the New York State Department of Environmental Conservation. New York State stopped stocking this water over 30 years ago. The first part of the survey was the water quality data collection of dissolved oxygen, pH, conductivity, salinity, temperature, total dissolved solids, turbidity, alkalinity, hardness, and phosphorus levels in the stream. The second part of the survey was to sample fish populations to determine species and abundance.

The SUNY Cobleskill study showed that all water quality parameters except for alkalinity, and hardness were within normal levels (see Manor Kill Stream Management Plan for full text of study). Fish were found at all sites except for site 2 in the spring of 2008. During the summer, data collection access to site 1 on Bear Kill, and the Bear Kill tributary could not be obtained. Site 2 and Site 10 were dry during the summer as well. Good numbers of both predators and prey were found at all other sites. The trout that were captured ranged in size from 61mm to 414mm. Most of the trout caught were less than 200mm.

The distribution of fish was common for small order streams such as the Manor Kill. There was more diversity in the middle stream section. The upper section was dominated by cold water species such as trout and sculpins. The lower stream reaches were dominated by cool water species like minnows. The only fish that did not fit this model were individuals of two species: Fathead Minnow (*Pimephaies promelas),* and *Brown* Bullhead (*Ameiurus nebulosus*), and a small number of Bluegill (*Lepomis macrochirus*). All of these fish are warm water species that were most likely introduced by sport fisherman.

The findings of this study indicate that there are no major chemical or physical water parameters that would limit the presence of the fish species. The alkalinity and hardness were below optimal range, but this is expected with the high volumes of runoff due to snow melt in the spring.

## B. STREAM MACROINVERTEBRATES

In the watershed: The Manor Kill watershed is an important resource to the Town of Conesville, NY and the City of New York. It provides drinking water, an agriculture water supply, and supports fishing activities along its length. In recent years, the need to address water quality has become increasingly important. However, little research has been done on the Manor Kill

watershed. The NYS DEC has conducted studies in the past, but they have been limited. A macroinvertebrate and water quality study was conducted by SUNY Cobleskill to determine a baseline of water quality assessment using multiple indices. These included water quality parameters, physical parameters, and macroinvertebrate indices. The following information summarizes the SUNY study (See Manor Kill Stream Management Plan for full report).

The SUNY Cobleskill study selected survey sites based on a downstream/upstream water quality assessment for every major tributary located on the Manor Kill. The sampling was done in the summer of 2008. Basic water quality parameters were taken at each site including temperature, conductivity, dissolved oxygen, and pH. A standardized kick net was used to sample macroinvertebrates within riffles and other physical parameters were measured including stream width, depth, velocity, embeddness, canopy cover, and substrate type.

Water quality remained relatively constant throughout the Manor Kill watershed (See Manor Kill Stream Management Plan for full report). However, the water temperature hovered around the stress threshold (20°C) for trout species in the lower half of the watershed. Furthermore, the conductivity was low throughout the watershed, indicating low nutrient levels. All other water quality parameters were within optimal range.

Water quality was assessed by evaluating the common macroinvertebrates living in the water. The study showed that all survey sites had high abundances of organisms that typically indicate healthier water quality conditions. The portions of the Manor Kill most impacted were in in the mid-stream reaches where there was moderately impacted water quality. Overall, the results show a relatively stable watershed with an exception of the stream the mid-stream reach.

Contributors to these moderately impaired waters include higher water temperatures (>20°C) lack of vegetation canopy along the banks, and more sedimentation into the stream.
This stretch consists of farm fields that extend into the riparian zones, and a rock quarry just upstream. These conditions could contribute to the degraded water quality conditions found along this stretch.

## C. WILDLIFE AND PLANT SPECIES OF CONCERN

In the watershed: Appendix C of the Manor Kill Management Plan lists detailed biodiversity information for the entire Upper Schoharie Creek area. These tables offer detail and summary about the wide variety of species in the watershed and broader region and lists terrestrial, vertebrate species that are predicted to occur within the watershed based upon presumed associations of species with habitats. There are 177 different birds, mammals, and reptiles predicted to inhabit the watershed area. In addition, the Stream Management Plan details information from the New York State Natural Heritage Program and the Breeding Bird Atlas.

Both of these programs inventory wildlife species from direct observation. From these sources of data, the following species are of concern within the Manor Kill Watershed:

Table 2: Wildlife and Plant Species of Concern

| **Species** | **Legal Status** | **Species of Greatest Conservation Need from New York State Open Space Plan** | **Observed** | **Predicted Presence in Watershed Based on Habitats Present/Notes** |
|---|---|---|---|---|
| Eastern Small Footed Myotis | State Species of Special Concern | X | | X Dead trees in forested areas |
| Indiana Myotis | Federal and State Endangered | X | | X Prefers mature red maple stands |
| Silver Haired Bat | State Species of Special Concern | X | | X Prefers bark from dead trees near wetlands |
| Jefferson Salamander | State Species of Special Concern | X | | X Needs mature forest vernal pools |
| Longtailed Salamander | State Species of Special Concern | X | | X |
| Wood Turtle | State Species of Special Concern | X | | X Needs forested streams within 200 m of well-drained sandy or gravel areas for nesting |
| Timber Rattlesnake | State Threatened | X | | X Needs rock ledges of forested hillsides |
| Eastern Box Turtle | State Species of Special Concern | X | | X Old fields, clearings and edges with sandy soils |
| Eastern Red Bat | | X | | X Deciduous |

| Species | Legal Status | Species of Greatest Conservation Need from New York State Open Space Plan | Observed | Predicted Presence in Watershed Based on Habitats Present/Notes |
|---|---|---|---|---|
| | | | | trees on forest edges |
| Hoary Bat | | X | | X Coniferous and deciduous trees |
| River Otter | | X | | X Streams |
| Four Toed Salamander | | X | | X Wet woodlands containing sphagnum moss |
| Common Mudpuppy | | X | | X flowing water greater than 1 meter in depth |
| Northern Red Salamander | | X | | X Logs and stumps |
| Smooth Greensnake | | X | | X Upland grassy openings |
| Bicknells Thrush | State Species of Special Concern | | X | Stunted coniferous forest at high elevations |
| Coopers Hawk | State Species of Special Concern | | X | Mature woodlands |
| Golden Winged Warbler | State Species of Special Concern | | X | Brushy openings with saplings |
| Northern Goshawk | State Species of Special Concern | | X | Extensive mature mixed woodlands |
| Red Headed Woodpecker | State Species of Special Concern | | X | Cavity trees in open areas |

| Species | Legal Status | Species of Greatest Conservation Need from New York State Open Space Plan | Observed | Predicted Presence in Watershed Based on Habitats Present/Notes |
|---|---|---|---|---|
| Sharp Shinned Hawk | State Species of Special Concern | | X | Extensive undisturbed woodlands |
| Vesper Sparrow | State Species of Special Concern | | X | Open areas with saplings |
| Whip Poor Will | State Species of Special Concern | | X | Woodlands with openings |
| American Black Duck | | | X | Wooded wetlands and streams |
| American Woodcock | | | X | Small clearings and dense swales |
| Black Billed Cuckoo | | | X | Low, dense thickets |
| Black Throated Blue Warbler | | | X | Forest with thick understory |
| Blue Winged Warbler | | | X | Old fields |
| Bobolink | | | X | Large expanses of grassland or old fields |
| Brown Thrasher | | | X | Hardwood forest edges |
| Canada Warbler | | | X | Dense undergrowth near streams |
| Eastern Meadowlark | | | X | Large expanses of grassland or old field |
| Louisiana Waterthrush | | | X | Woodlands with flowing water |
| Northern Bobwhite | | | X | Brushy field |

| Species | Legal Status | Species of Greatest Conservation Need from New York State Open Space Plan | Observed | Predicted Presence in Watershed Based on Habitats Present/Notes |
|---|---|---|---|---|
| | | | | edges |
| Olive Sided Flycatcher | | | X | Wet thickets near conifers |
| Prairie Warbler | | | X | Old fields with saplings |
| Yellow Warbler | | | X | Dense shrubs, small trees |
| Savannah Sparrow | | | X | Open areas with herbaceous cover |
| Scarlet Tanager | | | X | Forested areas un-fragmented |
| Willow Flycatcher | | | X | Low deciduous trees and thick hardwood regeneration |
| Wood Thrush | | | X | Cool, moist woodlands |
| Bald Eagle | Federal Threatened State Threatened | X | X | Open water, large trees for nesting |
| Bicknells Thrush | State Species of Special Concern | X | X | Stunted coniferous forest at high elevations |
| Blunt-lobed Grape Fern | State Endangered | | X | |
| Climbing Fern | State Endangered | | X | |
| Rough Arens | State Endangered | | X | |
| Whorled Mountain Mint | State Threatened | | X | |
| Appalachian Tiger Beetle | | X | X | |

| Species | Legal Status | Species of Greatest Conservation Need from New York State Open Space Plan | Observed | Predicted Presence in Watershed Based on Habitats Present/Notes |
|---|---|---|---|---|
| Hemlock Northern Hardwood Forest | | | X | |
| Beech Maple Mesic Forest | | | X | |
| Spruce Northern Hardwood Forest | | | X | |
| Mountain Fir forest | | | X | |
| Mountain Spruce Fir Forest | | | X | |

Many of these species of concern require forested habitats or openings within forested areas. Several need forested streams. Most of the salamanders require wooded wet areas surrounded by dry upland forest areas. The highly forested area would generally meet the habitat needs of forest-dependent species.

## D. RIPARIAN VEGETATION

Consider This: Riparian vegetation serves as a buffer for the stream against activities on upland areas. Most human activities whether agriculture, development, or even recreation, can result in a disturbance or *discharge* which can negatively impact the unprotected stream. Riparian vegetation captures and stores pollutants in overland flow from upland sources such as salts from roadways and excess fertilizer from lawns and cropland. The width, density, and structure of the riparian vegetation community are important characteristics of the buffer that can be used to define the level of its functionality.

On bare soils, high stream flows can result in bank erosion and overbank flow can cause soil erosion and scour on the floodplain. The roots of vegetation along the bank hold the soil and shield against erosive flows. On the floodplain, vegetation slows flood flows, reducing the energy of water. This reduction in energy will decrease the ability of water to cause erosion and scour. Furthermore, as vegetation slows the water, the soil suspended in the water is deposited on the floodplain.

In the Watershed: The watershed is primarily forested. However, agriculture and development activities are still concentrated along the valley floor, leaving the riparian area predominately herbaceous. The map below, from the Manor Kill SMP shows land cover throughout the Manor

Kill Watershed. Forested areas as a whole are important land covers in the watershed. Not only do they provide for the majority of wildlife habitats, but they play a major role in water quality.

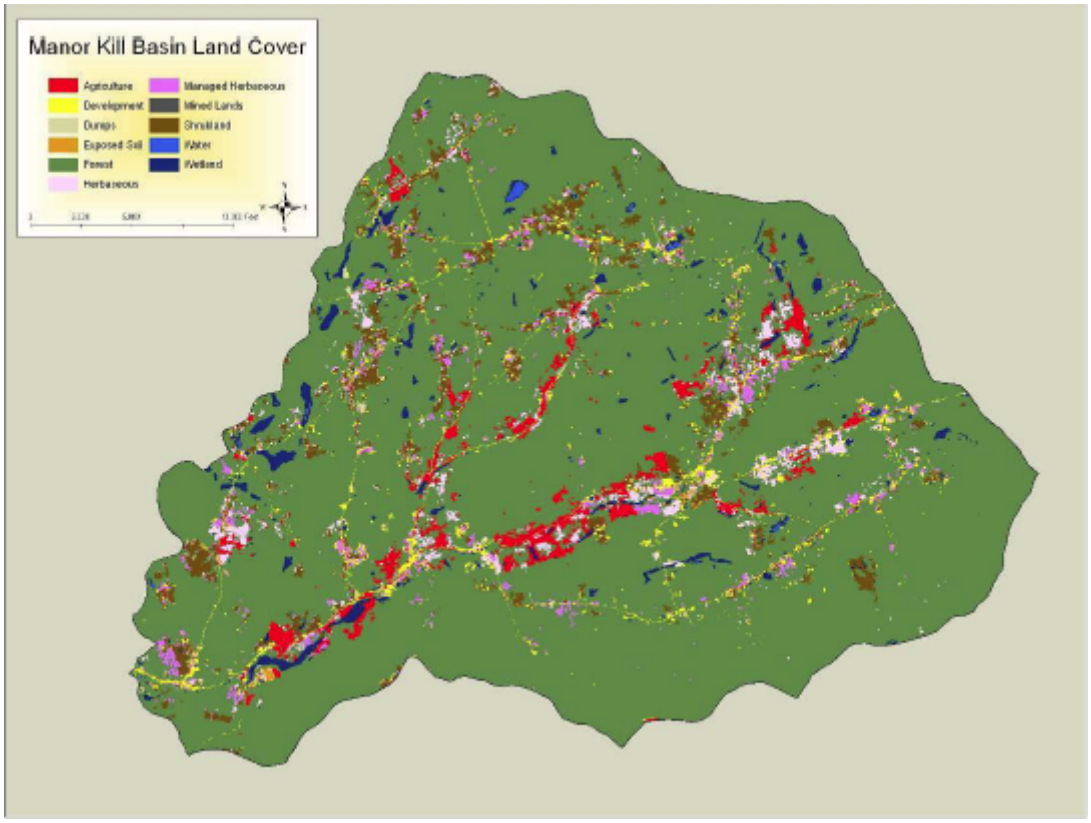



Figure 1: Land Cover in Manor Kill Watershed.

Vegetation within the 300 foot riparian buffer was mapped and evaluated in the Manor Kill SMP. Within this corridor, major vegetation types are deciduous (open and closed tree canopies), evergreen (open and closed tree canopies), mixed evergreen and deciduous (open and closed canopies), shrub land, herbaceous vegetation, bare soil, revetment, and unpaved roads. Vegetation from the Reservoir to the middle part of Conesville is a mix of vegetation types.

Many locations along the stream are dominated by herbaceous vegetation with little tree cover along the banks. From the middle part of town to the headwaters of the Manor Kill, vegetation is mostly herbaceous with little tree cover. The exotic invader Japanese Knotweed, a significant problem discussed in the Manor Kill Management Plan, can be found throughout the riparian corridor with a dense concentration of this growth near area where Hubbard Hill Road intersects Potter Hollow Mountain Road.

Approximately 480 acres, or 52% of land area in the stream corridor was considered to have inadequate vegetative cover; this included areas of herbaceous vegetation, bare soil and revetment. Overall, herbaceous vegetation (approximately 459 acres) and deciduous closed tree canopy (approximately 91 acres) were the largest vegetation types within the 300 foot buffer, while shrub land and mixed closed tree canopy occupied approximately 87 acres and 80 acres respectively. While herbaceous cover is better than no cover at all, plants with a variety of rooting depths (herbs, shrubs and trees) provide more extensive stream bank protection. Forested land cover helps to provide a high degree of stability to the watershed by slowing storm runoff and helping to protect against stream bank erosion.

With respect to stream management, the loss of hemlocks and other significant tree cover along the banks of the Manor Kill poses a threat to bank stability and the aquatic habitat of the stream. Other issues in the riparian area relate to the stream alignment with Potter Hollow Mountain Road. The narrow buffer of land between the creek and the road receives the runoff of salt, gravel, and chemicals from the road that stunts or kills vegetation. Road maintenance activities also regularly disturb the soil along the shoulder and on the road cut banks. This disturbance fosters the establishment of undesirable invasive plants. The linear gap in the canopy created by the roadway separates the riparian vegetation from the upland plant communities. This opening also allows light into the vegetative understory which may preclude the establishment of shade loving plants such as black cherry and hemlock.

## E. FOREST RESOURCES

Land cover of a watershed has a great influence on water quality and stream stability. The watershed's land cover directly impacts stream hydrology by influencing the amount of stormwater runoff. Forests, natural meadows and wetlands naturally absorb rainwater, allowing a portion of it to percolate back into the ground.

However, impervious surfaces such as pavement, parking lots, driveways, hard-packed dirt roads and rooftops increase the amount of rainfall that flows over land and reduces the amount of rainfall that percolates into the soil to recharge groundwater wells and streams. Impervious cover is a major influence on streams and stream life due to the way it changes the amount and duration of stormwater that gets to the stream. Generally, the more impervious surface there is in a watershed, the less groundwater recharge (which supplies summer low flows), and the greater the magnitude of storm flows (and related erosion in streambeds). In addition to degrading streams, watersheds with a high percentage of impervious surfaces are prone to larger and more frequent floods, which cause property damage through inundation, as well as ecological harm resulting from lower base stream flows. (See Section 2 for erosion and sedimentation projection information.)

### 1.1.9. WIND RESOURCES

Wind resources are expected to have a growing influence on development patterns as the world petroleum resources pass their peak production, petroleum supplies become limited relative to demand, and the price of petroleum resources rises. Also, wind resources are renewable and produce very low carbon emissions. Wind is most exploitable where there is a lack of obstructions introducing turbulence and slowing wind velocities. Wind resources are generally measured in average velocity. As shown in the Wind Map , the wind velocities are highest near the east and southeast perimeter of the Manor Kill Watershed as these landforms are high enough to receive much unobstructed wind and as they face the most prevalent winds arising from the west-northwest. The Manor Kill watershed also contains an important determinant to the development of wind resources – a major electrical transmission line (See Wind Resource Maps). The presence of a major transmission line ensures the generated electricity does not have far to travel before entering the grid. This ensures the value of the electricity as lines of smaller capacity have lower efficiencies at transmitting electricity. Two potentially severely limiting factors for the development of wind resources are the fact that much of the prime land for wind electrical generation towers is owned by New York State and the fact that roads needed to carry heavy trucks to the best locations do not exist or are not sufficiently well built to withstand the heavy trucks. Wind power development is oriented to personal use wind turbines and commercial scale wind facilities (also called wind farms). Personal use wind turbines are generally less than 120' tall while commercial scale turbines are generally 300 to 400 feet tall. Environmental concerns related to wind development include noise, shadow flicker, and bird and bat mortality. The New York State Department of Agriculture and Markets has determined that personal use wind turbines used for farm operations within a certified New York State Agricultural District (See Agriculture Map) cannot be prohibited.

## 1.2 LAND COVER

| | |
|---|---|
| Map Reference: | Property Class<br>Public or Preserved Lands |
| Why This is Important: | Understanding human land uses and natural land cover in the watershed is important to evaluate current conditions in the Town and is used to help predict what changes may occur in the future. Different land uses have different impacts on the environment. For example, forested areas function differently in terms of human use, wildlife habitats, and erosion control than do bare soils recently plowed for agriculture. |

In the Watershed:

Land Cover

The chart below illustrates the categories and percentages of the different land cover types present in the Manor Kill watershed. The major land cover in the watershed is forests (80% of the area). Managed herbaceous (pastures, lawns) is the second most frequent land cover but it encompasses only 10% of the land base. Wetlands and developed lands use less than 5% of the land base. Agriculture, barren land, herbaceous, open water and shrub land take up 1.81% of the land area.

**Table 3: Land Cover Category Acres Percentage**

| Land Cover | Acres | Percent of Total Land Base |
|---|---|---|
| Agriculture | 175 | .79% |
| Barren Land | 2 | .01% |
| Development | 675 | 3% |
| Forested | 17,642 | 80% |
| Herbaceous | 159 | .7% |
| Managed Herbaceous | 2,265 | 10% |
| Open Water | 37 | .16% |
| Shrub land | 35 | .15% |
| Wetlands | 1,082 | 5% |
| Total | 22,072 | 100% |

Land Ownership

In 2008, 13% of the lands in the Manor Kill watershed were protected as Forested, Conservation Lands. Of these, 10% was owned by New York State (2,232 acres); 2.8% was owned by New York City (610 acres); and .5% was owned by Schoharie County (117 acres). The remaining land is in private ownership.

State Forest Land

A substantial number of acres of State Forest Land exist within the Town of Conesville and are managed by the NYSDEC, including parts of:

- Huntersfield State Forest
- Ashland Pinnacle State Forest
- South Mountain State Forest
- Bates State Forrest
- High Knob State Forest

These State forests are also managed to prevent erosion and maintain areas in the Manor Kill Watershed to minimize impacts to streams and the environment.

## 1.3 LAND USES

### 1.3.1. RESIDENTIAL LAND USES

About 38% of the land base in the watershed is in residential use. Single family homes are the most common residential land use in the watershed in terms of land parcels. Rural estates (residential lots greater than 10 acres) within the watershed take up the most acreage of land (4,468 acres). There are 144 parcels on 1,316 acres of land in the watershed with mobile home uses. Seasonal and multiple residences are present on less than 80 parcels of land in the watershed.

Table 4. Land uses in the Manor Kill Watershed

| **Residential Property Class** | **# of parcels** | **# of acres** |
|---|---|---|
| Mobile Home | 144 | 1,316.2 |
| Multiple | 11 | 263.5 |
| Rural Estate | 121 | 4,468.5 |
| Seasonal | 57 | 456.2 |
| Single Family | 376 | 1,809.1 |
| Three Family | 1 | 0.8 |
| Total | 710 | 8,314.4 |

### 1.3.2. AGRICULTURAL LAND USES

Map Reference: Farmland
Agricultural District

Table 5: Agricultural Land Uses

| **Agricultural Property Class** | **# of parcels** | **# of acres** |
|---|---|---|
| Crops | 1 | 0.9 |
| Horse Farm | 3 | 438.3 |
| Livestock | 16 | 2,260.6 |
| Vacant Land | 4 | 114.6 |
| Total | 24 | 2,814.4 |

About 13% of the land base in the watershed is in agricultural use. There are a total of 2,814 acres of land used for agriculture within the watershed. Most of those are livestock operations. Within that category, crop land to support livestock is included.

### 1.3.3. COMMERCIAL LAND USES

Map Reference: Property Class

Table 6: Commercial and Industrial Land Uses

| **Commercial Property Class** | **# of parcels** | **# of acres** |
|---|---|---|
| Bar | 1 | 5.3 |
| Junkyard | 1 | 10.2 |
| Multipurpose | 1 | 0.3 |
| Office | 1 | 10.7 |
| Total | 4 | 26.5 |
| | | |
| **Industrial Property Class** | **# of parcels** | **# of acres** |
| Mining | 6 | 153.0 |
| Total | 6 | 153.0 |

Less than 1% of the land base in the watershed is used for commercial or industrial uses. There are relatively few commercial and industrial land uses within the watershed. About 180 acres are used for these purposes with most of the acreage oriented to mining. Twenty-six areas on four parcels are classified as commercial. Mining takes place on six different parcels within the watershed.

Mining

In the watershed: The following mines located within the Manor Kill Watershed are provided by the NYSDEC Department of Mineral Resources on the NYSDEC Environmental Resource Navigator webpage (http://www.dec.ny.gov/animals/38801.html):

Table 7: Mining Activities in Conesville

| **Name** | **Mine ID** | **Acres** | **Type** |
|---|---|---|---|
| Conesville Pit | 40692 | 9 | Unconsolidated Mine |
| Conesville Sand and Gravel | 40791 | 7 | Unconsolidated Mine |
| Robinson Mine | 40588 | 6 | Unconsolidated Mine Reclaimed |

| Name | Mine ID | Acres | Type |
|---|---|---|---|
| Manor Kill Mine | 40829 | 9 | Unconsolidated Mine |
| Bush Road Gravel Mine | 40775 | 9 | Unconsolidated Mine |
| South Mountain Road Gravel Bank | 40587 | 5 | Unconsolidated Mine Reclaimed |
| Schoharie #2 Shale Mine | 40650 | 1 | Consolidated Mine Reclaimed |

Five (5) of the mines have not been reclaimed. Of these five (5) mines, three (3) are privately owned and two (2) are owned by the Town of Conesville.

Mining operations can affect stream turbidity in several ways. To mine materials, the surface of a mine must be cleared of trees and the topsoil must be stripped and stockpiled for later use during mine reclamation. Therefore, the mine area can erode at this vulnerable stage and the stockpiles can erode as well. Once material has been excavated, runoff may be directed inward by the mined surfaces, however depending on the depth to groundwater, accumulated surface runoff water may discharge outside of the mine area into surface waters and is a potential source of turbidity. Another source of turbidity can be from dust and particulate materials tracked out of the mine onto adjacent roads. From the roads, these materials can wash into roadside ditches and subsequently enter surface water bodies. Similarly, the dust from loading, screening operations or rock crushing operations can be carried by winds and runoff into streams. Mines can also have impacts relative to noise, traffic, aesthetics and land use.

### 1.3.4. FORESTRY LAND USES

Map Reference: Property Class
Aerial Photo

Table 8: Wild, Forested, Conservation Land Uses

| Wild, Forested, Conservation Lands and Public Parks | # of parcels | # of acres |
|---|---|---|
| Government Owned | 29 | 2,376.6 |
| Private | 10 | 971.3 |
| Total | 39 | 3,347.8 |

About 15% of the land base is in wild, forested or conservation lands (3,348 acres). This includes private lands on 10 parcels (971 acres) and government owned lands (2,376 acres.) Forestry operations are an important part of the local economy in the Manor Kill Watershed.

### 1.3.5 OTHER LAND USES

About 31% of the land base in the watershed is considered vacant land (6804 acres). Vacant land could be pastures, acreage attached to a large residential parcel and other unimproved parcels).

Table 9: Community Service and Vacant Land Uses

| **Land Use** | **# of parcels** | **# of acres** |
|---|---|---|
| Community Service (cemetery, government, protection, religion) | 15 | 211.52 |
| Vacant (vacant agriculture, residential vacant, rural estate vacant, other) | 499 | 6804.69 |
| Public Services | 3 | 8.7 |
| Right of Way | | 348.72 |
| Total | 517 | 7373.63 |

### 1.3.6. INFRASTRUCTURE

Map Reference: Roads and Parcels

Infrastructure, which is the physical public and private structures that interconnect businesses and residences thereby supporting much of modern civilization, includes roadways, railways, airports, public structures, utilities, and telecommunications facilities. Infrastructure can have direct or indirect impacts on stream water quality. Direct effects can include modification of surface water runoff by swales, ditches, and culverts, such as used in relation to roads or treatment of collected sewage at a sewage treatment facility. Indirect effects are caused by the potential growth inducing or restraining aspects of the infrastructure. Installation of infrastructure has an associated cost. Both public and private developers are apt to consider the presence and capacity of infrastructure before making decisions about initiating development. Generally the more infrastructure that is present and the greater its capacity, the lower the costs of development will be for projects.

#### A. ROADS

In the Watershed: With regards to the roads themselves, primary ingress and egress for residents of Manor Kill Watershed (Watershed) is by way of Potter Mountain Road (New York State Reference Route 990V/County Route 3). Potter Mountain Road runs east/west across the Watershed, in the vicinity of the Manor Kill stream bed. Durham Road, which ties into Potter Mountain Road, provides one (1) additional primary point of ingress and egress on the eastern side of the Watershed.

There are two (2) key road intersections within the Watershed where Potter Mountain Road is intersected by:

- Bull Hill Road (County Route 59)
- Bearkill Road (County Route 18)

Bull Hill Road is the key secondary road which provides an ingress and egress route between the western and the northern portions of the Watershed. Bearkill Road ties into a web of Town roads which provide an ingress and egress route between the central and northern portions of the Watershed by way of Bull Hill Road and Shale Pit Road. Shale Pit Road is a seasonal use road. One (1) additional point of ingress and egress is provided by Leroy Road on the northwestern side of the Watershed, which intersects Bull Hill Road. However, Leroy Road is also a seasonal use road once it crosses the town boundary with Gilboa.

There are two (2) points of ingress and egress via secondary roads on the southern side of the Watershed. Pangman Road traverses the southwest rim of the Watershed and intersects Route 990V. South Mountain Road traverses the southeast rim of the watershed and ties into a web of Town roads. Durham Road is the main connection to State route 145 to the east.

Consider This: As mentioned above, swales, ditches, and culverts can impact the surface water rates of flow and erosion. These improvements or structures can change the patterns of runoff, can increase or decrease the rate of flow of surface water by straightening curved natural channels or by changing the size or extent of a drainage area. Erosion can take place in the areas of increased velocity within or at critical areas such as culvert intakes and discharge points.

The Schoharie County Planning and Development Agency has mapped and inventoried the culverts within the Town and County road system in the Manor Kill Watershed. These structures are depicted in Map Roads and Culverts. There are a total of 375 culverts in the inventory. Very few of these structures have inlet or outlet protection. Of the culvert outlets, 184, or 49 percent, have issues with their condition (See Table 10). Of the culvert outlets, 29, or 8 percent, are classified as being eroded or severely eroded. Assuming funds are or become available to address such issue, there will be an opportunity to prevent erosion and to settle solids within the runoff by installing settling structures upstream or downstream of the culverts. These settling structures would need to be periodically cleaned out, but they would be expected to produce a noticeable lowering of sediment load and turbidity reaching the streams in the Manor Kill Watershed.

Table 10: Culvert Conditions

| Outfall Condition | Number of Culverts |
|---|---|
| Backwater | 7 |
| Blocked | 82 |
| Eroded | 24 |
| Other | 1 |
| Partial Sediment | 65 |
| Severely Eroded | 5 |
| **Total Negative Conditions** | 184 |
| Good | 191 |
| **Total Number of Culverts** | 375 |

Another way that roads may impact water quality is by the means to address snow and ice in the winter. In the Town of Conesville the roads are sanded in the winter. Much of this sand must enter the roadside ditches where it is available to be washed into streams.

Road related stormwater runoff structures may represent an opportunity for improvement in water quality. Certain municipalities have focused on passing the stormwater flow from the swales, ditches, and culverts built along and in relation to roadways through designed detention ponds that settle out the particles that are already in the runoff thereby improving the downstream water quality and reducing downstream turbidity.

## B. UTILITIES

Internet & Cable:

One (1) internet provider, Verizon, currently provides dial-up connection service to the Town. This leaves residents with very limited options for internet service.
The United States Department of Agriculture (USDA) does provide an assistance program known as the Rural Broadband Access Loan Program. This program provides loans for funding the cost of construction, improvement, and acquisition of facilities to provide broadband service to eligible communities. Eligibility is based on current municipal population and must be less than 20,000 based on the most current United States Census.

The Town of Conesville currently has no cable service. Satellite internet and cable is an option for this area as the necessary land based infrastructure is not currently available. However, this is a costly alternative with high startup costs and potentially unreliable service based on varying satellite locations and interference by heavy precipitation. To improve satellite and wireless internet access, local providers SurferzNet and NY Air are interested in constructing a new telecommunications tower in the Town; however, currently these companies have not made public formal plans.

Electric:

Electric service is currently provided to the Manor Kill Watershed by New York State Electric and Gas (NYSEG).

Telephone:

Telephone lines are maintained by Verizon throughout the Town of Conesville. Over 130,000 cellular telephone towers are registered with the Federal Communications Commission (FCC) with the location of each tower recorded. There are currently no cell towers within the Town. The two (2) closest towers are reportedly located approximately 11 miles to the west and northeast in the Towns of Stamford and Rensselaerville, NY. Two (2) others are located in Tannersville and Freehold. Users indicate that there is little to no cellular telephone connectivity reception in the Town.

## C. PUBLIC WATER/SEWER/SEPTIC SYSTEMS

Consider This: Public water supply systems can have a noticeable impact on streams as they can cause a significant deduction from the available base groundwater supply that serves as a feed to the water flow in the streams. Sewers and septic systems can be important to streams in that their discharge can directly impact the water quality and nutrient content in the receiving streams. Also, like any other infrastructure, their presence and capacity can influence growth of development.

In the Watershed: There is one (1) public water supply within the Watershed, the West Conesville Water District. The water source consists of one (1) well and three (3) springs, with a

51,000-gallon in ground reservoir. The District has thirty-three (33) connections with twenty-two (22) currently in service, meeting the water demands of seventy-seven (77) residents. All other residents of the Watershed are currently serviced by private water supplies.

There is no public wastewater treatment system within the Watershed. All residents are served by private on-site wastewater treatment systems.
As the Manor Kill Watershed is located within the New York City Watershed, the residents of the Manor Kill Watershed are eligible for the septic system rehabilitation and replacement program which is managed by the Catskill Watershed Corporation. Since 1997, fifty-six (56) residents have participated in the program. Twenty-two (22) alternative and three (3) conventional on-site wastewater systems have been funded. The remaining thirty-one (31) residents have had a system inspection and have taken no further action.

### 1.3.7. RECREATIONAL RESOURCES

Map Reference: Property Class

Table 11: Characteristics of Land Classified as Recreation

| Recreation and Entertainment | # of parcels | # of acres |
|---|---|---|
| Social | 1 | 0.23 |
| Sports | 1 | 6.42 |
| Total | 2 | 6.65 |

In the Watershed: Recreation related to the Manor Kill was considered by the public to be an important resource. The public is also concerned that recreational opportunities along the Manor Kill have changed over the years: fewer fishing opportunities and loss of swimming were listed as the primary concerns.

Fishing: Although DEC no longer stocks fish in the Manor Kill, there are healthy populations of native brown and brook trout. There are no public fishing access locations however along the Manor Kill except by special permit on DEP properties.

Hiking: the Long Path runs through Conesville parallel to the Manor Kill along Richmond, Ashland Pinnacle and Huntersfield Mountains.

State Forests: New York State owns and manages several areas as State Forests within the Watershed. Recreational activities are allowed on these lands including hiking, mountain biking, snowmobiling, horse riding, snowshoeing and cross country skiing. State lands in the watershed include the Bates, High Knob, Leonard Hill, South Mountain, and Ashland Pinnacle State Forests.

NYC DEP Lands: Nine DEP-controlled lands have some level of public access. The chart below indicates those areas and status of public access. Hiking and hunting are allowed on eight of the nine properties, and fishing only on the Bull Hill Road Unit.

| Map # | Area | Town | Location | WMU+ | Hike | Fish | Hunt | Acres |
|---|---|---|---|---|---|---|---|---|
| 37 | Road 7 Unit | Gilboa | NYC Road7 | 4R | No | No | No | 148 |
| 38 | Bull Hill Unit | Conesville | Bull Hill Rd. | 4G | Yes | Yes | Yes | 90 |
| 39 | Hubbard Hill Unit | Conesville | E. Conesville Road | 4G | Yes | No | Yes | 290 |
| 40 | Hubbard Hill South Unit | Conesville | Hubbard & Bearkill Roads | 4G | Yes | No | Yes | 110 |
| 41 | Bearkill Unit | Conesville | Bearkill Road | 4G | Yes | No | Yes | 115 |
| 42 | Manorkill Unit | Conesville | Potter Mountain Road | 4G | Yes | No | Yes | 240 |
| 43 | West Conesville Unit | Conesville | Bull Hill Road | 4G | Yes | No | Yes | 245 |
| 44 | Macumber Road Unit | Conesville & Prattsville | Macumber Road | 4R | Yes | No | Yes | 142 |
| 45 | Bluebird Road Unit | Conesville | South Mountain & Bluebird Roads | 4R | Yes | No | Yes | 222 |

## 1.4 LAND USE PLANNING IN THE WATERSHED

### 1.4.1. TOWN

Both Gilboa and Conesville have adopted Comprehensive Plans for their towns.

Conesville: The plan was adopted in 2007. It establishes six goals and numerous strategies and actions that could be implemented by the Town. Several of the goals relate to the Manor Kill and watershed topics. These include:

- Providing for the orderly growth and development of the Town of Conesville
- Make the Town secure from the dangers of flooding, fire and other dangers
- Protect surface and groundwater quality, maintain high quality physical environments and preserve wildlife habitats through effective design.

Highlights of the Comprehensive Plan recommendations that are related to the Manor Kill Watershed and the Plan goals include:

- Use development performance standards
- Create incentives for preservation of open spaces and working landscapes
- Use floodplain regulations more effectively
- Preserve natural topography when new roads are built
- Incorporate stormwater management and erosion control planning in site plan and subdivision reviews
- Allow for conservation subdivision designs to provide open space buffers for stormwater control

Gilboa adopted their Comprehensive Plan in March 2004. This plan includes many of the same goals as established for Conesville. Highlights of Gilboa's Comprehensive Plan related to the Manor Kill Watershed and the goals include:

- Establish performance standards for steep slopes
- Use floodplain regulations more effectively
- Preserve natural topography when new roads are built
- Incorporate stormwater management and erosion control planning in site plan and subdivision reviews
- Encourage conservation subdivisions to protect open spaces
- Update the Town of Gilboa's Homesite Ordinance with performance criteria for site plan review related to protection of air quality, drinking water quality, wildlife habitat, scenic vistas, stream water quality, mature forests, farmland, and stream corridors

### 1.4.2. SCHOHARIE COUNTY

Schoharie County has a county-wide Agriculture and Farmland Protection Plan that offers goals and suggested strategies for protecting farmland and promoting agriculture.

Schoharie County's All-Hazards Mitigation Plan also provides recommendations on floodplain regulations.

The County also provides a Watershed Planner who offers direct technical assistance for development of land use documents, watershed protection and regulation issues. In addition

to a county-level position at the Schoharie County Soil and Water Conservation District, a Soil & Water Stream Program Manager offers direct assistance as DEP's Streamside Assistance Program Coordinator.

### 1.4.3. CATSKILL WATERSHED CORPORATION (CWC) PROGRAMS

The Catskill Watershed Corporation is a Local Development Corporation established to protect the water resources of the New York City Watershed West of the Hudson River (WOH); to preserve and strengthen communities located in the region; and to increase awareness and understanding of the importance of the NYC Water System. The CWC works primarily by funding a variety of projects as follows:

1. Septic System Programs: By being in the NYC Watershed west of the Hudson NYC drinking water watershed, homeowners in the Manor Kill Watershed are eligible for funding through specific CWC programs to repair, replace, and/or maintain a home septic system.

   These programs include:
   - The *Septic Rehabilitation and Replacement Program* – Reimburses eligible homeowners for the cost of repairing or replacing a residential septic system.
   - The *Septic Maintenance Program* – Provides financial assistance for maintenance every three (3) years to homeowners who have received new systems from the CWC.
   - The *Septic Monitoring Program* – A research initiative that tests the relative effectiveness of several conventional and alternative on-site wastewater treatment systems.

2. Stormwater:

   - Future Stormwater Program: NYC Watershed Regulations require that some property owners who disturb or pave natural drainage areas implement stormwater pollution prevention plans (SPPPs). To help offset costs associated with SPPPs required by the New York City Department of Environmental Protection, the CWC reimburses applicants for eligible design and construction costs.

   - Stormwater Retrofit: This is a competitive grant program to provide funds to correct or reduce water quality problems associated with erosion or substandard stormwater management conditions existing on or before January 21, 1997. Municipalities, organizations, businesses and individual property owners may apply for funding to design, construct, implement and maintain stormwater Best Management Practices

(BMPs) to address runoff in concentrated areas of impervious surfaces in the West of the Hudson (WHO) Watershed.

- Community Stormwater Planning & Assessment: The intent of this competitive grant program is to encourage counties, towns and villages in the WOH Watershed to conduct detailed, comprehensive assessments of existing public stormwater infrastructure with the goal of evaluating their systems and identifying and prioritizing potential areas for BMP installations.

- CWC funds can be used to help map existing infrastructure and compile a Geographic Information System database identifying each individual structure with an associated description, operational status and repair needs.

3. Local Technical Assistance Program: grant program

The purpose of the Local Technical Assistance Program is to encourage development of community planning initiatives in the West of Hudson Watershed. Managed by the CWC, this grant program is intended to improve the quality of life and enhance water supply protection through long-term land use, zoning, pollution, and open space controls. Eligible projects might include

- comprehensive land use plans
- zoning laws
- open space requirements for development projects
- highway maintenance plans
- environmental protection laws

4. Stream corridor Protection Program: This is a grant program to stabilize stream corridors where flooding poses a direct and immediate threat to private property

5. Economic development: Catskill Fund for the Future

The CWC's Economic Development Programs are intended to support environmentally responsible businesses and to create and retain jobs in the Catskills to help offset impacts of New York City Watershed regulations and the city's acquisition of thousands of acres of land which will remain off limits to development in perpetuity.

The cornerstone of the CWC's efforts in the West of Hudson Watershed is the Catskill Fund for the Future (CFF), a revolving fund initially capitalized by a $59.7 million appropriation by New York City, invested and wholly managed by the CWC. An economic development study, prepared in 1998 for the CWC by consultants Hamilton, Rabinovitz and Alschuler (HR&A),

served as a guidance document for establishment of loan, grant and tourism promotion programs funded through the CFF.

6. Education: Watershed Education Grants

The CWC, in partnership with the NYC Department of Environmental Protection (DEP), provides Watershed Education Grants to schools, libraries, museums, vocational institutions and non-profit organizations in the WOH Watershed and in New York City.

The purpose of the grant program is to support projects that emphasize the importance of the city's water supply; the role of watershed residents as stewards of that resource; the ecology of the WOH Watershed and diversity of its aquatic and terrestrial life and habitat; the importance and means of preserving water quality in the Watershed; the unique cultural heritage of the area; the development of the city's vast water system; and the importance of increasing communication and understanding among residents throughout the NYC water supply system.

7. Community Wastewater Management:

The Community Wastewater Management Program is intended to fund the planning, design and construction of community septic systems and/or the creation of septic maintenance districts in several West-of-Hudson communities. The hamlets were named in the priority list of communities in need of wastewater treatment, which was included in the 1997 New York City Watershed Memorandum of Agreement (MOA). West Conesville is on the list in the MOA.

### 1.4.4. WATERSHED AGRICULTURAL COUNCIL (WAC) PROGRAMS

The Watershed Agricultural Council (WAC) is a nonprofit organization with the mission to support the economic viability of agriculture and forestry through the protection of water quality and the promotion of land conservation in the New York City watershed region. WAC is funded by New York City Department of Environmental Protection, the U.S. Department of Agriculture, the U.S. Forest Service and other federal and foundation sources. They offer programs related to water quality, land stewardship, economic initiatives and education programs. Specifically, WAC offers whole farm and small farm planning tools, assistance with best management practices for farming and forestry, forest management planning, stream buffer program (easements), logger training, and forestry market development.

### 1.4.5 SCHOHARIE BASIN TASK FORCE

The Schoharie Turbidity Task Force was a project designed to develop a turbidity reduction strategy for the Schoharie basin. The project included the surveying of stakeholder interests to better understand the challenges that turbidity poses to various interest groups (i.e. local residents, fishermen, water supply, local officials, highway crews, etc.). In addition, the group recommended the hosting of a "turbidity summit" to present turbidity concerns within the Schoharie basin, recommend possible best management practices to reduce turbidity and to gather input from about 100 attendees. Final turbidity reduction recommendations were completed in early 2008 and are available at www.catskillstreams.org/majorstreams_sc.html. The Turbidity Task Force continues to provide bi-annual educational programs—the watershed summit and the watershed tour—for local stakeholders. These outreach programs are aimed at local decision-makers in particular, to identify and enable the implementation of better stream management practices.

### 1.4.6 NEW YORK CITY DEP HAMLET DESIGNATION

As per the 1997 Memorandum of Agreement (MOA), the Town can designate parcels to be excluded from acquisition by fee (not easements) by the City. This is to ensure that there are opportunities for growth, to preserve community character and to accommodate these and other important local concerns. The original 1997 MOA defined locations and maximum acreage which could be excluded from acquisition. These are identified on Map Possible New Hamlet Areas. The Town of Conesville is currently working to designate additional lands to be included in the hamlet designation. The Town of Conesville has two designated hamlets (Conesville and West Conesville) and one designated Commercial/Industrial Area. These are all located along Potter Mountain Road/Route 990v which parallels the Manor Kill. In order to help the Town and NYC DEP come to agreement on where additional hamlet areas could be located, the map titled "Possible New Hamlet Areas" was produced. This map shows the buildable area identified for the buildout, overlaid with areas of the town susceptible to erosion if full buildout were to occur. The green areas that show through the erodible areas form a starting point for identifying additional hamlet areas that are less likely to negatively impact the environment than other areas of the town.

## 1.5 LAND USE REGULATIONS IN WATERSHED

### 1.5.1. REGULATION OF SEPTIC SYSTEMS

Installation of septic systems for individual households or businesses is regulated by the following entities within the Watershed:

- NYSDOH through Part 75;
- New York City Department of Environmental Protection, Catskill Watershed Regulations;
- Town Building and Code Enforcement; and,
- Catskill Watershed Corporation.

The NYSDOH has overall responsibility for regulating the installation and modification of individual household septic systems. This is accomplished through implementation of Code 75 and especially through the requirements of Appendix 75A of that code. Generally, the NYSDOH relies on towns to carry out regulations relating to the construction of proposed new septic systems or modifications to existing systems through the Building Permit process.

By being located within the New York City drinking water watershed west of the Hudson River, the Town must also ensure compliance with the NYCDEP regulations regarding subsurface sewage treatment. The NYCDEP cites 10 NYCRR Part 75 and Appendix 75A of that code as the governing regulation unless local regulations are more stringent. In these latter situations the more stringent regulations are to be followed. The Watershed Rules and Regulations include some important restrictions such as:

- prohibit mound systems, intermittent sand filters and evapotranspiration/absorption systems;
- require an additional area of at least 100% of the primary absorption field's area to be set aside as a reserve field;
- prohibit the building of primary or reserve fields under pavement or other impervious surfaces;
- calls for at least one percolation test and one deep hole test in each of the primary and reserve areas to be witnessed (not performed) by NYSDEP (a minimum percolation of 3 minutes per inch);
- prohibit the siting of new septic systems where soil percolation rates are inadequate;
- require a pump system to have a backup storage tank capable of holding one day's flow;
- subsurface treatment systems shall not be placed on slopes that exceed 15%.

## A. NYSDOH POLICIES AND APPROVAL PROCEDURES

The NYSDOH requires that percolation tests (perc tests) and deep-hole examinations be conducted by individuals proposing construction of new homes or added bedrooms to existing homes. The perc test determines if the soils on-site will allow the wastewater to pass through it at the proper rate to accomplish the required biological breakdown. The deep-hole examination can reveal the presence of bedrock, very low or high permeability layers, a high groundwater table, or other issues that could prevent the proper functioning of a septic system. The NYSDOH requires that, in every case, either the local Building Inspector or a qualified professional engineer should oversee both the perc test and the deep-hole examination. If the perc test or deep-hole examination reveals that a conventional system cannot be installed, or an old system is not functioning properly, the property owner must have an alternative system designed by a qualified professional engineer. The completed design must be submitted to the NYSDOH and NYCDEP for final review and approval.

## B. SCHOHARIE COUNTY DEPARTMENT OF HEALTH POLICIES AND APPROVAL PROCEDURES

In Schoharie County, each Town Building Inspector explains the requirements to prospective builders and only issues building permits when the septic system soil assessment and design have been addressed correctly. However, the field observations and the plan reviews are either conducted by the Schoharie County DOH and/or the NYCDEP.

For instance, if a multiple lot subdivision is proposed, then the conduct of the deep hole and percolation test is accomplished by a Professional Engineer registered to practice in New York State. However, the deep hole is also examined by the Schoharie County DOH and the NYCDEP, in addition to the Professional Engineer. The builder of a single home has the option of hiring a Professional Engineer registered to practice in New York State or has the option to have the Schoharie DOH and NYCDEP conduct the deep hole and percolation test with the assistance of the builder's contractor. If the Professional Engineer conducts the deep hole and percolation test, either the Schoharie County DOH or the NYCDEP must examine the deep hole as well.

**Experiences Noted by the Schoharie County DOH**

Mr. Carl Christman, who has been employed by the Schoharie County Department of Health for approximately 21 years, was interviewed to obtain his impressions of the septic system installation types and performance over the years.

Mr. Christman stated that approximately 50 percent of the systems installed in the Town of Conesville are conventional systems and 50 percent are raised systems. The latter are usually required because the following are encountered:

- Shallow groundwater
- Shallow seasonal groundwater
- Shallow bedrock
- Impervious or low permeability soils.

The reported cost of the raised systems is as high as $20,000. There are almost no failures of septic systems reported for systems installed since 1980. Mr. Christman stated that lot sizes of 2.5 acres and less have difficulty meeting the required separation distances and the 100 percent reserve field size. Generally, lot sizes of three acres and greater can meet these requirements, although in low percolation rate soils, an even larger lots size than 3 acres is required or some properties are unbuildable.

### 1.5.2. LAND USE REGULATIONS – TOWN LEVEL

Town of Conesville: Conesville has subdivision law with general design standards that requires 200' of road frontage and a lot depth of no more than four times the width of all lots. They also have a street design and highway dedication law as well as a flood damage prevention law.

Town of Gilboa: Gilboa has a subdivision regulation that requires 200' of road frontage and a lot depth of no more than four times the width of all lots. They also have a right-to-farm law, highway specifications and dedications law, junkyard law, and a homesite ordinance. The homesite ordinance covers manufactured and mobile homes, campgrounds, individual homes and regulates building setbacks, driveways, sewage systems, and water supplies. It does not cover commercial activities.

### 1.5.3. OTHER PERMITS

A variety of permits may be required for land use activities within the watershed. The chart below describes permits that may be needed for future development or land use.

Table 12: Permits Needed for Land Uses

| **Permit/Requirement** | **Needed For** | **Required/Issued By** |
|---|---|---|

| Permit/Requirement | Needed For | Required/Issued By |
|---|---|---|
| Article 15, Stream bank or Bed Disturbance | Any activity that would disturb the bank or bed of the stream including crossings, bridges, diversions, bank stabilization, etc. | NYS DEC |
| ACOE Permit | Any activity that places greater than 25 cubic yards of fill below the ordinary high water mark | Army Corps of Engineers |
| Crossing, Piping or Diversion Permit | Crossing a stream, diverting water from a stream, or piping water from a stream | New York City DEP |
| Notice of Intent (NOI) and Preparation of a Stormwater Pollution Prevention Plan (SWPPP) | Whenever 1 acre or more of land is disturbed, the activity is controlled by the NY State Pollution Discharge Elimination System (SPDES) | NYS DEC |
| Stormwater Pollution Prevention Permit | Whenever 2 or more acres located at least in part within the limiting distance of 100 feet of a watercourse or wetland or 300 feet from a reservoir or reservoir stem or on a slope exceeding 15% are disturbed | New York City DEP |
| Setback | Roads, driveways, structures and other new impervious surfaces must be setback from streams | New York City DEP |
| Individual Residential Stormwater Permit | For any individual residence within 100' of a perennial stream | New York City DEP |

| **Permit/Requirement** | **Needed For** | **Required/Issued By** |
|---|---|---|
| Building Permit | Erection, construction, enlargement, alteration, improvement, removal, demolition of a structure | Town |
| Certificate of Occupancy | Required before any structure can be used, and issued after compliance with laws is checked | Town |
| Construction in Highway Right-of-Way | Construction, reconstruction within the right-of-way of a public highway, including construction and repair of driveways, side roads, utility lines, drainage facilities | Schoharie County, Town Highway Department |
| Freshwater Wetlands Permit | Draining, dredging, excavating, building a structure or road, placing fill or introducing any kind of pollution in a designated wetland | NYS DEC and/or the Army Corps of Engineers |
| Subdivision Approval | For subdivision of land | Towns of Conesville and Gilboa |
| Highway Dedication | For development and dedication of new roads to Town | Towns of Conesville and Gilboa |
| Homesite Permit | For manufactured, mobile home, individual home, driveway, sewage system and water supply | Town of Gilboa |
| Mining | For all mining and gravel excavation of over 1,000 tons per year | NYS DEC |

| **Permit/Requirement** | **Needed For** | **Required/Issued By** |
|---|---|---|
| Realty Subdivision: sewage and water | Subdividing land to create 5 or more lots less than 5 acres in size each | NYS DEC and NYS Department of Health |
| Sanitary Code | For all residential and commercial septic systems<br><br>For all septic systems with a flow greater than 1,000 gallons per day | New York City DEP, Town<br><br>NYSDEC |
| SEQRA | See Part 617 for lists of actions that are covered under this law. | NYS DEC, NYC DEP and Town |
| Water Supply | Installation, acquisition, construction or extension of water systems if the activity involves five or more service connections, regardless of the amount of water used. | NYS DEC |
| Flood Plain | Construction in Floodways and Flood Plains | NYSDEC, Federal National Flood Insurance Program |

Further Discussion of Permits:

The NYSDEC SPDES General Permit (GP-0-08-001) authorizes stormwater discharges to surface waters of the State from construction activities. An owner or operator who disturbs more than one (1) acre of soil must develop a Storm Water Pollution Prevention Plan (SWPPP) as required by the General Permit and must submit a Notice of Intent (NOI) to the NYSDEC for authorization. The NYCDEP stormwater regulations are generally more stringent, however, both the NYSDEC and the NYCDEP programs rely on guidance documents published by the NYSDEC. The two principal documents include: The New York Stormwater Management Design

Manual (April 2008) and New York Standards and Specifications for Erosion and Sediment Control (August 2005).

Therefore, the NYCDEP regulations have more of a direct effect on minimizing the effects of construction on soil erosion, however the NYSDEC regulation provides a backup to the NYCDEP regulations, and the NYSDEC guidance documents are critical to the success of the NYCDEP program.

Floodplains

The NYSDEC Division of Water, Bureau of Flood Protection and Dam Safety assists residents and businesses to comply with the Federal National Flood Insurance Program and the corollary local laws or ordinances that govern construction within flood prone areas.

All development within Special Flood Hazard Areas is subject to floodplain development regulations. The Special Flood Hazard Area is an area that would be inundated by the 100-year flood, better thought of as an area that has a one percent (1%) or greater chance of experiencing a flood in any single year. Special Flood Hazard Areas are shown on Federal flood maps, known as Flood Insurance Rate Maps, as shaded areas labeled with the letter "A" or "V" sometimes followed by a number or letter:

- "V" zones are coastal flood hazard zones subject to wave runup in addition to storm surge (wave runup is maximum vertical extent of wave uprush on a beach or structure above the still water elevation).
- "A" zones include all other Special Flood Hazard Areas.
- "VE", "AE", "V", or "A" zones, followed by a number, are areas with specific flood elevations, known as Base Flood Elevations.
- A zone with the letter "A" or "V" and no number is a studied flood hazard area with approximate boundaries and without a specific flood elevation.
- An "AE" zone, or a numbered "A" zone, may contain a regulatory floodway area, which is the channel of a river and adjacent land areas that must be reserved to discharge the 100-year flood without causing a rise in flood elevations.

The regulatory floodway is shown either on the community's Flood Insurance Rate Map or on a separate "Flood Boundary and Floodway" map for maps published before approximately 1988. More stringent development controls exist for regulatory floodways, as compared to elsewhere within Special Flood Hazard Areas.

The NYSDEC implementation of the Federal regulations on floodplains and floodways greatly minimizes and mitigates the impacts of development within the floodplains and floodways.

Stream Classification and Discharge

Stream quality is, in part, protected by NYSECL Section 24 and regulations at 6 NYCRR Part 703. Surface water quality standards are established for each class of stream ranging from Class A through Class D. These regulations include narrative standards (turbidity; suspended, colloidal, and settleable solids; oil and floating substances; thermal discharges; taste-, color-, and odor-producing, toxic, and other deleterious substances), pH, dissolved oxygen, dissolved solids, odor, color, and coliform bacteria.

NYSECL Section 24 and 6 NYCRR Part 701 defines the best usages of Class A fresh surface waters as drinking water, culinary purposes, primary and secondary contact recreation, and fishing. The A classification for fresh surface waters may be assigned to, "those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to remove naturally present impurities, meet or will meet [NYSDOH] drinking water standards, and are, or will be, considered safe and satisfactory for drinking water purposes."

Class B fresh surface waters are for primary and secondary contact recreation and fishing. Classes A and B are suitable for fish propagation and survival. Additionally, surface waters identified as trout habitat or trout spawning areas carry the additional classification of (t) or (ts), respectively.

Class C fresh surface waters are suitable for fishing. The regulation states that Class C waters are suitable for primary and secondary contact recreation; however, other factors not listed may limit these uses.

6 NYCRR 701.1 states that the discharge of sewage, industrial waste or other wastes shall not cause impairment of the best usages of the receiving waters, as specified by the water classifications. The parameter concentration standards outlined in Part 703 are used as the threshold criteria for evaluating discharges from new development. The actual quality standards for each surface freshwater class are listed in Parts 703.2 through 703.5. The NYSDEC has the ability, on a case-by-case basis, to establish more stringent discharge standards or limitations under certain circumstances.

The NYSDEC SPDES program and the NYCDEP Watershed Rules and Regulations fit together to control the discharge of wastewater and stormwater, including point source discharges to

groundwater and surface water. The NYSDEC stream classification system supports the limitations on discharges within the Manor Kill Watershed, thereby protecting the streams from the impacts of commercial or industrial development.

Trout Stocking

Fishing is a reported use of the Manor Kill and its tributaries. The NYSDEC website indicates that the NYSDEC planned to stock the Schoharie Reservoir with Brown Trout (8.5 - 9.5 inches in length) in the spring of 2009. However, no specific stocking of the Manor Kill is noted.

Septic Systems

A SPDES permit issued by the NYSDEC is required for a facility with a total discharge to groundwater greater than 1,000 gallons per day (gpd) of sewage-wastewater, or if the wastewater contains industrial or other non-sewage wastes. Domestic septic systems are otherwise controlled by the NYSDOH and the NYCDEP.

If there were to be a proposed discharge greater than 1,000 gpd of sewage wastewater, the NYSDEC would use this program to ensure the impacts to the watershed were minimized or mitigated.

Mineral Resources

The NYSDEC implements a permitting program for mining and excavation of over 1,000 tons per year (tpy) of minerals. Among other restrictions, the permit program includes requirements that protect water quality, including requiring control of runoff, addressing tracking of soil onto public roads, and requiring long term closure of the site after mineral extraction is complete.

This program minimizes or mitigates the impacts from mineral extraction within the watershed.

Wildlife, Plants and Habitats

The NYSDEC has an Endangered Species Program designed to locate and correct fish or wildlife problems before certain species disappear forever. The State Wildlife Grants, which started with Federal legislation in fall 2001, provide funds to State wildlife agencies for conservation of fish and wildlife species in greatest need of conservation. The New York Natural Heritage Program facilitates conservation of New York's rare animals, rare plants, and significant

ecosystems, and provides greater assurance that management activities for designated State lands protect these designated unique resources.

## 1.6 DEMOGRAPHIC PROFILE

In the watershed: As of the census[2] of 2000, there were 726 people, 304 households, and 214 families residing in the town. The population density was 18.4 people per square mile (7.1/km²). There were 777 housing units at an average density of 19.7/sq mi (7.6/km²). The racial makeup of the town was 97.38% White, 0.28% African American, 0.28% from other races, and 2.07% from two or more races. Hispanic or Latino's of any race were 1.79% of the population.

There were 304 households out of which 26.0% had children under the age of 18 living with them, 57.6% were married couples living together, 7.2% had a female householder with no husband present, and 29.3% were non-families. 26.0% of all households were made up of individuals and 13.2% had someone living alone who was 65 years of age or older. The average household size was 2.39 and the average family size was 2.85.

In the town the population was spread out with 22.3% under the age of 18, 5.9% from 18 to 24, 24.4% from 25 to 44, 28.5% from 45 to 64, and 18.9% who were 65 years of age or older. The median age was 44 years. For every 100 females there were 98.9 males. For every 100 females age 18 and over, there were 101.4 males.

The median income for a household in the town was $33,417, and the median income for a family was $37,344. Males had a median income of $31,250 versus $21,964 for females. The per capita income for the town was $16,236. About 5.7% of families and 7.4% of the population were below the poverty line, including 12.4% of those under age 18 and none of those aged 65 or over.

Males: 359 (49.7%)

Females: 364 (50.3%)

Median resident age: 43.6 years

New York median age: 35.9 years

Estimated median household income in 2007: $41,573 (it was $33,417 in 2000)

Conesville: $41,573

New York: $53,514

Estimated median house or condo value in 2007: $106,341 (it was $68,000 in 2000)

Conesville: $106,341

New York: $311,000

Mean prices in 2007: All housing units: $146,474; Detached houses: $162,333; Townhouses or other attached units: $116,874; In 2-unit structures: $167,240; Mobile homes: $42,826; Occupied boats, RVs, vans, etc.: $17,500

Table 13: Demographic Characteristics

| **General Characteristics -** | **Number** | **Percent** | **U.S. Comparison** |
|---|---|---|---|
| Total population | 726 | | |
| Male | 361 | 49.7 | 49.1% |
| Female | 365 | 50.3 | 50.9% |
| *MEDIAN AGE* (years) | 43.6 | (X) | 35.3 |
| Under 5 years | 33 | 4.5 | 6.8% |
| 18 years and over | 564 | 77.7 | 74.3% |
| 65 years and over | 137 | 18.9 | 12.4% |
| One race | 711 | 97.9 | 97.6% |
| White | 707 | 97.4 | 75.1% |
| Black or African American | 2 | 0.3 | 12.3% |
| American Indian and Alaska Native | 0 | 0.0 | 0.9% |
| Asian | 0 | 0.0 | 3.6% |
| Native Hawaiian and Other Pacific Islander | 0 | 0.0 | 0.1% |
| Some other race | 2 | 0.3 | 5.5% |
| Two or more races | 15 | 2.1 | 2.4% |
| Hispanic or Latino (of any race) | 13 | 1.8 | 12.5% |
| | | | |
| Household population | 726 | 100.0 | 97.2% |
| Group quarters population | 0 | 0.0 | 2.8% |
| Average Household size | 2.39 | (X) | 2.59 |
| Average family size | 2.85 | (X) | 3.14 |
| Total housing units | 777 | | |
| Occupied housing units | 304 | 39.1 | 91.0% |
| Owner-occupied housing units | 268 | 88.2 | 66.2% |
| Renter-occupied housing units | 36 | 11.8 | 33.8% |
| Vacant housing units | 473 | 60.9 | 9.0% |
| **Social Characteristics -** | **Number** | **Percent** | **U.S.** |
| Population 25 years and over | 483 | | |
| High school graduate or higher | 381 | 78.9 | 80.4% |
| Bachelor's degree or higher | 51 | 10.6 | 24.4% |

| General Characteristics - | Number | Percent | U.S. Comparison |
|---|---|---|---|
| Civilian veterans (civilian population 18 years and over) | 88 | 16.9 | 12.7% |
| Disability status (population 5 years and over) | 117 | 17.5 | 19.3% |
| Foreign born | 25 | 3.5 | 11.1% |
| Male, Now married, except separated (population 15 years and over) | 174 | 61.1 | 56.7% |
| Female, Now married, except separated (population 15 years and over) | 187 | 66.3 | 52.1% |
| Speak a language other than English at home (population 5 years and over) | 43 | 6.4 | 17.9% |
| **Housing Characteristics -** | **Number** | **Percent** | **U.S.** |
| Single-family owner-occupied homes | 140 | | |
| Median value (dollars) | 65,000 | (X) | 119,600 |
| Median of selected monthly owner costs | (X) | (X) | |
| With a mortgage (dollars) | 831 | (X) | 1,088 |
| Not mortgaged (dollars) | 295 | (X) | 295 |

(X) Not applicable. Source: U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3)

For population 25 years and over in Conesville

- High school or higher: 78.9%
- Bachelor's degree or higher: 10.6%
- Graduate or professional degree: 6.2%
- Unemployed: 8.0%
- Mean travel time to work: 36.7 minutes

For population 15 years and over in Conesville town

- Never married: 20.6%
- Now married: 63.7%
- Separated: 1.4%
- Widowed: 6.3%
- Divorced: 7.9%

## 1.7 ECONOMIC PROFILE

Table 14: Economic Characteristics

| Economic Characteristics - | Number | Percent | U.S. |
|---|---|---|---|
| In labor force (population 16 years and over) | 315 | 56.6 | 63.9% |
| Mean travel time to work in minutes (workers 16 years and over) | 36.7 | (X) | 25.5 |

| Economic Characteristics - | Number | Percent | U.S. |
|---|---|---|---|
| Median household income in 1999 (dollars) | 33,417 | (X) | 41,994 |
| Median family income in 1999 (dollars) | 37,344 | (X) | 50,046 |
| Per capita income in 1999 (dollars) | 16,236 | (X) | 21,587 |
| Families below poverty level | 12 | 5.7 | 9.2% |
| Individuals below poverty level | 52 | 7.4 | 12.4% |

Common Industries for Males
- Construction (19%)
- Educational services (8%)
- Public administration (8%)
- Utilities (6%)
- Accommodation and food services (6%)
- Administrative and support and waste management services (5%)
- Truck transportation (4%)

Common Industries for Females
- Educational services (23%)
- Health care (20%)
- Accommodation and food services (13%)
- Finance and insurance (9%)
- Arts, entertainment, and recreation (6%)
- Chemicals (4%)
- Public administration (4%)

Common Occupations for Males
- Driver/sales workers and truck drivers (11%)
- Vehicle and mobile equipment mechanics, installers, and repairers (7%)
- Electrical equipment mechanics and other installation, maintenance, and repair occupations including supervisors (7%)
- Building and grounds cleaning and maintenance occupations (6%)
- Carpenters (5%)
- Supervisors and other personal care and service workers except personal appearance, transportation, and child care workers (4%)
- Business operations specialists (4%)

Common Occupations for Females
- Other teachers and instructors, education, training, and library occupations (13%)
- Secretaries and administrative assistants (10%)
- Other office and administrative support workers including supervisors (9%)
- Registered nurses (9%)
- Retail sales workers except cashiers (4%)

- Bus drivers (4%)
- Preschool, kindergarten, elementary and middle school teachers (3%)

Residents with income below the poverty level in 2007:

This town: 7.4%

Whole state: 14.6%

Residents with income below 50% of the poverty level in 2007:
This town: 3.7%
Whole state: 7.4%

**Table 15: Economic Information for Conesville: 1998 and 2006 Comparison**

| **1998 County Business Patterns 12076** | | | |
|---|---|---|---|
| Number of establishments | 8 | | |
| First quarter payroll in $1000 | 158 | | |
| Number of employees | 35 | | |
| Annual payroll in $1000 | 791 | | |
| Number of Establishments by Employment-size class | | | |
| Industry Description | Total Establishments | Establishments with 1-4 Employees | Establishments with 5 – 9 Employees |
| Total | 8 | 5 | 2 |
| Construction | 4 | 3 | 0 |
| Manufacturing | 1 | 0 | 1 |
| Transportation & warehousing | 2 | 1 | 1 |
| Accommodation & food services | 1 | 1 | 0 |
| | | | |
| **2006 County Business Patterns 12706** | | | |
| Number of establishments | 20 | | |
| First quarter payroll in $1000 | 175 | | |
| Number of employees | 33 | | |
| Annual payroll in $1000 | 1234 | | |
| Number of Establishments by Employment-size class | | | |
| Industry Description | Total Establishments | Establishments with 1-4 Employees | Establishments with 5-9 Employees |
| Total | 20 | 19 | 1 |
| Forestry, fishing, hunting, and agriculture | 2 | 2 | 0 |

| | | | |
|---|---|---|---|
| Construction | 9 | 8 | 1 |
| Manufacturing | 1 | 1 | 0 |
| Transportation & warehousing | 3 | 3 | 0 |
| Professional, scientific & technical service | 1 | 1 | 0 |
| Admin, support, waste mgt, remediation ser | 1 | 1 | 0 |
| Accommodation & food services | 3 | 3 | 0 |

Source: U.S. Census Bureau

# 2.0 TRENDS

**Purpose of Section:** The purpose of this section is to understand the changes that may impact the lands and people of the Manor Kill Watershed. This section evaluates the potential capacity for development in the watershed, the erosion and turbidity potential now and under future development scenarios, and identification of other changes that may influence the environment.

## 2.1.BUILDOUT ANALYSIS

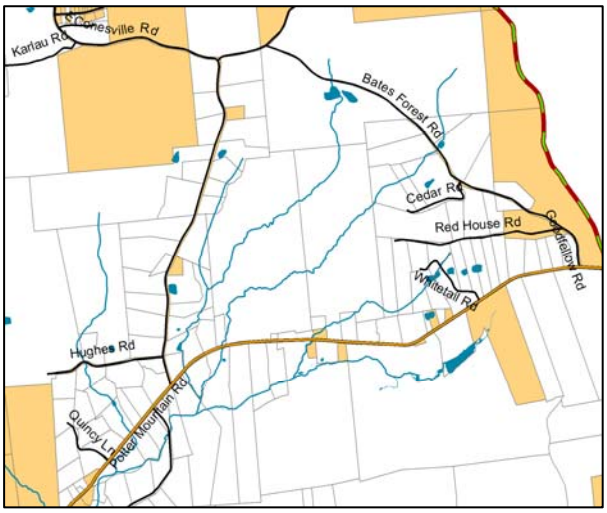
Map References: Buildout Maps (includes the following)

Buildout Existing Residences
Buildout Fully Built Parcels
Buildout Buildable Parcels
Buildout Environmental Constraints and DEP Buffer Requirements
Buildout Buildable Area
Buildout Potential New Residences

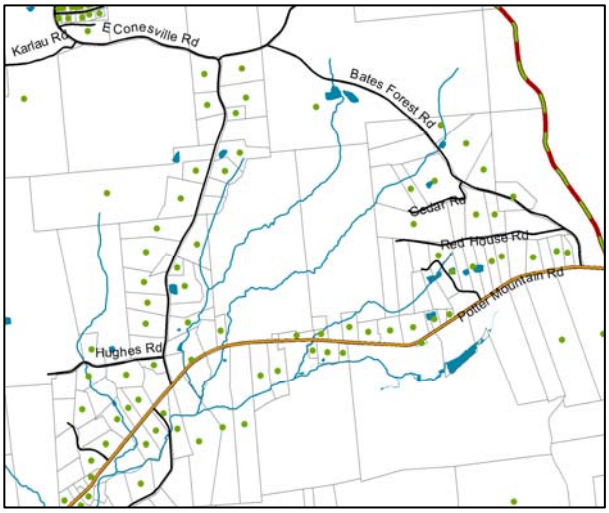
A build-out analysis is an exercise designed to estimate the amount of development that can possibly occur if all developable land in a specified area is built according to the municipality's current land use regulations. The buildout analysis applies current land use regulations, considers environmental constraints that would limit development in certain areas, and calculates the total residential density allowed at full buildout of the municipality. It does not predict when this would occur, at what rate it would occur, or where it would occur first. It only predicts the possible end result. The general process followed to calculate full buildout conditions is:

1. Fully built parcels were identified by comparing existing building status with each parcels density requirements. Some examples are:
    A. Parcels with existing residences that cannot be further subdivided
    B. Commercial/Public uses that are not likely to be developed
    C. Properties with conservation easements that restrict further development
    D. Properties owned by government agencies that are not likely to be developed

(Map showing fully built parcels)

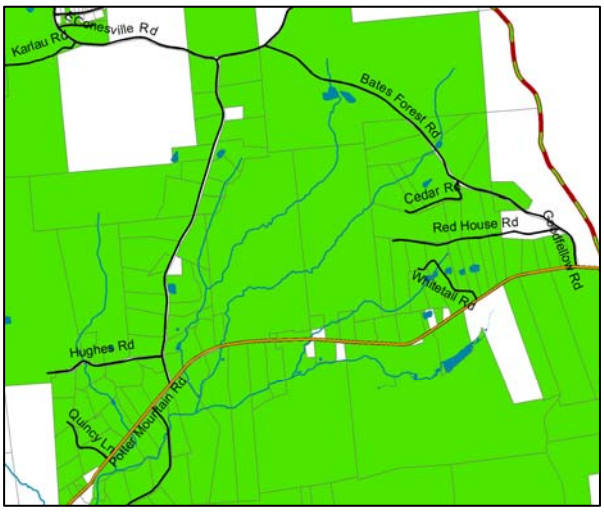



(Map showing existing residences as small green dots)



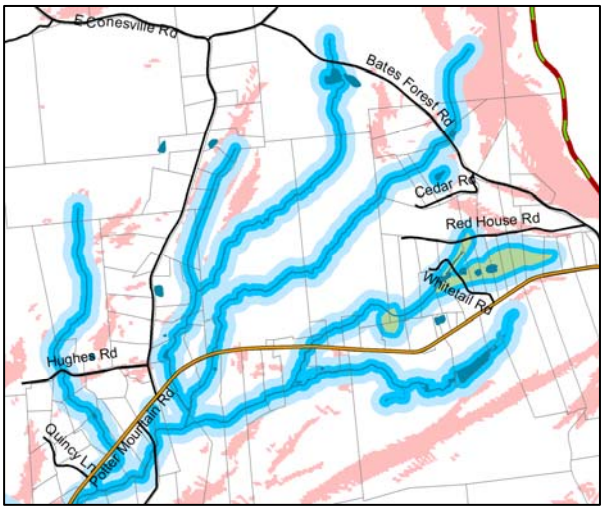
2. Remaining buildable parcels were identified; essentially the opposite of the fully built parcel map.

   (Map showing remaining buildable parcels)



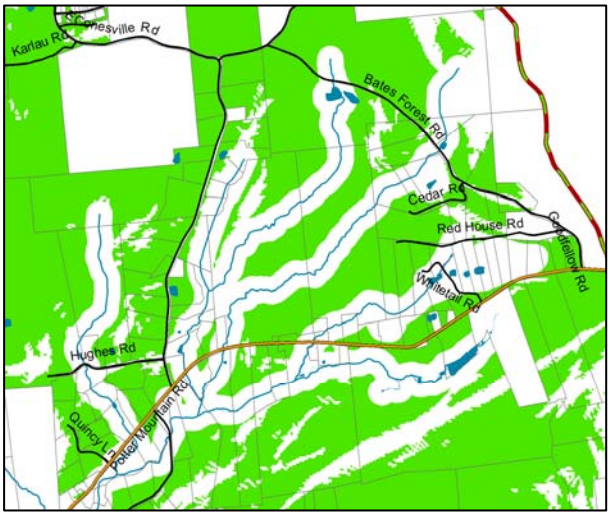

3. All of the environmental constraint layers were added including:
   A. Water, streams, and wetlands
   B. 100 year flood zone
   C. Slopes over 15%
   D. DEP buffer requirements for new residential development

   (Map showing environmental constraints. Blues are water, and water buffers. Greens are wetlands and wetland buffers. Pink is steep slopes.)



4. The Constraints are removed from the Buildable land.

(Map showing remaining buildable area within the buildable parcels, in green)




5. All of the parcels in the watershed that are eligible for the DEP Land Acquisition Program were identified. Since the Manor Kill watershed is in a level 4 priority area, parcels eligible for land acquisition must be at least 10 acres in size, cannot contain any habitable structures, and must meet one of the following conditions:

   A. The parcel must be at least partially located within 1,000 feet of a reservoir

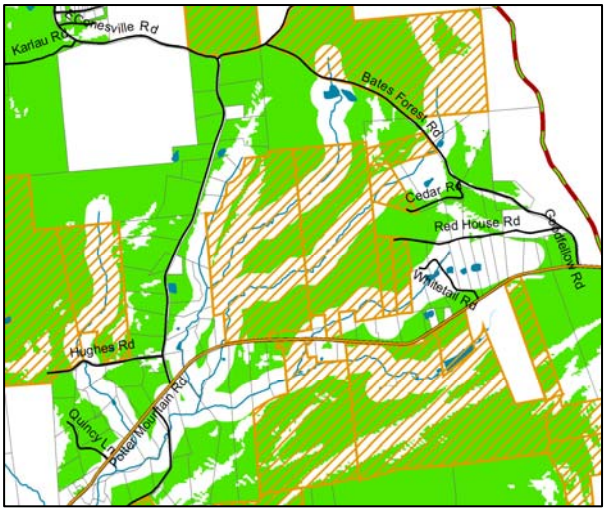
   B. The parcel must be at least partially located within a 100 year flood plain

   C. The parcel must be at least partially located within 300 feet of a watercourse as defined in the Watershed Regulations

   D. The parcel must contain all or part of a federal wetland greater than 5 acres, or a NYSDEC mapped wetland

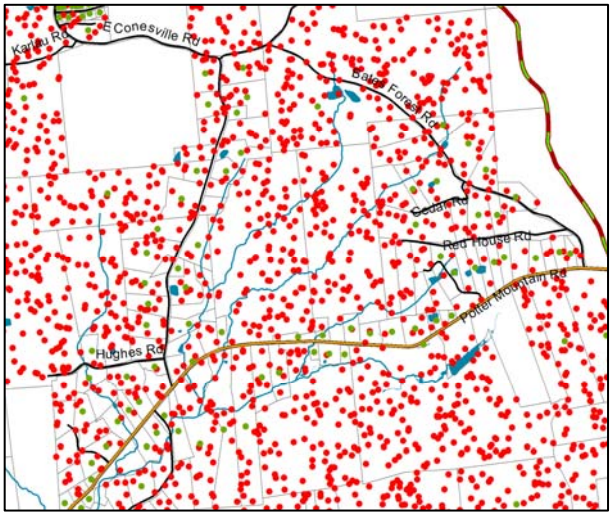
   E. The parcel must contain ground slopes greater than 15%

(Map showing DEP Land Acquisition Eligible properties compared to buildable area)




6. Using this information, calculations are done to determine how many potential new residential uses there might be at full buildout given the existing regulations in the Watershed.

   (Map showing the total potential new residential uses at full buildout. Each small red dot represents one potential new residential use.)




**The following table shows the results of the buildout calculations for the entire watershed, and the results if every Land Acquisition Eligible property were to be purchased by DEP.**

**Table 16**: **Manor Kill Buildout Results**

| **Using a One Acre Lot Size** | | | |
|---|---|---|---|
| Existing Residences ~ 719 | | | |
| **Constraints and Buffers Removed from the Buildable Area** | **Potential Total New Residences** | **Potential New Residences Located on Eligible Land Acquisition Lands** | **Potential New Residences if All Eligible Lands are Acquired** |
| Existing Conditions: No environmental constraints considered and removed from calculation of density of new structures | 13,699 | 6,133 | 7,566 |
| Water, Wetland, and Stream constraints considered and removed from buildable area | 13,477 | 6,038 | 7,439 |
| Water, Wetland, Stream, and 100 year Flood Hazard constraints considered and removed from buildable area | 13,317 | 5,934 | 7,383 |
| All of the above constraints considered, plus 100' buffers from watercourses and wetlands, and 300' buffers from reservoirs and stem considered and removed from buildable area | 12,292 | 5,512 | 6,780 |
| All of the above constraints considered, plus 250' buffers from watercourses and wetlands, and 500' buffers from reservoirs and stem removed from buildable area | 10,835 | 4,893 | 5,942 |
| **All of the above constraints considered, plus slopes over 15% removed from buildable area** | **6,704** | **2,754** | **3,950** |

## 2.2. RUNOFF/EROSION MODELS

| | |
|---|---|
| Map References: | N-SPECT Watershed Modeling Maps:<br><br>Sediment Output by Catchment<br>Local Contributions to Sediment Output under Existing Conditions<br>Local Contributions to Sediment Output under Full Buildout Conditions<br>Change in Sediment Output under Full Buildout Conditions |
| Why is This Important: | In order to reduce erosion and sedimentation and minimize environmental impacts that result from land uses and changes in land cover, an analysis was done to help identify and evaluate locations within the Watershed are most vulnerable to erosion. Turbidity in streams starts with the erosion of particles of soil by either the impact of the precipitation itself, or by the surface water runoff travelling across the soil. These eroded soil particles are carried into the stream creating cloudy or muddy water (turbidity) and carrying metals and nutrients that are of concern to downstream water systems and downstream consumers of water. Both the volume of runoff and the amount of eroded soil have been studied and can be predicted from a range of rain, soil, land use, and topographic parameters that are already known throughout the Manor Kill Watershed. |

Consider This: An analysis was done to predict runoff and erosion based on a method developed by the US NOAA Coastal Services Center called the Nonpoint-Source Pollution and Erosion Comparison Tool (N-SPECT). This method uses a variety factors used in the SCS Runoff Estimation Method which predicts the volume of runoff and the Revised Uniform Soil Loss Method which predicts the mass of eroded soil.

The SCS Runoff Estimation Method assigns a number (called an SCS Curve Number) to each land use within a Soil Type. The Soil Types have been studied and mapped throughout the watershed. Studies have also determined the characteristics of different soils as they erode. Knowledge of these characteristics allows each soil type to be categorized into Hydrologic Soil Groups. Soils have also been studied in relation to different land uses so that we know how each type of soil will affect the precipitation and runoff. Using the SCS Curve Number, the slope of the land, and the intensity of the storm in inches per day, the volume of runoff can be predicted. On a microscopic scale this amounts to determining the portion of precipitation that

will infiltrate into the soil to become groundwater, and that portion that will run off the land to become surface water and will end up in swales, ditches, and streams. The SCS Runoff Estimation Method is oriented around a prediction for a single storm. The average annual rainfall is known from meteorological data, so that the amount of runoff from all the storms in a year can be estimated as well.

The amount of soil eroded can be predicted by using another method that relies on a mathematical equation (called the Revised Uniform Soil Loss Equation) that combines the effect of several factors including rain energy, soil erodability, length of overland flow before becoming concentrated, slope, land cover management, and conservation practices being used. These factors were determined from a combination of relevant studies and local water quality sampling data and are further described as follows:

- Rain Energy is determined mostly by droplet size that is generally created by the weather patterns in a particular area and has been found to vary across the United States.

- Erodability depends on certain soil characteristics on a microscopic scale, and has been determined for the soil characteristics in each Soil Type.

- Length of overland flow can be measured before the water enters a swale, ditch or stream varies, and so varies the opportunity for erosion of the soil surface.

- Slope plays a role in erosion and the steeper the slope, all other factors being equal, the greater the erosion.

- Land Cover Management affects erosion and after study, a factor has been assigned for each type of cover and its management regime.

- Conservation Practice also has assigned factors. For instance, the same crop grown on terraced land will have less erosion than on contour plowed land.

All of the factors above were mapped in Geographical Information System (GIS) format or were calculated from other GIS mapped factors. N-SPECT is a GIS tool that uses the SCS Estimation Method and the Uniform Soil Loss Equation described above to manipulate the GIS mapped factors, including land cover, soil characteristics, topography, and precipitation regimes in order to assess spatio-temporal patterns of surface water runoff processes, nonpoint source pollution, and erosion.

Utilizing the mathematical models described above, N-SPECT calculates flow direction and flow accumulation throughout a watershed. Land cover, soils, and precipitation data sets are processed to estimate runoff volume at both the local level and watershed scales. The factors described above represent the contribution of each type of land cover to the expected

pollutant and sediment load and these are applied by the computer to known land cover data to approximate total pollutant and sediment loads. N-SPECT is designed to be portable to any watershed, provided the user has access to the necessary data, as is the case for the Manor Kill Watershed.

One way to use N-SPECT is to have it assess an overall water quality rating by comparing the total pollutant and sediment loads calculated by N-SPECT to local water quality standards. This water quality rating can help resource managers make informed decisions about water quality and about which areas, such as catchment areas to target for improved erosion control. N-SPECT also permits functional comparisons of current land cover conditions to proposed changes in both land use and land cover. N-SPECT results can be used to help understand and predict the impacts of land and cover management decisions on water quality and, potentially, on receiving water health.

**Results of N-SPECT**

Total Sediment Output by Catchment: Shows the total sediment that each catchment produces per year.

Annual Sediment Output per Square Meter (by Catchment): Although similar to the Total Sediment Output, this map shows the data that is "normalized" by area indicated as the amount of sediment per square meter. This map is useful for visualizing the relative contribution of sediment without the influence of catchment area. This technique is one way the user can begin to see differences between independent catchments within the Watershed. Local Contributions to Sediment Output under Existing Conditions: Shows specific locations that are contributing sediments to the Watershed. The darker the color, the more soil erosion is taking place under existing conditions.

Local Contributions to Sediment Output under Full Buildout Conditions: Shows specific locations that could contribute sediments to the Watershed if all available lands were built out to the fullest extent possible at some point in the future. The darker the color, the more soil erosion could occur after buildout.

Change in Sediment Output under Full Buildout Conditions: Shows the change that could occur under full buildout conditions. The darker the color, the more change there could be (more erosion). Some areas show less soil erosion when the land cover is changed. In the areas where erosion is predicted to decline in the full build-out condition, the same model predicts markedly increased peak and total runoff. This is a relatively common and well known consequence of unrestricted or over development. Although the quantity of eroded soil from those areas is predicted to decrease, the significantly increased peak and total runoff from these areas will potentially have increased negative impacts from increased erosion in ditches, increased

stream bank erosion, increased undermining of inlet and outlet erosion control aprons & culverts, and increased flooding.

Table 17: N-SPECT Results (Change in Erosion from Existing to Full Buildout in mg/year)

| **Catchment Area** | **Total Sediment Output, Existing Conditions** | **Total Sediment Output, Full Buildout Conditions** |
|---|---|---|
| 1 | 4,013,040 | 5,862,260 |
| 2 | 2,818,460 | 4,172,720 |
| 3 | 4,082,850 | 6,784,530 |
| 4 | 1,119,270 | 2,229,320 |
| 5 | 1,340,390 | 2,976,690 |
| 6 | 1,331,770 | 2,516,180 |
| 7 | 1,518,310 | 3,188,230 |
| 8 | 3,932,340 | 8,336,220 |
| 9 | 1,346,690 | 2,989,580 |
| 10 | 3,927,300 | 8,880,950 |
| 11 | 3,641,440 | 8,161,270 |
| 12 | 5,163,080 | 1,072,150 |
| 13 | 3,754,310 | 7,954,730 |
| 14 | 964,162 | 2,081,990 |
| 15 | 863,250 | 2,198,450 |
| 16 | 1,617,980 | 5,241,810 |
| 17 | 7,761,770 | 1,692,020 |
| 18 | 2,292,250 | 6,116,800 |
| 19 | 1,240,190 | 2,190,190 |
| Total Estimated Erosion | 52,728,852 | 109,523,620 |

## 2.3 OTHER TRENDS IDENTIFIED IN THE MANOR KILL MANAGEMENT PLAN

The Manor Kill Management Plan presents and discusses these same topics and provides a great deal of basic information on the Manor Kill and the functioning of streams in general. The reader is referred to this document. Some of the information is summarized in this section because it is relevant to understanding the issues facing the entire Manor Kill Watershed. This data is also relevant to aid in identifying and mitigating negative environmental impacts within the watershed and are thus important components of this GEIS. Highlights of the Management Plan discussions on the physical characteristics of the Manor Kill include:

- There are approximately 498 miles of road in the Schoharie watershed (65 in Manor Kill). These roads often are very close to the creek and together with bridges, act to further constrict the creek.

- Floodplains and streamside wetlands have been filled, diversions created to sluice water into floodplain ponds and pastures and lawns cleared along its banks and terraces. These activities have an impact on the Manor Kill especially during flood events that cause the loss of property and infrastructure. It also affects the stream system during low flow periods when the stream is over-wide and shallow as it is unable to support a vibrant coldwater fishery in affected segments.

- Climate change may influence the watershed. With the predicted lack of snow fall in the future, streams and groundwater in the watershed will not receive a slow sustaining release of water through the winter and spring. Replacing the normal slow release will be more intense storms, which will sporadically dump large quantities of water into the system potentially causing damaging flooding. Modeling predictions indicate that in the next century we will see more extreme stream flows that will cause streams to flow higher in winter, likely increasing flood risk, and lower in summer, exacerbating drought. Changing the dynamic of the hydrologic cycle in the Manor Kill would also impact the NYC water supply system, forcing potential changes in operational measures.

- The physical character of the Manor Kill's drainage system, combined with steep mountainous slopes, and high precipitation, results in a stream system where stream water levels rise and fall quickly in response to storm events. This "flashiness" is somewhat mitigated by heavy forest cover throughout much of the watershed. Therefore, efforts to protect upland, as well as riparian, forest are important to reducing flooding impacts.

- Overland flow of water runoff accounts for most of water that causes the sharp peaks in water levels of the stream.

- Groundwater flow on the hill slopes throughout the watershed is a major factor in the hill slope failures that impact stream channel conditions and water quality. This groundwater flow is influenced by the geology of the area. The combination of stream erosion at the top of the hill slope, fluctuating groundwater levels, differential seepage from the slopes and saturated sediments can result in very long-lasting, deep-seated slope failures. Every major rainfall-runoff event seems to generate new slope failures or reactivate older failures. Some of the chronic turbidity sources in the tributary are from these hill slope failure sources, which can release large volumes of sediment, especially during a storm or other high-water event.

- Lacustrine silt and clay, along with lodgement till, are primary sources for the suspended sediment and turbidity problems seen in the Manor Kill, although they are less pronounced here than in the Upper Schoharie Creek or Upper Esopus Creek watersheds. Long-lasting exposures of these soils can be chronic sources of suspended sediment into the stream well-after a storm event. Rain water and overland runoff contacting exposed banks can also readily entrain sediment from these units. The nature of these deposits makes them variably susceptible to stream erosion. Sediments, especially the lacustrine and tills are sensitive to natural or manmade disturbances which can have a long lasting negative effect on channel stability, water quality and stream ecology.

# 3.0 POTENTIAL ENVIRONMENTAL IMPACTS

**Purpose of Section:** The purpose of this section is to identify the potential activities that could take place within the Watershed and their potential impacts on the environment. The data is presented to assist the towns in correlating the cause and effect relationship between specific potential projects and potential impacts.

Over 19 different types of data, as listed below, were collected and analyzed for this GEIS. Section 2 (Environmental Setting) discusses the current conditions and importance of each of these resources to the water quality and the overall environment of the Manor Kill Watershed.

| | | |
|---|---|---|
| Bedrock | Surficial Geology | Surface Water |
| Roads | Municipal Boundaries | Watershed Boundaries |
| Land Uses | Land Cover | Agricultural Districts |
| Topography | Steep Slopes | Wetlands |
| Stream Classification | Floodplains | Soils (6 different features of soils) |
| Public Lands | Buildable Lands | Archaeologically Sensitive Areas |
| Aerial Photographs | | |

## 3.1 ISSUES AND POTENTIAL USES FACING THE MANOR KILL

The following were identified as significant issues facing the Manor Kill Watershed:

1. Loss of wildlife habitats.
2. Loss of recreational opportunities.
3. Increase in flooding, and flooding severity. Changes in stream channels, and associated scouring/deposits.
4. Loss of land due to flooding/scouring. Stream banks instable.
5. Loss of farm fields due to flooding/scouring and deposition of debris and stream material on farm fields.
6. Change in water depth.
7. Change in land use from much more open to wooded/shrub as farms have gone out of business.
8. Road maintenance; culvert and ditches not maintained, cleaned, sized correctly, or equipped with inlet or outlet protection.
9. Wind development.
10. Turbidity and erosion.
11. New York City Land Purchases and Easements.

12. Identification of new or expanded hamlet areas (as per NYC DEP)

The following activities are feasible land uses that do, or could occur, in the foreseeable future in the Manor Kill Watershed:

- Cell Towers
- One Lot Single Family New residential development of 1 to 4 units
- Major subdivisions of 5 or more units
- Commercial, non-residential or intensive outdoor recreational Use
- Removal of Vegetation > 1 acre
- Removal of vegetation < 1 acre
- Roads: widening, new sections, paving gravel, changes to culverts
- Grading
- Building in 100-year Floodplain
- Construction on slopes >20%
- Construction on slopes 10-20%
- Construction on exposed bedrock or shallow soils
- Storage of petroleum or other chemicals
- Wind Turbine
- Mine Construction or Expansion
- Forest Harvesting

## 3.2 IDENTIFICATION AND EVALUATION OF POTENTIAL IMPACTS

Some environmental features in the Manor Kill Watershed are more sensitive to change than others. Some are very constrained for any type of new land use or development because they are vulnerable to disturbance, are vital to the ecosystem, or are areas that could experience significant negative environmental impacts (direct and indirect). Others, like wetlands, often have a legal status that prevents or severely limits future development there.

The following environmental features are considered to have extremely severe environmental constraints for future land uses.

Lakes and Streams: These include the actual watered areas, but not the shorelines or stream banks, and include the reservoir. These are un-buildable areas due to presence of water.

Slopes > 20%: Building on steep slopes poses many problems that make construction economically unfeasible and environmentally difficult. Steep slope construction leads to erosion and sedimentation, which degrades area streams and lakes. Steep slope

construction, especially on ridgelines can negatively impact viewsheds, and can disrupt wildlife travel corridors.

Wetlands: Wetlands have many important natural functions such as flood control, ground water and surface water quality protection, shoreline stabilization, provision of open space and wildlife habitats, protection of stream ecosystems, and are aesthetically valuable to many people.

Deed Restricted Lands or Lands with Easements: These are private lands or NYC DEP lands that have restrictions on them that will prohibit future subdivision, building, or other development.

Wetland Buffer: These are lands within 100 feet of a state regulated wetland and are included in a legal setback/buffer area.

The following environmental features are considered to have severe limitations for future land uses. These include lands that could be potentially developed, but that have certain environmental conditions, or a legal status, that make it likely that one or more direct, indirect and cumulative negative environmental impacts will occur during development unless specific conditions or project alterations are carried out to protect resources.

Slopes 15-20%: Lands having slopes in this range pose some engineering and economic problems for placement and septic systems are not permitted. Further, development on steep slopes can increase erosion and sedimentation, can disrupt wildlife corridors, and impinge on scenic views. Slopes of 15 to 20% are less constrained than those greater than 20%.

Riparian Zones: These areas include stream banks or riverbanks, and the immediate lands adjacent to them. Riparian zones are important areas and function as flood control mechanisms, groundwater recharge areas, water filtration areas, and important fisheries and wildlife habitats. The size of riparian zones varies according to the topography of each stream; in general, 100-foot buffers from the stream encompass critical parts of most riparian zones.

Soils with Limitations for Septic Systems: These are locations that have soil characteristics and percolation rates that are considered not amenable for placement of a standard septic system. These soils place severe limitations on the location and affordability of placement of septic systems. These areas have a high risk of introducing nonpoint pollution from septic system runoff due to inadequate or poorly designed septic systems.

Shallow Bedrock: Various locations throughout the Watershed have shallow soils, and/or exposed bedrock. These areas are not suitable for standard septic system construction because there is not enough soil for adequate treatment of waste. Further, exposed

bedrock or shallow soils pose limitations for construction of sub grade foundations and buried utilities.

Public Lands & Deed Restricted Lands: Public lands, NYS DEP owned lands or easement lands, state forests, other wild conservation lands, lands that have public utilities, and those with known easements that prevent future development are not likely to be developed in the future.

The following environmental features are considered to have moderate environmental constraints for future land use. Areas having moderate limitations are potentially developable, but development here could result in indirect or cumulative negative environmental impacts to the environment and to resources that are highly valued features of the Watershed[3]. Mitigation of negative environmental impacts in these areas could be necessary prior to development approval.

Agricultural Areas: Agriculture is a primary land use in the valley areas of the Manor Kill. Loss of agriculture can have numerous negative environmental impacts related to both the natural and man-made environments. Such losses can result in damage to open space, wildlife habitats, scenic views, and rural character. When farmlands are converted to other uses such as housing, additional negative impacts can include increased costs of providing services, increased erosion, and sedimentation and conveyance of nutrients.

Prime Farmland Soils: Prime farmland is defined by the United States Department of Agriculture, Natural Resources Conservation Service as those soils that are particularly suited and best used for agricultural purposes. This is land that has the best combination of

3 Direct Environmental Impacts are environmental changes that can be immediately linked to project activities. Indirect Environmental Impacts, sometimes called secondary impacts, are changes in environmental features or dynamics that are consequences of direct impacts. While direct impacts are environmental changes immediately linked to a specific action or project, indirect impacts often result from the many interactions of direct impacts and the environment. Indirect impacts are often more numerous than specific direct impacts.

Cumulative Environmental Impacts are aggregates of direct and indirect impacts resulting from two or more projects or activities in the same area or region. Relatively small impacts may occur for any given project that is acceptable to the community and they may not be environmentally significant on a per project basis. SEQRA requires a municipally to analyze and mitigate cumulative impacts as well as direct and indirect impacts. Cumulative impacts can be "additive" in the sense that the impact is a summation of the incremental impacts of other activities. In some cases, a cumulative impact may be greater than the simple summation of projects. For example, a large mammal population may be reduced in proportion to the loss of habitat, but the total population may be depleted long before the entire amount of critical habitat is removed.

physical and chemical characteristics for producing food, forage, fiber or other crops. It must also be available for these uses. Prime soils generally have the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops. These soils are not excessively erodable or saturated with water for a long period of time and do not flood frequently or are protected from flooding.

Soils with percolation rates that meet New York State Department of Health (NYSDOH) requirements, but that have other limitations: There are various locations within the Watershed where the soils have characteristics (ponding, flooding, shallow bedrock or water tables, etc) that may meet the NYSDOH requirements, but that also have other limitations. These locations are sensitive because limitations may exist that would prevent installation of a standard septic system.

Aquifers: Except in the public water district, it is likely that future development in the Watershed will rely on wells drilled into bedrock or unconsolidated aquifers. Water availability may be a moderate limiting factor to development, but it must be determined on a project-by-project basis. Some land activities such as storage of chemicals can pollute groundwater sources. Large scale changes in vegetation can change aquifer recharge rates which may affect water quantity.

Floodplain: Development in the floodway and floodplain can interfere with the natural functioning of the area by reducing the capacity of the flood plain or flood way to hold and conduct water. Construction here can increase water flow velocities, increase floodwaters, and pose significant safety and property damage issues. Mapped floodways and floodplain areas are considered as having moderate environmental constraints.

### 3.1.1 ENVIRONMENTAL IMPACT MATRIX

A matrix allows one to correlate the cause and effect relationship between specific potential projects and impacts. The environmental impact matrix below contains a listing of potential or likely projects that could take place in the Manor Kill Watershed and relates them to specific environmental resources. The matrix is used not only to identify those resources that could be impacted, but details the type of impact that could occur. The matrix is also used for the identification of interactions between individual impacts, and evaluation of the significance of the impacts. Section 4 (mitigation) also uses a matrix to identify mitigation techniques, including design, engineering, and policy alternatives that the towns could consider.

The matrix below identifies many of the primary direct impacts of activities relating to development. Planning Boards should use these matrices during their review of projects. However, there are potentially many more indirect effects of these activities, many of which could contribute significantly to the cumulative impact a land use will have on the environment.

Assessment of impacts rests on a thorough understanding of current environmental conditions. This GEIS provides detailed information so that Town and Planning Boards in the future can conduct a before-after comparison of the environment during their review of newly proposed projects. One can assess environmental changes potentially caused by a project only after there is a definition of the base conditions.

The environmental impact matrix, below, helps in understanding the relationship between specific activities likely to occur in the watershed and specific types of impacts. This matrix not only identifies the resources that could potentially be negatively impacted by certain land use activities, but also indicates whether the potential impacts are likely to be negative, positive, indirect or with no appreciable value. This table identifies impacts under "worst-case" scenarios. Those activities listed below, as having **potential negative or indirect impacts** should be carefully reviewed during the planning process and appropriate mitigation methods (Section 4 of this GEIS) applied to prevent environmental degradation. This matrix does not imply that all possible impacts of an activity are already known. The matrix should be used as a tool to guide decision-makers in their review of specific projects. Specific project impacts will need to be evaluated based on the scope of the activity and the exact location where the activity is proposed. Further, the impacts listed below are related to those addressed in this GEIS. *Other impacts, such as to schools, public services, employment, dark skies, visual character, archeological or historical resources, and housing, for example are not evaluated below.*

| **Type of Potential Impact** | **Code** | See Table 19 for Definitions of Significance |
|---|---|---|
| Minor Impact | 1 | |
| Moderate Impact | 2 | |
| Large Impact | 3 | |

**Table 18: Environmental Impact Matrix**

| **Potential Land Use Activity** ⇨ | Cell Towers | One Lot Single Family or Residential Development of 1 to 4 units | Major subdivisions of 5 or more units | Commercial, non-residential or intensive outdoor recreational Use | Removal Of Vegetation | | Roads: widening, new sections, paving gravel, changes to culverts | Grading | Building in 100-year Floodplain | Construction on slopes | | Construction on exposed bedrock or shallow soils | Storage of petroleum or other chemicals | Wind Turbine | Mine Construction or Expansion | Forestry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | > 1 acre | < 1 acre | | | | >20% | 10-20% | | | | | |
| **Environmental Resources and Potential Impacts** ⇩ | The following resources could be impacted by the above activities. Probability and magnitude of impact can only be determined on a case-by-case or site-by-site basis. See Table 19 for further definitions and criteria for determining significance. | | | | | | | | | | | | | | | |
| Groundwater : Risk of water contamination, modification of water quantity | **1** | **2** | **2** | **3** | **2** | **1** | **2** | **2** | **1** | **2** | **2** | **3** | **3** | **1** | **3** | **2** |
| Streams, lakes, ponds: Risk of water contamination, increased | **1** | **2** | **3** | **3** | **3** | **2** | **3** | **3** | **3** | **3** | **2** | **2** | **3** | **1** | **3** | **3** |

| **Potential Land Use Activity** ⇨ | Cell Towers | One Lot Single Family or Residential Development of 1 to 4 units | Major subdivisions of 5 or more units | Commercial, non-residential or intensive outdoor recreational Use | Removal Of Vegetation | | Roads: widening, new sections, paving gravel, changes to culverts | Grading | Building in 100-year Floodplain | Construction on slopes | | Construction on exposed bedrock or shallow soils | Storage of petroleum or other chemicals | Wind Turbine | Mine Construction or Expansion | Forestry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | > 1 acre | < 1 acre | | | | >20% | 10-20% | | | | | |
| sediments, loss of wildlife habitats, loss of recreation | | | | | | | | | | | | | | | | |
| Wetlands: Loss of flood control, decrease in water quality and quantity, loss of open space and wildlife habitats | **1** | **2** | **3** | **3** | **3** | **2** | **3** | **3** | **3** | **3** | **2** | **1** | **3** | **1** | **2** | **2** |
| Floodplains: Decreased capacity to hold water, increased flow | **1** | **2** | **3** | **3** | **3** | **3** | **3** | **3** | **3** | **1** | **1** | **1** | **3** | **1** | **3** | **3** |

| **Potential Land Use Activity** ⇨ | Cell Towers | One Lot Single Family or Residential Development of 1 to 4 units | Major subdivisions of 5 or more units | Commercial, non-residential or intensive outdoor recreational Use | Removal Of Vegetation | | Roads: widening, new sections, paving gravel, changes to culverts | Grading | Building in 100-year Floodplain | Construction on slopes | | Construction on exposed bedrock or shallow soils | Storage of petroleum or other chemicals | Wind Turbine | Mine Construction or Expansion | Forestry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | > 1 acre | < 1 acre | | | | >20% | 10-20% | | | | | |
| velocities, increased flood waters, decreased safety, increased erosion and sedimentation | | | | | | | | | | | | | | | | |
| Stream-Side Vegetation and Soils: Increased stream water temperature, increased erosion and turbidity, loss of wildlife habitats | **1** | **2** | **3** | **3** | **3** | **3** | **3** | **3** | **3** | **2** | **2** | **1** | **1** | **1** | **2** | **3** |

| **Potential Land Use Activity** ⇨ | Cell Towers | One Lot Single Family or Residential Development of 1 to 4 units | Major subdivisions of 5 or more units | Commercial, non-residential or intensive outdoor recreational Use | Removal Of Vegetation | | Roads: widening, new sections, paving gravel, changes to culverts | Grading | Building in 100-year Floodplain | Construction on slopes | | Construction on exposed bedrock or shallow soils | Storage of petroleum or other chemicals | Wind Turbine | Mine Construction or Expansion | Forestry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | > 1 acre | < 1 acre | | | | >20% | 10-20% | | | | | |
| Agriculture and Prime Soils: Loss of open space, loss of wildlife habitats, loss of community character, loss of local food and economy | **1** | **2** | **3** | **3** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** |
| Wildlife: Loss of biodiversity, loss of recreation | **1** | **2** | **3** | **3** | **3** | **2** | **1** | **1** | **3** | **3** | **2** | **1** | **1** | **3** | **2** | **2** |
| Forests: Loss of wildlife habitats, fragmentation | **2** | **2** | **3** | **3** | **3** | **2** | **2** | **3** | **2** | **3** | **2** | **2** | **1** | **2** | **2** | **3** |

| **Potential Land Use Activity** ⇨ | Cell Towers | One Lot Single Family or Residential Development of 1 to 4 units | Major subdivisions of 5 or more units | Commercial, non-residential or intensive outdoor recreational Use | Removal Of Vegetation | | Roads: widening, new sections, paving gravel, changes to culverts | Grading | Building in 100-year Floodplain | Construction on slopes | | Construction on exposed bedrock or shallow soils | Storage of petroleum or other chemicals | Wind Turbine | Mine Construction or Expansion | Forestry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | > 1 acre | < 1 acre | | | | >20% | 10-20% | | | | | |
| of forest, loss of forestry opportunities, loss of recreation, loss of community character | | | | | | | | | | | | | | | | |
| Road & Street Conditions/Traffic: Increased erosion and sedimentation, change in community character, increased impervious surfaces | **1** | **2** | **3** | **3** | **1** | **1** | **3** | **3** | **3** | **3** | **2** | **1** | **1** | **1** | **2** | **2** |

| **Potential Land Use Activity** ⇨ | Cell Towers | One Lot Single Family or Residential Development of 1 to 4 units | Major subdivisions of 5 or more units | Commercial, non-residential or intensive outdoor recreational Use | Removal Of Vegetation | | Roads: widening, new sections, paving gravel, changes to culverts | Grading | Building in 100-year Floodplain | Construction on slopes | | Construction on exposed bedrock or shallow soils | Storage of petroleum or other chemicals | Wind Turbine | Mine Construction or Expansion | Forestry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | > 1 acre | < 1 acre | | | | >20% | 10-20% | | | | | |
| Public Water Supply: Decreased drinking water quantity | **1** | **2** | **3** | **3** | **3** | **3** | **2** | **2** | **1** | **2** | **1** | **3** | **1** | **1** | **2** | **2** |
| Public Water Quality: Decreased drinking water quality | **1** | **2** | **3** | **3** | **3** | **3** | **2** | **2** | **1** | **2** | **1** | **2** | **3** | **1** | **2** | **2** |

Table 19: **Criteria and Definitions for Determining Significance of Major Environmental Impacts***

| **Term** | **1. Significance** | **2. Soil Erosion** | **3. Soil Contamination** | **3. Loss of Prime Farmland** | **4. Wildlife Resource Degradation** |
|---|---|---|---|---|---|
| **Magnitude** | Major | Secondary effects like building damage or siltation of stream | Poses secondary health risks | Impacts areas of prime farmland soils | Loss or impact on any threatened, endangered, or listed species or habitat |
| | Moderate | Aesthetic effects | ___ | ____ | Loss of any sensitive species or habitats, loss or degradation of any unusual plant community |
| | Minor | Imperceptible changes | No associate health risks | Impacts no soils defined as prime | Loss or degradation of undisturbed vegetation or habitat in affected area |
| **Duration** | Long-Term | Life of activity | Cumulative over operational life | Life of activity | > 1 year or during critical periods |
| | Medium-Term | Recurrent | Recurrent | _____ | One month to 1 year |
| | Short- Term | During construction | Easily cleared up or self-remediating | 5 years or less | Less than 1 month |
| **Extent** | Large | >100 square yards | >100 square yards | >50 acres of prime farmland is removed | > 5% of watershed resources |
| | Medium | ~ 10 square yards | ~ 10 square yards | 10 to 50 acres is removed | 2% to 5% of watershed resources |
| | Small | < 1 square yard | < 1 square yard | <10 acres removed | Less than 2% of watershed resources |
| **Likelihood** | Probable | Occurs under typical operating conditions | Occurs under typical operating conditions | Occurs under typical operating conditions | Occurs under typical operating conditions |
| | Possible | Occurs under worst-case conditions | Occurs under worst-case conditions | Occurs under worst-case conditions | Occurs under worst-case conditions |
| | Unlikely | Occurs under malfunction conditions | Occurs under malfunction conditions | Occurs under malfunction conditions | Occurs under malfunction conditions |

## Criteria and Definitions for Determining Significance of Major Environmental Impacts* (Continued)

| Term | 5. Significance | 6. Water Flow Reductions | 7. Water Quality Degradation | 8. Groundwater Degradation | 9. Wetland Degradation | 10. Floodplain Damage |
|---|---|---|---|---|---|---|
| **Magnitude** | Major | Would eliminate or sharply curtails existing aquatic life or human uses depended on flowing water | Immediately observable impact (fish kills or health risks | Poses secondary health risks | In conflict with State or Federal wetland protection standards | In conflict with State or Federal floodplain management |
| | Moderate | Would substantially interfere with existing aquatic life or human uses depended on flowing water | Some observable biological response | Approaching or slightly exceeding drinking water standards | _____ | _____ |
| | Minor | Any observable reductions in existing aquatic life (diversity and/or biomass) or impairment of human uses or withdrawals | No biological response observed | Degradation of baseline conditions on one or more parameters without approaching or exceeding standards | No wetland losses or all losses mitigated as per State requirements | No conflicts |
| **Duration** | Long Term | Life of activity | Continuous series of events > 1 to 2 years | Continuous series of events > 1 to 2 years | Life of activity | Life of activity |
| | Medium Term | Project life of 5 to 20 years | Intermittent events maximum 2 years | Intermittent events maximum 2 years | Project life of 5 to 20 years | Project life of 5 to 20 years |
| | Short Term | < 5 year project life | Single event | Single event | < 5 year project life | < 5 year project life |
| **Extent** | Large | Effects extend to | Effect over entire | Effect over entire | >5% of wetland | Floodplain and |

| Term | 5. Significance | 6. Water Flow Reductions | 7. Water Quality Degradation | 8. Groundwater Degradation | 9. Wetland Degradation | 10. Floodplain Damage |
|---|---|---|---|---|---|---|
| | | Schoharie Reservoir | watershed or > 40% of entire stream length | watershed or > 40% of entire stream length | | floodway impaired |
| | Medium | Effects extend downstream | Effect > 25% of watershed | Effect > 25% of watershed | 2 to 5% of wetland | Floodplain impaired but not floodway |
| | Small | Effects do not extend downstream | Effect less than 25% of watershed | Effect less than 25% of watershed | < 2% of wetland | Floodplain not impaired |
| **Likelihood** | Probable | Occurs under typical operating conditions | Occurs under typical operating conditions | Occurs under typical operating conditions | Occurs under typical operating conditions | Occurs under typical operating conditions |
| | Possible | Occurs under worst-case conditions | Occurs under worst-case conditions | Occurs under worst-case conditions | Occurs under worst-case conditions | Occurs under worst-case conditions |
| | Unlikely | Occurs under malfunction conditions | Occurs under malfunction conditions | Occurs under malfunction conditions | Occurs under malfunction conditions | Occurs under malfunction conditions |

*Table adapted from the US Forest Service Rural Utilities Service, Draft Environmental Impact Statement Significance Criteria, Jackson County Lake Project and the National Environmental Protection Act (NEPA) CEQ Regulations on Significance (40 CFR 1508.27)

## 4.0 MITIGATIONS

**Purpose of Section:** The purpose of this section is to offer project level and municipal level mitigation techniques that can reduce or eliminate potential negative environmental impacts.

A wide variety of management or mitigation techniques can be used to reduce or eliminate potential negative environmental impacts. By reference, all actions, strategies, and mitigations at the watershed and management unit level as included in the Manor Kill Management Plan (summarized below) are also included in this GEIS as available mitigation tools.

**Mitigation Practices**

The following mitigation techniques can be applied at the project level (to be evaluated and applied by the Planning Board for a specific project under review) or by the Town as broader town policy. These practices can be applied to a variety of land use activities and will serve to protect water quality by reducing impervious areas, reducing runoff, maintaining water quality, decreasing peak flows, and protecting stream channels. Further, these practices will also protect wildlife habitats and preserve the open spaces and rural character that define the towns of Conesville and Gilboa. Mitigation practices chosen by the town should be consistent with the adopted comprehensive plan and the adopted Manor Kill Management Plan.

Preserve undisturbed areas: Conservation of natural areas such as undisturbed forested and native-vegetated areas, natural terrain, riparian corridors and wetlands on a development project can help to preserve redevelopment hydrology of the site and aid in reducing stormwater runoff and pollutant load. Undisturbed vegetated areas also promote soil stabilization and provide for filtering and infiltration of runoff.

Preserve existing buffers or create new setbacks for disturbed areas: Naturally vegetated buffers should be defined, delineated and preserved along perennial streams, rivers, shorelines and wetlands. Buffers and native vegetation should be protected throughout planning, design, construction and occupancy.

Reduce clearing and grading: Clearing and grading of the site should be limited to the minimum amount needed. Restrict clearing to the minimum area required for building footprints, construction access, and safety setbacks. The Planning Board could also:

- Establish limits of disturbance for all development activities
- Use site foot-printing to minimize clearing and land disturbance
- Limit massive grading approaches.

• Use alternative site designs that use open-space or conservation subdivision layouts for large developments.

Locate sites in less sensitive areas: Ensure that land use activities do not encroach on designated floodplain and/or wetland areas. Leave areas of porous or highly erodible soils as undisturbed conservation areas. Buildings should be located away from steep slopes, drainageways and floodplains. Excessive grading should be avoided on all slopes, as should the flattening of hills and ridges. Steep slopes should be kept in an undisturbed natural condition to help stabilize hillsides and soils. On slopes greater than 25%, no development, regrading or stripping of vegetation should be considered.

Placement of structures or significant grading should be avoided on slopes greater than 20%. On less steep slopes, building should utilize best management practices to reduce or eliminate erosion and sedimentation. Guidelines for such best management practices can be found from the Natural Resource Conservation Service or Schoharie County Soil and Water Conservation District office. Additionally, the publication "New York Guidelines for Urban Soil Erosion and Sediment Control," published by the Empire State Chapter of the Soil and Water Conservation Society, describes recommended best management practices.

Buildings and other impervious surfaces should be located on those portions of the site with the *least* permeable soils. Similarly, areas on a site with highly erodible or unstable soils should be avoided for land-disturbing activities and buildings to prevent erosion and sedimentation problems as well as potential structural problems. These areas should be left in an undisturbed and vegetated condition.

Open space conservation designs of major subdivisions: Use conservation subdivision site designs for residential development incorporates smaller lot sizes to reduce overall impervious cover while providing more undisturbed open space and protection of water resources. Locate the developed portion of the subdivision in the least sensitive areas of the site and use reduced setbacks and frontages, and narrower right-of-way widths to design nontraditional lot layouts within the subdivision.

Reduce roadway and driveway lengths and maintain with pervious surfaces: Roadway lengths and widths should be minimized on a development site where possible to reduce overall imperviousness. New roadways or driveways on a site should generally conform to the lay of the land. Natural drainageways and stream buffer areas should be preserved by designing road layouts around them. Consider different site and road layouts that reduce overall driveway or road length. For large subdivisions with new streets, minimize street width by using narrower street designs and smaller side-yard setbacks to reduce total road length.

Reduce building foot-print size or other impervious surfaces: Use shared driveways that connect two or more homes, alternative driveway surfaces, and smaller front building setbacks to reduce the total driveway length needed.

Reduce parking lot size and maintain with pervious surfaces: Use alternate building designs to reduce the impervious footprint of buildings. Consolidate functions and buildings to reduce footprints of structures. Reduce directly connected impervious areas. For commercial or municipal uses, do not overbuild parking lots. Use alternative porous surface for overflow areas or main parking areas if not a high-traffic parking lot. Parking lots should have landscaping or incorporate vegetated stormwater control features.

Use Low Impact Design Stormwater Control Practices: Use vegetated buffer and filter strips, open vegetated channels, and bioretention methods.

Maintain Forested riparian buffers: Encourage reforestation where no wooded buffer currently exists. Proper restoration should include all layers of the forest plant community, including understory, shrubs and groundcover, not just trees. A riparian buffer can be of fixed or variable width but should be continuous and not interrupted by impervious areas that would allow stormwater to concentrate and flow into the stream without first flowing through the buffer. Ideally, riparian buffers should be sized to include the 100-year floodplain as well as steep banks and freshwater wetlands.

Preserve prime agricultural soils and active farmlands: Move new structures away from areas having prime soils or active agricultural activities and along the edges instead of the center of an open field, to the maximum extent practical. Use conservation subdivision designs for large projects that protect areas with prime agricultural soils.

Preserve Forested and Open Wildlife Habitats: Maintain forested habitats around wetlands (if present) and vernal pools (temporary wetlands within wooded areas), including both canopy and understory. Maintain forested corridors connecting wetlands or vernal pools and minimize disturbance to the forest floor and understory vegetation. Maintain or create buffers between land use activities and undeveloped areas. Promote farms and farmland to preserve grasslands and open habitats.

Use Best Management Forestry Practices: Use New York State Forestry Best Management Practices for Water Quality during forestry operations.

Evaluate Groundwater Needs and Impacts Prior to Project Approval: The amount of water required for new land uses varies substantially depending on the project. For example, the water requirements for an area to be developed as single-family residences are considerably different than the requirements for a commercial or industrial project. Placing limits on well yields may be necessary under certain conditions to allow for proper recharge of the aquifer in

certain locations. These limits can be determined only on a case-by-case basis and are both location and project specific.

Site-specific hydrologic research and testing is an important part of development planning to determine whether the required volumes of water for the project are available. Further, during project design and review, aquifer testing is necessary to determine the safe yield that can be withdrawn from an aquifer. Appropriate limits on well yields can only be determined after such study. Proposed projects should detail the basic water supply needs at the project site.

Use of heavy construction equipment, paving over large areas with impervious surfaces, and significant compaction of soils over large areas should be avoided in known aquifer recharge areas. Use of chemicals, petroleum products, sludge disposal, and use of septic systems within a wellhead protection area should be prohibited.

**Other General Mitigation Techniques Include:**

**1. Effective Use of SEQRA**

Many activities taking place in the Watershed are ones that require an environmental review under SEQRA. Generally, Type II as defined by SEQRA (usually activities that only require a building permit) do not require SEQRA review. Use of the Full EAF is currently required for those activities classified as a Type I action under SEQRA. The Full EAF provides the planning board or lead agency additional, more detailed information about the site and the project. Use of the Full EAF is optional for unlisted actions. The lead agency may require a full EAF if the short EAF does not provide sufficient information.

This GEIS outlines numerous, potential negative environmental impacts that may result from proposed project activities in the area. Due to the extent of various environmental constraints in the area, the Planning Board should use the Full Environmental Assessment Form (EAF) rather than the short EAF for all activities that are subject to an environmental review under SEQRA. The short form requires minimal information and does not give the planning board or other reviewing agency enough information upon which to make a proper SEQR determination.

According to 6 NYCRR Part 617.4(a)(2), local municipalities can adopt their own lists of additional Type I actions. As outlined in Section 4.1, Type I actions are those actions or projects that are more likely to require the preparation of an EIS than unlisted actions. Part 617.4 details the Type I list that all agencies are subject to, however this list can be adjusted or supplemented. Actions that are considered Type II (actions where no SEQRA review is necessary) cannot be added to any local Type I list. It is recommended that the Town develop a local Type I list to more effectively utilize SEQRA to meet local objectives. This list should be developed to be consistent throughout the region.

Pursuant to 6 NYCRR 617.4, the following actions are identified as Type I:

- Adoption of changes in the allowable uses within any zoning district, affecting 25 or more acres of the district;

- The granting of a zoning change, at the request of an applicant, for an action that meets or exceeds one or more of the thresholds given elsewhere in the Type I list;

- Construction of 10 new residential units in municipalities that have not adopted zoning or subdivision regulations;

- A project that involves physical alteration of 10 acres;

- A project that uses in excess of 2,000,000 gpd of water;

- A facility with more than 100,000 square feet of gross floor area;

- Any unlisted action that includes a nonagricultural use occurring wholly or partially within an agricultural district and exceeds 25% of any threshold in Section 617.4;

- Any unlisted action occurring wholly or partially within, or substantially contiguous to any historic building, structure, facility, site or district or prehistoric site that is listed on the National Register of Historic Places, or that has been proposed by the New York State Board on Historic Preservation for a recommendation to the State Historic Preservation Officer for nomination for inclusion in the National Register, or that is listed on the State Register of Historic Places; and

- Any unlisted action that exceeds 25% of any threshold in Section 617.4 occurring wholly or partially within or substantially contiguous to any publicly owned or operated parkland, recreation area or designated open space.

The Town can designate locations as a Critical Environmental Area (CEA). 6 NYCRR 617.14(g) provides the authority to any local agency to designate a specific geographic area within its boundaries as a CEA under SEQRA. The potential impact on the environmental characteristics of the CEA resulting from any Type I or Unlisted action, is relevant, and must be evaluated during the SEQRA process. This GEIS identifies several potential areas that could be considered CEAs. Such designations will allow the Town to seek Lead Agency status and mandate coordinated review. By controlling the SEQRA process within the CEA, the Town could protect community interest and prevent private interests or opposition groups from controlling the process.

**2. Techniques to Evaluate and Protect Visual Resources- All Projects**

SEQRA requires mitigation of new land uses on resources of "historic or aesthetic significance." If such impacts are found, conditions may be imposed on the project's approval to mitigate that impact.

Based on the DEC policy on visual resource assessment, the following steps should be taken by local planning boards to ensure that impacts to aesthetic resources in the region are minimized or eliminated:

1. Inventory of Visual Resources
2. Visual Assessment
3. Determination of Significance
4. Define Potential Mitigation Techniques

a. Inventory: Verify the applicants' inventory of aesthetic resources and ensure that they have clearly identified both state and locally designated important visual resources. Verify that applicants have considered locally important visual resources. When completing a project review, consider a) requiring use of the Visual Assessment Form in SEQR, b) determine if the project falls within any state or local identified visual resource viewsheds and c) determine if any other visual resources exist at the specific site being reviewed.
b. Visual Assessment: Verify the applicants' visual assessment, require new viewshed analysis for any new visual resource identified at the site as needed. Any new map required should depict all properties and tax parcel boundaries that are included in a sites' viewshed.
c. Determination of Significance: Aesthetic impact occurs when there is a detrimental effect on the perceived beauty of a place or structure. Significant aesthetic impacts are those that may cause a diminishment of the public enjoyment and appreciation of an inventoried resource, or one that impairs the character or quality of such a place. Proposed large facilities by themselves should not be a trigger for a declaration of significance. Instead, a project by virtue of its siting in visual proximity to an inventoried resource may lead to a significant impact declaration.
d. Mitigation: Planning Board should confirm that the applicants mitigation strategies are reasonable and likely to be effective, or assure mitigation by requiring the applicant to submit a design that includes the required mitigation, or, impose permit conditions consistent with those mitigation requirements. All mitigation options selected should be specified in the applicants plan. Plans should sufficiently depict understandable and enforceable details. Adherence of the plan should become a permit condition and the planning board should make site visits frequently to ensure that all mitigation strategies detailed in plans have been adequately incorporated into the design and construction.

In order to mitigate visual impacts, project sponsors can incorporate the following concepts into their site designs.

a. Design and Siting: Use screening, relocation, camouflage or disguise, low profile, downsizing, alternate technologies, and lighting.
b. Maintenance: Consider decommissioning.
c. Offsets: Use offsets where applicable. See DEC Policy Statement for details on when offsets are deemed appropriate.

**3. Techniques to Evaluate Traffic Impact Study Requirements**

A traffic impact study could be conducted when any proposed land use within the Watershed Is anticipated to generate more than 100 trips during a given peak hour. For example, a 3,000 square foot fast food restaurant with a drive-through typically generates 925 peak hour trips and a convenience store generates an average of 1054 peak hour trips. In comparison, a medical/dental office typically generates 134 peak hour trips and a self-storage facility generates 8 peak hour trips. (Data received from NYS DOT, 2000). Other land uses that may require a traffic impact study include those that cause significant or degrades the Level of Service (LOS) below the minimum LOS D.

These studies should include mitigation of impacts, as needed.

The traffic impact study should be comprehensive and take into consideration the overall traffic patterns, volumes, flows, and issues within the Watershed and evaluate new additions of traffic in this context. The study should answer the question "does the traffic generated by the proposed development cause a decrease in service or safety?" Specifically, the traffic impact study should include a review of existing site conditions, trip generation and design hour volume data, trip distribution and traffic assignment analysis, and existing and projected traffic volume information.

**4. Remediate Septic System Impacts**

The Town could consider seeking funding to utilize community treatment systems in areas where multiple-properties have already been subdivided and built upon very close to streams or wetland in the watershed. This might allow the purchase of land relatively distant from the streams for the infiltration system and this might be preferable to multiple infiltration systems on small lots near the streams or wetlands. All designs, whether community or individual lot designs, should be site specific based on the underlying soil conditions. Previously listed regulations must be adhered to; however, less suitable soils may require alternative designs to ensure that guidelines are met. The Town should promote public education about proper on-site treatment system maintenance and of available assistance programs for funding.

## 5.0 ALTERNATIVES

Under a No Action alternative, land use and development patterns would continue in accordance with current land use regulations of the towns, County, City, and State. State- and City-level stormwater and erosion requirements will serve to mitigate some of the potential negative environmental soil erosion impacts as land uses are changed and development occurs. Those mitigations however, will not address other impacts to the environment including loss of wildlife habitat, loss of open space and rural character, loss of agriculture, and loss of recreation. Implementing the mitigations proposed in this GEIS, would result in fewer environmental impacts. The No Action alternative would result in greater impacts to natural resources and would place substantially greater demand on community services and facilities.

## 6.0 CRITERIA AND THRESHOLDS

**Purpose of Section:** To outline specific actions that could result in negative environmental impacts in the Manor Kill Watershed and that may need additional evaluation during the approval process. Should any of these thresholds be exceeded, it is recommended that a Full Environmental Assessment Form or a Supplemental GEIS be used as per SEQRA Part 617.

### 6.1 Triggers for future SEQRA actions

The towns of Conesville and Gilboa can use this GEIS to identify actions that need further or more detailed review under SEQRA. As specific actions are reviewed by the Town, the Short Environmental Assessment Form and/or the Full Environmental Assessment Form should be used to determine potential negative environmental impacts. The Table 18 and 19 matrices should be used to help determine those potential impacts. However, it is recommended that the following thresholds be evaluated to determine which actions need further review and are more likely to be significant negative impacts. These thresholds are lower than that established in Part 617.12 of the New York State SEQRA law based on the potential for additional turbidity impacts.

These thresholds could be incorporated in a local law as local Type I actions as allowed under SEQRA 617. If a project exceeds any of the following thresholds, a Full Environmental Impact Assessment Form and/or a Supplemental GEIS should be utilized during the SEQR process:

a. The project exceeds the NYSDEC threshold for when a septic system permit needs to be reviewed by the NYSDEC:

1) Restaurant, apartment, camp, or other strictly sanitary waste: there is a SPDES General Permit for 1,000 to 10,000 Gallons per day of Sanitary Waste to Groundwater Permit No. GP-95-01.
2) Less than 1,000 Gallons per day of Sanitary Waste if it has any component of an industrial waste: Commercial Laundry.

b. Construction of new residential units which meet or exceed the following thresholds:

1) Construction of 12 or more new residential units <u>not to be</u> connected to existing community or public water and sewerage systems including sewage treatment works.

2) Construction of 15 or more new residential units to be connected to existing community or public water and sewerage systems including sewage treatment works.

3) Construction of 6 new residential units to be connected to a proposed common, private or public central water/sewer system including a sewage treatment facility.

4) A project or action which involves the physical alteration of more than 5 acres, including clearcutting of forestland.

5) A project or action which would use ground or surface water per day in excess of 5,000 gallons.

6) A project where parking is needed for 50 vehicles or more.

7) A non-agricultural facility with more than 15,000 square feet of gross floor area.

8) A project that causes widening of more than 500 feet of road length.

9) A project that results in the removal of more than 50 feet of riparian vegetation.

10) A project that results in an increase in more than 100 cars per day.

11) A project that requires a Stormwater Pollution Prevention Plan from NYS DEC.

12) A project that meets or exceeds any medium-term duration, moderate magnitude, medium extent, or probable likelihood as outlined and defined from Table 19 of this GEIS.

13) A proposal that places any fill, residence, or structure in a floodplain or stream (see Floodplain Map).

14) Clearing of land for non-agricultural purposes, clearcutting, or construction of structures on parcels where more than 50% of the parcel is in slopes > 15%. The applicant should be required to demonstrate presence, or lack of, such a condition.

15) Application of a major subdivision as defined per town subdivision law.

c. Criteria for Review.

**In order to minimize the potential negative impacts outlined in this GEIS, the towns should specifically evaluate if the proposed action will result in any adverse effects on:**

1) Surface or groundwater quality or quantity

2) Potential for erosion, drainage or flooding problems

3) Aesthetic, agricultural, or historic character

4) Vegetation or fauna, especially in the riparian corridor along streams, significant habitats, or threatened or endangered species

5) The Town of Gilboa or Town of Conesville Comprehensive Plan

6) Long-term, short-term and cumulative impacts.

# 7.0 APPENDICES

The following maps are included in this GEIS:

1. Roads and Property Boundaries
2. Topography
3. Steep Slopes
4. Water Features
5. Bedrock Geology
6. Surficial Geology
7. Soil Depth to Water Table
8. Soil Erodibility
9. Soil Ponding Frequency
10. Soil Flooding Frequency
11. Soil Drainage Class
12. Hydric Soils
13. Property Class
14. Farmland
15. Agricultural District
16. Archeologically Sensitive Areas
17. Public Lands
18. Aerial Photo
19. Buildout Map
20. Sediment Output by Catchment
21. Sediment Output Existing Conditions
22. Sediment Output Full Buildout Conditions
23. Change in Sediment Output/Full Buildout
24. Wind Resources (2)
25. Road Culverts

## 8.0 PUBLIC COMMENTS ON DRAFT GEIS AND RESPONSES TO THOSE COMMENTS

The following comments were received from the Public Hearing or during the public comment period. A response to each is offered below where necessary:

Public Hearing Summary

1. The scope and format of the DGEIS was explained, highlighting that the document provides a comprehensive report of Conesville's environmental setting, outlines factors that may impact water quality, and provides measures to mitigate those potential impacts. The various charts and maps were mentioned, and their usefulness to local boards and residents was discussed (e.g. the hamlet re-designation negotiations with DEP); NO RESPONSE NECESSARY.

2. An overview of other projects was provided – SMP, Community Stormwater Assessment, Environmental Study Team – how these projects work together with DGEIS; availability of implementation funding was discussed; other topics that could be addressed in the DGEIS to further tie all of the documents together (e.g. Stormwater run-off); NO RESPONSE NECESSARY.

Questions were taken from the public:

3. What is the purpose of all of these projects? Who funds them? How does the DGEIS help DEP; the Town? Is this going to lead to more regulations telling us how to build our houses?

RESPONSE: The Town of Conesville has developed a variety of plans (Comprehensive Plan, Stream Management Plan, etc.) and conducted studies (This GEIS, Community Stormwater Assessment, etc) to provide up-to-date and comprehensive information about the desires of the community and environmental resources in the Town. Most of the projects have been funded by technical assistance grants provided by the Catskill Watershed Corporation. The DGEIS was developed not for DEP, but to aid in environmental review and subsequent decision making by the Town of Conesville. The Town is required by New York State to conduct an environmental review prior to permitting any project requiring subdivision approval and certain other projects (See 6 NYCRR Part 617). This GEIS is designed to give the Town more information about the critical resources in Conesville, locations and resources that are environmentally sensitive, and methods to reduce environmental impacts related to future land uses. This GEIS is not an additional regulation, but a tool and process to aid in the already required SEQRA process. Should the Town find that a project may have negative environmental impacts, then the Town can use this GEIS to assist in determining how to reduce those impacts. In that case, a project may need to be modified in order to mitigate identified impacts. In

Conesville, building a house would not be subject to SEQRA unless it was part of a subdivision being reviewed by the Town, and thus would need to meet only the normal Building Permit requirements. The Town of Conesville may choose to adopt additional land use regulations in the future that are consistent with its adopted Comprehensive Plan in order to address certain land use and environmental issues.

4. What is the hamlet re-designation process? What does the word 'hamlet' mean? What is the impact of DEP buying land and/or conservation easements in the Town? How is the town supposed to build up a tax base if you can't develop your land? Will we have access to the stream if DEP buys all the land around us?

RESPONSE: *Rules and Regulations For The Protection From Contamination, Degradation And Pollution Of The New York City Water Supply And Its Sources* establishes the hamlet designation process and defines "hamlet". According to those regulations, a Hamlet means a population center designated as a hamlet by a Town Board in the West of Hudson watershed pursuant to a Water Supply Permit issued by the New York State Department of Environmental Conservation for Project No. 0-9999-00051/00001. This GEIS scope is oriented to evaluating the potential environmental impacts of future potential land uses. It does not address the impact of DEP land acquisitions, nor does it address stream access.

Comments Received from New York City Department of Environmental Protection:

1) On page 23, the last sentence should be clarified. The New York City *Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its* Sources (Watershed Regulations) does address and indeed prohibits certain activities within 100 feet of New York State regulated freshwater wetlands.
2) With regard to the regulation of septic systems on page 53 of the DGEIS, it is important to distinguish a minimum percolation rate of 3 minutes per inch and indicate that one percolation test and one deep hole test in each of the primary and reserve areas is required and will be witnessed (not performed) by NYCDEP. In addition, consider including a statement regarding locating subsurface treatment on slopes that do not exceed 15%.
3) The table on page 56 indicates that a permit for a Stormwater Pollution Prevention Plan (SPPP) is required whenever 2 acres or more are disturbed. This should be revised to include 2 or more acres located at least in part within the limiting distance of 100 feet of a watercourse or wetland or 300 feet from a reservoir or reservoir stem or on a slope exceeding 15%. Furthermore the Setback column is somewhat ambiguous. The aforementioned limiting distances apply to new impervious surfaces.
4) The column for Individual Stormwater Permit on page 56 should be revised to state Individual *Residential* Stormwater Permit. The second column must be revised and refer to individual residence rather than any activity.
5) The SEQRA column in the table on page 58 should be revised and include NYCDEP in the last column as NYCDEP is often either an Involved or Interested Agency.

6) On page 97 - Other General Mitigation Techniques, Effective Use of SEQRA, please consider revising the second sentence to Type II activities that do not require SEQRA review.
7) NYCDEP supports the efforts made by Schoharie County Planning & Development Agency to inventory and map the culverts within the Manor Kill Watershed.

RESPONSE: The Final GEIS includes all edits as recommended by NYC DEP comments #1 - 6, above. No response necessary for comment #7, above.