

**TOWNSHIP OF GREENWICH**

**MUNICIPAL PARTNERSHIP PLANNING PILOT GRANT (MP3)**

**FINAL REPORT**

**ENVIRONMENTAL PROTECTION AND GROWTH MANAGEMENT;  
SUSTAINABLE AGRICULTURE; AND  
AFFORDABLE HOUSING STRATEGIES**

**2007**

**SUBMITTED TO THE NEW JERSEY HIGHLANDS COUNCIL**

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**Township of Greenwich**  
**NJ Highlands MP3– Case Study**

**Environmental Protection and Growth Management;**  
**Sustainable Agriculture and Affordable Housing Strategies**

**Executive Summary**

Greenwich Township is a rural NJ Highlands community that may be the most accessible community in southwest Warren County, and thereby subject to substantial regional suburban growth pressure. This is due primarily to its location along I-78 and three interchanges, two of which are within the Township’s borders. The purpose of the MP3 project was to evaluate Greenwich Township’s existing ordinances relative to their effectiveness in environmental protection and growth management; evaluate enhancement strategies for sustainable agriculture; and analyze and develop alternative housing strategies for the Township. These investigations factored into changes to the master plan and zoning ordinances, and outlined challenges and a series of considerations for preservation of agriculture lands in Greenwich.



The Township is historically a farming community, with rich fertile soils that are underlain by carbonate rock formations that store regionally significant reserves of groundwater. Greenwich’s location within the region has resulted in development of a series of residential neighborhoods that have begun the process of fragmenting the landscape, which if left unchecked, could result in eliminating regionally significant agricultural and groundwater resources. Agriculture as a way of life in New Jersey has too often given way to land use change from the pressure for suburban development statewide. Providing an adequate supply of affordable housing continues to be a local challenge to the Township in the face of State regulations, which require municipalities to provide their fair share within the region. This concern remains a priority, despite the Township’s significant supply of affordable housing in southwest Warren County that resulted from court-ordered growth.

These concerns formed the backdrop of Greenwich Township’s master plan update, required under the M.L.U.L., at the same time that the Highlands Regional

Master Plan is being prepared in response to the Highlands Act, which will aim to control the impacts of a growing population on the natural resources of the region that is responsible for providing potable for a substantial population in NJ and PA. The Township's goal with this MP3 project was to ensure that local policies and strategies protect natural resources, and farmland, provide opportunities for agriculture to evolve as an economically thriving enterprise in the region, and address affordable housing needs. The objective of the MP3 project was to assist the Township in formulating strategic responses to each of the challenges.

The MP3 project involved the following tasks:

- Prepare a report that lists environmental and growth management issues, and existing local regulations relative to each; sets forth options for addressing each identified issue where existing regulations were found to be inadequate, and provide suggestions for further research;
- Evaluate agricultural enhancement strategies and alternatives for Greenwich Township.
- Evaluate affordable housing options under COAH's rules and identify options for addressing local affordable housing needs, and identify innovative design approaches, such as green design, to providing affordable housing;

The Planning Board was designated to complete the tasks involved in the MP3 project. The Board investigated and discussed each of the components of the MP3 project over the course of numerous regularly scheduled and special meetings. The Planning Board provided opportunities for public participation and comment at these meetings.

### **Environmental Protection & Growth Management Issues**

The Planning Board identified the following environmental protection and growth management issues:



1. Farmland preservation and the retention of priority agricultural soils is the highest land use priority. Strategies are needed to permanently retain large contiguous tracts of farmland to protect this valuable natural resource and preserve farming as a way of life;
2. Protection of groundwater recharge areas and groundwater reserves to preserve existing resources capable of contributing to future regional water supply needs for agriculture as well as the residents of New Jersey
3. Provide for limited nonresidential growth to address the imbalance between residential and nonresidential uses and values in the tax base, which is disproportionately weighted by residential development.
4. Recognition and protection of unique views and vistas.

5. Protect natural resources from development, including forests, meadows, grassland areas, steep slopes, ridgelines, scenic vistas and views, streams and their corridors, groundwater aquifers and recharge areas, wetlands and swampy areas, unique landscapes, and agricultural areas.
6. Protect historic sites, farmsteads, and the Township's historic character.
7. Identify and protect critical resource areas.
8. Protect and retain the Township's rural / historic road network that contributes to the essential character of the Township.

The 2006 Master Plan update reflects these local goals, objectives and priorities, and a series of land use ordinance amendments in 2006 enabled the Township to begin the work of implementing specific strategies consistent with farmland protection and resource conservation goals. Specifically, the Township adopted a Resource Conservation District Zoning ordinance that seeks to retain farmland and protect natural resource lands in conjunction with subdivisions as the highest land use priority. Much still needs to be done however to more fully implement effective strategies that reflect the other environmental protection and growth management goals and objectives listed above.

### **Agricultural Enhancement Strategies and Alternatives**

This component of the MP3 project involved an investigation by the Planning Board into the need for policies and strategies to enhance the profitability of farming and to retain agriculture in the face of present day development pressures and a challenging economic climate to farmers. The investigation resulted in the creation of a technical report that the Planning Board decided to include as an appendix to the Land Use Plan Element of the Master Plan.

The Planning Board identified the primary goals for land use in Greenwich Township to be the retention of farmland and the preservation of natural resources. Toward that end, and with particular resolve to investigate agricultural enhancement strategies, the Planning Board convened a meeting of experts in farming, farmland preservation, the agricultural industry in general and sustainable agriculture for a round table discussion of strategies and initiatives to enhance agriculture. The Planning Board's invited guests included the following experts:



- Susan Craft, Executive Director, NJ SADC Farmland Preservation Program;
- Eileen Swan, former municipal mayor, open space and farmland preservation consultant;
- Christine Danis, NJ Highlands Council Planner;

- Dr. Steven DeBroux, Professor of Agronomy and Environmental Sciences, Delaware Valley College;
- George and Melanie DeVault, (sustainable) farmers in the Lehigh Valley, growers of high value crops and value added products engaged in direct farm sales to the public and producer's only farmers market in Emmaus, PA;
- Robert Santini, local farmer;
- Sam Santini, local farmer;
- Cliff Oberly, local dairy farmer;

This group of experts along with the Planning Board and Open Space Preservation Township Committee liaison identified a series of issues related to maintaining ongoing agricultural operations, as well as potential strategic responses. The concept of sustainable agriculture was investigated and specific findings resulted within the parameters of the following definition:

*As defined by Congress, sustainable agriculture is:*

"an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

1. satisfy human food and fiber needs;
2. enhance environmental quality and the natural resource base upon which the agricultural economy depends;
3. make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
4. sustain the economic viability of farm operations; and
5. enhance the quality of life for farmers and society as a whole."

*In short, Sustainable Agriculture is:*

**Economically viable:**

- If it is not profitable, it is not sustainable . . .

**Socially supportive:**

- The quality of life of farmers, farm families, and farm communities is important . .

**Ecologically sound:**

- We must preserve the resource base that sustains us all . . .

Among the specific findings identified in the Planning Board's technical report are the following:

Food Dollar – farmers receive diminishing share of food dollar;

- In 2005, the farmer's share of the food dollar was 19 cents of the dollar;

- In 1990, the farmer's share was 30 cents of the dollar; and
  - In 1950's the farmer's share was about 50 cents of the dollar.
- The diminishing share of the dollar has taken a toll on farmer's profitability.

#### Public awareness and perception of agriculture

- Public awareness of local agricultural production and why local commitments are needed to retain agriculture;
- Perception that agriculture is an interim use; need to overcome that perception;

#### Sustainable agriculture – changing production and practices

- Sustaining agriculture in the community will involve changing agricultural production and practices over time.
- Retaining Greenwich Township's productive farmland and scenic landscape will require an understanding by the municipality that what is grown cannot be regulated.
- Farmers will be needed in the future to continue farming after today's generation of farmers' ages.
- Farmers view their farm is their retirement asset.
- Farmers want to farm; local regulations should support, rather than frustrate farmers' efforts to continue to farm.
- Efforts focused on saving the family farm may have limited success if the farm fails.
- A funding mechanism and financial incentives are needed to transfer ownership from older farmers to young farmers – it is one of the central components to sustaining agriculture in the community.
- Creating an environment for young farmers to get started in the agricultural industry on smaller tracts of land (20 – 30 acres) may be the key to addressing the aging farmers' financial needs.
- *Opportunities exist for specialty or high value farm products*, including vegetables, fruits and value added processed products.
- Proximity and highway access to major markets provide the opportunity to create smaller farms (i.e. 20 – 30 acres) for more intensive, higher value farming than the conventional agriculture now being conducted throughout the Township.

#### **Evaluate Affordable Housing Options Under COAH's Rules And Identify Options For Addressing Local Affordable Housing Options, And Innovative Approaches**

The Planning Board prepared an updated Housing Element and Fair Share Plan in accordance with the NJ Council on Affordable Housing's (COAH's) rules. This included identification of a series of strategies for the provision of affordable housing, which include a number of different mechanisms. These include a new growth-share requirement that developer's produce affordable housing according to COAH's formula

for residential and nonresidential development, as well as Buy & Fix, Accessory Apartment and Rehabilitation mechanisms for a total of not less than 17 affordable units.

Buy and fix units are existing market-rate dwellings that are purchased by the municipality and resold at an affordable price to an income-eligible household. Accessory apartments are affordable units created as accessory units to an existing single-family dwelling. Rehabilitation units are units that require improvement to meet the 'safe, decent, affordable' standard for occupancy by an income eligible household.



The Planning Board's investigation in this component of the MP3 project focused primarily on evaluating the feasibility of requiring 'green design' to be incorporated into the design of all affordable housing projects. The goal in requiring green design affordable housing is to develop affordable housing that:

- ▶ Are durable and long lasting;
- ▶ Are cost effective to build and practical to maintain

- ▶ Use natural resources and materials efficiently; use materials and products based on their life-cycle environmental impacts.
- ▶ Conserve water usage, reduce runoff, and treat waste on-site.
- ▶ Maximize energy conservation and efficiency; use renewable energy resources.
- ▶ Reduce building footprints, simplify building shapes, and maximize space efficiency (smaller is better).
- ▶ Optimize building orientation; integrate natural daylight and ventilation.
- ▶ Are healthy by eliminating toxic and harmful materials and finishes in facilities and their surrounding environment.
- ▶ Support transportation alternatives.
- ▶ Reduce, reuse and recycle materials in all phases of construction and deconstruction; reduce harmful waste products produced during construction.
- ▶ Apply maintenance and operational practices that reduce or eliminate harmful effects on people and the natural environment.
- ▶ Is designed for future flexibility, expansion, and building demolition; capable of safe and efficient deconstruction

The Planning Board reviewed guidelines and checklists, which are included in the technical report produced in connection with this MP3 project. It was determined that the Township should begin with a modest 'green building' affordable housing requirement of 10% of the specific measures, designs, and materials recommendations on all affordable housing projects. Final checklists and guidelines, and an implementing ordinance will be needed, but the goal seems to be appropriate since the objectives will reduce the cost for maintenance and operation of affordable housing, for residents of the Township that will be occupying the affordable units.

## Conclusions and Next Steps

Greenwich Township's MP3 project enabled the Planning Board to conduct investigations into three important components of community planning for this NJ Highlands municipality at a critical time when these three issues came to the forefront as local priorities. A series of next steps have been identified within each area of investigation of this MP3 project, as summarized below.

### Environmental Protection & Growth Management Issues

Develop and adopt ordinances that fully implement the following locally identified goals and objectives:

- Protect groundwater recharge areas and groundwater reserves capable of supporting regional water supply needs for agriculture as well as the residents of New Jersey;
- Develop design standards and adopt ordinances for limited nonresidential growth to ensure the highest quality design possible;
- Develop local ordinances to protect unique views and vistas.
- Protect natural resource protection ordinances aimed at specifically protecting and managing the following resources: forests, meadows, grassland areas, steep slopes, ridgelines, scenic vistas and views, streams and their corridors, groundwater aquifers and recharge areas, wetlands and swampy areas, unique landscapes, and agricultural areas.
- Identify ordinance standards for the protection of historic sites, farmsteads, and the Township's historic character.
- Develop local policies and ordinance standards for the preservation of the Township's rural / historic road network whenever development takes place, and thereby protect one of the elements that establishes the essential character of the Township.

### Agricultural Enhancement Strategies and Alternatives

Sustainable agriculture strategies identified by the Planning Board will involve public outreach and the development of specific ordinance standards to facilitate the continuation and evolution of agriculture as a profitable and sustainable industry in Greenwich Township. The Planning Board's sustainable agriculture technical report identified a wide range of recommendations, which can form the basis of a work plan for Township officials, local volunteers, and the Township's professional staff to work toward implementing. If economically viable and profitable agriculture is to keep a foothold and remain a way of life in Greenwich Township, local efforts will be needed in achieving success with this outcome.

## Evaluate Affordable Housing Options Under COAH's Rules And Identify Options For Addressing Local Affordable Housing Options, And Innovative Approaches

With the 10% minimum commitment to green design, the Planning Board has taken the first step in advancing green design in affordable housing. It is hoped that once the private sector and the Township gain experience using these design and construction techniques, the level of commitment to green design will increase. Ultimately, it is hoped that a commitment to green design, and the use of alternative energy such as solar, will in combination reduce the cost of operation with other green design techniques. In addition it is hoped that local regulations requiring green design techniques and practices will increase their usage and make it easier for the development community to increase their incorporation of such building techniques in development.

The next steps to implement an affordable housing green design requirement would be as follows:

- Identify or create a suitable checklist and guidelines to evaluate the “10% green design requirement” for affordable housing.
- Adopt an ordinance implementing the requirement, and establishing a review procedure. In the case of an application for site plan or subdivision, the review should be required in connection with the Planning Board’s review of an application, since the Township’s growth share ordinance requires the provision of affordable housing on site with the development proposed. For units that do not require site plan or subdivision approval, the review could be conducted by the Township’s construction code official.
- After some experience implementing the ordinance, the Township could reevaluate whether the minimum 10% requirement should be increased to a higher percentage. It should be expected that since the concept of ‘green design’ and the implementation of such practices have been gaining in popularity in all development sectors, including residential market-rate as well as affordable housing; and nonresidential commercial and office development throughout the country, the requirement could be increased as contractors and builders become familiar with such practices.
- The Township should also investigate NJDCA funding opportunities and preferences for ‘green affordable housing’ projects. This could serve to not only reduce the cost for affordable housing production, but could also yield substantial cost savings to the residents occupying the affordable housing units created under the green building design requirements.

**Appendix A: Analysis of Natural Resource Protection & Growth Management Issues**

NJ Highlands Regional Council  
Municipal Planning Partnership Program Report

Greenwich Township  
Warren County, NJ  
June 2006

This section of this report responds to a Highlands Municipal Planning Partnership Program Grant (MP3) requirement to conduct an investigation into local natural resource protection and growth management issues. The MP3 grant awarded to Greenwich Township includes three planning tasks, of which this report is one chapter. This section identifies a series of findings and recommendations as to the strengths and weaknesses of existing ordinance provisions and their effectiveness in addressing natural resource protection and growth management issues.

Under this task in the MP3 project, the Township was required to establish a local committee to review land use ordinances, zoning, planning documents and other studies to evaluate their strengths and weaknesses in support of natural resource protection and growth management objectives. In this task, the Greenwich Township Planning Board served as the local committee to review land use ordinances, zoning, the master plan, a locally commissioned groundwater study, and to evaluate the strengths and weaknesses in support of natural resource protection.

The purpose of this task is to identify natural resource protection and growth management issues in Greenwich Township, and determine whether existing policies, plans and ordinances appropriately respond to these issues. Natural resource protection and growth management have become local planning priorities for Greenwich Township due to a confluence of factors, including recent large-scale residential and commercial growth in the Township (resulting from court ordered development), regional growth pressure that seeks undeveloped land for new suburban development, the periodic State Development and Redevelopment Plan (SDRP) update, the adoption of the Highlands Act and the periodic update to the Township's Master Plan. Greenwich Township's MP3 project is designed to identify natural resource protection and growth management ordinance deficiencies and options for responding to these issues.

The Board's investigations and conclusions in this study have, in part, resulted in amendments to the Master Plan including an updated Land Use Plan and Conservation Plan Element, which were adopted in May 2006. The Planning Board and the Township have begun implementation of some of the findings and recommendations identified in this report through the preparation of draft ordinance amendments. Other recommendations may require further analysis and subsequent development of

ordinances. The Conservation and Land Use recommendations in this report are intended to provide a basis establishing Greenwich Township's consistency with the SDRP and the Highlands Regional Plan and address local natural resource protection and growth management issues.

The Board's investigations on this MP3 project were undertaken during regular meetings and specially scheduled meetings that were always publicly noticed in accordance in the law. The meetings were periodically attended by members of the public, municipal Environmental and Recreation Commission members, Township Committee members, as well as individual landowners. From the meetings, the Planning Board developed the findings and recommendations identified in this report.

Under the grant, the Township is required to prepare a report (this report) that lists each local environmental protection and growth management issue, discusses the extent of current local environmental protection and growth management through local ordinances and other controls, and sets forth options for addressing those issues where current protection or growth management measures may be inadequate. Some sources and references are cited in this report, which informed the Board's considerations. Suggestions for additional research and implementing ordinances are included.

- **List of Local Environmental Protection and Growth Management Issues**

9. Establish farmland preservation and the retention of priority agricultural soils as the highest land use priority and identify land use strategies that will permanently retain large contiguous tracts of farmland to ensure the survival of this valuable natural resource and farming as a way of life in Greenwich Township;
10. Protect groundwater recharge areas and groundwater reserves through the maintenance of these areas in their undeveloped state so as to preserve existing resources capable of contributing to future regional water supply needs for the residents of New Jersey; and protect, restore, and enhance the quality and quantity of surface and ground waters.
11. Provide for limited nonresidential growth to address the imbalance between residential and nonresidential, employment generating land uses, which is disproportionately weighted by residential development.
  - Provide for growth of existing research/office/manufacturing land uses to retain existing employers and enhance the employment and nonresidential tax ratable base of the Township.
  - Establish zoning provisions to permit professional, office and limited research uses in the westerly portion of the Township immediately adjacent to the sewer service area and interstate highway to provide for growth in the Township's nonresidential tax base.

12. Recognize and protect the Township's unique views and vistas.
  13. Limit disturbance and development of forests, meadows, grassland areas, steep slopes, ridgelines, scenic vistas and views, streams and their corridors, groundwater aquifers and recharge areas, wetlands and swampy areas, unique landscapes, and agricultural areas.
  14. Protect historic sites, farmsteads, districts and the historic character of the cultural landscape.
  15. Identify and protect critical resource areas.
  16. Protect and retain the Township's rural / historic road network that contributes to the essential character of the Township.
- **Discussion of current local environmental protection and growth management ordinances and controls**

This discussion identifies the relative strengths and weaknesses in Greenwich Township's ordinances relative to local environmental protection and growth management issues that are listed above. This discussion references existing land use ordinance provisions as they relate to these issues and also references prior master plans and updates to the Master Plan, which were adopted in 2006, as well as a groundwater resources study commission by the Township.

Protecting expansive agricultural areas of prime soils and soils of statewide significance, and underlying groundwater reserves that may be useful and valuable to future generations of New Jersey citizens, surfaced as primary land use planning goals by the Planning Board. Groundwater recharge capacities are highly dependent on limiting the construction of impervious surfaces on the soils that serve to recharge groundwater to underlying aquifers. The Greenwich Township Planning Board agrees with and identifies as its own, the Highland Act planning area goal to "(1) protect, restore, and enhance the quality and quantity of surface and ground waters therein; and (7) promote conservation of water resources". These environmental protection issues are central to the Township's updated planning orientation, which are highlighted in the Township's groundwater resources study completed in 2005. That study identified Greenwich Township's underlying carbonate rock geology as a potentially significant source of potable water to the region.

The Planning Board reviewed Greenwich Township's Land Use Ordinances Chapters XIII through XIX, and zoning identified consistency among goals and objectives for land development identified in the 1998 Master Plan with zoning ordinance provisions. The Township's zoning ordinance includes a series of amendments that have been adopted over a long period of time, and the ordinance includes numerous confusing and sometimes erroneous provisions, which may no longer be applicable to current zoning designations.

The Planning Board compared the Township's 1998 Master Plan and zoning ordinances to an updated statement of goals and objectives (2005/06), which revealed a significant gap and an inherent conflict between updated goals and objectives and the types and intensities of development permitted and encouraged in Greenwich Township's local land use ordinances. Some of the 1998 Master Plan goals and objectives relate to natural resource protection and growth management and included growth management strategies for areas zoned for residential development, while other goals and objectives in the plan are growth oriented and provide for a substantial amount of nonresidential development in areas that remain agricultural land today. Corresponding ordinance provisions are not provided to respond to all of the natural resource protection goals and objectives in that plan.

Existing ordinance provisions flow primarily from the 1998 and prior land use plans, which sought to encourage the development of a generous supply of non-residential employment and tax ratable growth. Permitted types, levels, intensities and patterns of development identified in the 1998 Land Use Plan do not place the highest priority on retaining the Township's farmland and natural resource base. Instead, it appears that the 1998 Land Use Plan and current ordinance provisions seek to encourage a level of nonresidential development that would result in local tax revenue generation that could be used to offset the cost for providing services to a growing population associated with large-scale court ordered growth. This growth occurred on farmland in the westerly portion of the Township adjacent to Route 22.

Existing zoning ordinance provisions include residential and non residential zones with substantial growth capacity, including 2- and 7-acre residential zones, and a variety of non residential districts that provide for business (commercial), industrial, research / office / manufacturing zones and zones that permit a combination of these uses.

Ordinance provisions for residentially zoned portions of the Township include a rural residential zone that requires minimum lot sizes of 7-acres for conventional development. This zone includes a community open space development and farm estate development option, which under certain conditions entitle a developer to an increase in the number of residential lots that may be created through cluster and lot-size averaging arrangements. The cluster and lot-size averaging provisions require a 70% open space set-aside and call for the protection of environmentally sensitive areas, however environmentally sensitive areas are not defined by ordinance.

A 'town center' designation is also provided in the zoning ordinance, which permits agricultural and community open space development options based upon a base density of 2-acres. The town center zone formerly included density incentives to cluster through a density transfer provision allowed for limited mixed use development options. These designations are in non-sewer service portions of the Township. The Township eliminated the density transfer and mixed use provisions to the Town Center between 1998 and the present. Smaller lot residential zoning districts are designated to

acknowledge historic settlement and subdivision patterns in the Township, including a 7,500 sq. ft. zone, and one- and two-acre zones.

The 1998 Land Use Plan called for, and current zoning provides for a substantial amount of land in the Township to be developed for nonresidential development through a series of zoning designations, including business (commercial) districts, research / office / manufacturing districts, industrial districts and variants of these designations providing for combinations of these uses. The ordinance includes provisions for single and multiple occupant development projects, mixed corporate campus-type uses. Design standards including pedestrian circulation, buffering and landscaping requirements are provided to establish high-value, attractive nonresidential developments. Areas of the Township programmed for this variety of nonresidential uses are almost exclusively actively farmed lands with high quality soils. These designations are identified throughout the Township including:

- the central portion of the Township adjacent to I-78 (ROM/RO);
- the southeast corner of the Township between I-78 and SR 173 (ROM);
- the westerly portion of the Township along I-78, US 22 and CR 519 (Business, Industrial, ROM);
- the southwest portion of the Township between SR 173 and Pohatcong Township (Industrial);
- the northerly portion of the Township along Route 57 (Business/Industrial); and
- the center of Stewartsville at the intersection of North and South Main Street with Greenwich and Washington Streets (small node of Business).

With the exception of the business zone in Stewartsville, virtually all lands zoned for nonresidential development are either currently, or have been within the recent past (i.e. 5-15 years) agricultural lands. Permitted nonresidential development impervious coverage standards range from 45%-70%. These zoning designations prevail throughout Greenwich Township's scenic, agricultural landscape.

The residential and nonresidential land use policies in the Township's 1998 Land Use Plan, as enacted through current ordinances encourage a level of growth and development that are incongruous with updated natural resource protection and growth management objectives that are identified in recently adopted Master Plan amendments. The existing zoning provisions that are consistent with the 1998 Master Plan will ultimately convert the Township's predominantly rural landscape to large lot suburban neighborhoods and a vast concentration of commercial, industrial and regional research/office employment uses on what is today highly productive farmland including valuable natural resources.

The extent of nonresidential zoning will serve to severely compromise Greenwich Township's rural agricultural landscape as it exists today. This would result in the diminution or loss of irreplaceable natural resources, such as prime soils/soils of statewide significance, as well as a range of other high value environmentally sensitive

areas, which will be discussed below. Additionally, permitted impervious coverage and associated stormwater runoff will have the effect of diminishing groundwater recharge capacities and increasing overland flows away from the underlying carbonate rock geology aquifers, and would negatively impact high quality surface waters.

The 2002 Circulation Plan identifies a series of planned cul-de-sac roads intended to serve nonresidential zoning districts that are currently actively farmed lands in the Township. These planned roads would induce growth and generate traffic on local roads, if developed as planned. Farmland areas served by these new roads could then be readily converted to nonresidential uses, thereby fragmenting and ultimately converting large contiguous areas of viable farmland with highly productive soils to non-farm uses, while at the same time reducing groundwater recharge into the underlying carbonate rock aquifers, and destroying other natural resources such as critical habitat.

Greenwich Township's remaining agricultural base consists of highly productive agricultural farm soils that account for approximately 60% of the Township's land mass. Approximately one-third of this area is currently zoned for large-scale nonresidential development. Current land use ordinance provisions would therefore have a significant detrimental impact on the goal of retaining large contiguous farmland areas and protection of surface and groundwater recharge areas.

The retention of priority farm soils is both an environmental protection and growth management issue, that will require changes to local ordinances if these highly productive agricultural soils are to be retained for agricultural use in the future. From an environmental protection perspective, prime soils and soils of statewide significance are a dwindling natural resource in New Jersey. Greenwich Township's existing nonresidential ordinance provisions that permit the conversion of agricultural uses to nonagricultural uses are sure to result in a continued loss of agricultural areas and erosion of the limited inventory of productive farmland soils in the region.

Recommended techniques for preserving agriculture in moderate strength farming areas include comprehensive planning, agricultural zoning, maximum building lot sizes for non-farm development, and establishment of urban growth or village boundaries. A review of the professional literature and research from the American Farmland Trust, the Smart Growth Network, the American Planning Association and the New Jersey Pinelands Commission indicate that large lot zoning for a minimum lot size of 20 to 45 acres is appropriate as an agricultural protective zoning technique, when non-farm residences are to be permitted. In addition, *lot size averaging and off-site clustering* can be useful land use techniques, when the proper balance is achieved between permitted densities and lot area requirements.

In 1997, The American Farmland Trust (AFT) examined a range of approaches to retaining farmland, and recommended "Agricultural Protection Zoning" (APZ) as a zoning technique used to support and protect farming by stabilizing the agricultural land base. The AFT is a nationwide nonprofit organization dedicated to protecting agricultural resources, founded by a group of concerned farmers in 1980. AFT's mission

is to stop the loss of productive farmland and to promote farming practices that lead to a healthy environment. AFT defines APZ as ordinances that allow no more than one house for every 20 acres, support agricultural land uses and significantly restrict non-farm land uses.

As described by AFT, APZ is a zoning technique used to support and protect farming by stabilizing the agricultural land base. APZ designates areas where farming is the desired land use, generally on the basis of soil quality as well as a variety of locational factors. Other land uses are discouraged. APZ ordinances vary in what activities are permitted in agricultural zones. The most restrictive regulations prohibit any uses that might be incompatible with commercial farming. The density of residential development is limited by APZ. Maximum densities range from one dwelling per 20 acres in the eastern United States to one residence per 640 acres in the West.

In addition to the protection, preservation and retention of large-contiguous tracts of farmland, another primary natural resource protection priority and growth management issue is the protection of groundwater recharge areas, and groundwater reserves. This parallels farmland preservation objectives of retaining large contiguous tracts of open lands. The Township commissioned a study to investigate groundwater reserves, entitled Evaluation of Groundwater Resources of Greenwich Township, Warren County, New Jersey, prepared by M2 Associates Inc., dated November 2005 noted a number of conclusions, not the least of which were stated as follows:

1. Greenwich Township understands that its groundwater resources have significant value for municipal residents and possibly others beyond its boundaries. The Township understands the need for protecting vital water resources so that they are not diminished or damaged. Greenwich Township recognizes its important location and role in preserving resources for downstream communities.
2. The Township's groundwater resources serve as a potential reservoir for areas of New Jersey with significantly greater populations. As a result of the local population growth, much greater demand has been applied to the resources within the municipal boundaries and the potential reservoir capabilities of the aquifer systems for other areas of the State has been somewhat diminished. The Township is concerned with protecting these potential reservoirs before they are further diminished or permanently damaged and understands that current population trends could quickly overwhelm groundwater resources. Their understanding and planning is similar to the thinking of the leaders of New Jersey's eastern cities in the 19<sup>th</sup> and early 20<sup>th</sup> centuries when they realized a need to protect upstream reservoirs and groundwater resources to ensure that the citizens of these cities had sufficient water to meet demands of the late 20<sup>th</sup> century.

3. N.J.A.C 7:9B indicates that all of the streams in Greenwich Township are high-quality surface-water resources worthy of significant protective measures.
4. As C1 waters, streams are protected from degradation resulting from discharges such as those from wastewater treatment plants, which limits options for disposal of wastewater to groundwater discharges. Greenwich's soils will limit the operation of wastewater leaching systems.
5. The structural geology of Greenwich Township indicates that the rocks beneath this municipality have a high potential for the storage and transmittal of large quantities of groundwater within the carbonate rocks. The structural and bedrock geology of Greenwich Township indicate that this Township *may be one of the best long-term resources for water supply in New Jersey.*
6. Ninety percent or approximately 6,293-acres of Greenwich Township are underlain by carbonate rocks, where groundwater is stored. The openings in the rock can transmit very large quantities of water sometimes in excess of 1000 to 2000 gpm.
7. For the same reason that carbonate rock aquifers are capable of very high well yields, they are also extremely susceptible to contamination from anthropogenic sources. Solution features and sinkholes can rapidly transmit man-made or man-introduced contaminants into these prolific water resources. Because of the nature of these aquifers, additional measures are often necessary to protect water quality and quantity. The filling, grouting, or sealing of solution cavities can significantly reduce groundwater recharge and greatly increase surface water runoff. The sealing of these solution openings will affect the long-term water resources of Greenwich Township and the region.
8. Wells located by qualified geologists using best available technologies in carbonate rock-aquifers can often yield in excess of 1000 gpm. A well with a long-term sustained yield of 1000 gpm could produce more than 1.4 million gallons of water per day and based on a usage rate of 100 gallons per day per person, could provide sufficient water for more than 14,000 people. A series of properly located wells in a well field or combination of well fields could feasibly sustain a small to moderately sized city located elsewhere in New Jersey.
9. It is very likely that the groundwater resources of Greenwich Township are equivalent if not greater than the surface-water storage capacity of Spruce Run Reservoir, one of New Jersey's largest reservoirs. If the porosity of the carbonate rock-aquifers beneath Greenwich Township is closer to 20 percent than 2 percent, the total potential volume of water in storage beneath the Township would be nearer 123 billion gallons, which would be more than

twice the size of Round Valley Reservoir, which is the largest reservoir in New Jersey with a capacity of 55 billion gallons.

10. The groundwater resources of the carbonate rock-aquifers of Greenwich Township could sustain the water-supply demands of at least 15,700 persons per day without resulting in adverse impacts to the aquifer during drought conditions similar to the “Drought of Record”. Given the hydrogeologic characteristics of the carbonate rock-aquifers and the relationship of these aquifers with the streams in the Township, it is possible that the dependable yield of the carbonate rock-aquifers could be much higher than 20 percent of drought recharge. If it were assumed that 50 percent of recharge during a drought could be withdrawn without resulting in adverse impacts, the groundwater resource of Greenwich Township could sustain a population of 39,000 persons. If properly protected, the Township’s carbonate rock-aquifer resources likely could sustain the population of a small city. However, additional development or increasing populations within the Township will likely diminish the quantity and quality of water that could be obtained.
11. If Greenwich Township protects the groundwater resources of its carbonate rock-aquifers by concentrating development and preserving areas underlain by these rocks, especially where highly fractured, one of New Jersey’s best untapped resources will be available for future generations.

The study also noted the following:

“Construction of new developments is likely to result in increased contamination of these groundwater resources as well as reduction in their long-term viability because of reduced recharge from increased impervious surfaces and solution opening grouting activities.”

Other concerns noted in the report include the negative impact of impervious surfaces and diminished surface water quality. Virtually all of the surface waters in Greenwich are rated C-1, and are thereby considered to be of the highest water quality in the state. Impervious coverage associated with the amount of land zoned for nonresidential development should be expected to diminish surface water quality. Notwithstanding the negative impacts on surface water quality, carbonate rock groundwater quality would also be compromised. The carbonate rocks beneath Greenwich Township encompass an area of approximately 6,293-acres, or approximately 90% of the area of the Township. To effectively serve the local natural resource protection goal to protect groundwater quality and quantity, Greenwich Township should reduce the extent of development permitted in its land use ordinances.

The local ordinance includes measures for development within carbonate rock areas of the Township. These provisions ignore the natural resource protection goal to maintain groundwater quality and quantity and instead require measures such as grouting

the bedrock to try to prevent the harmful and sometime dangerous impacts of developing on limestone where sinkhole creation is commonplace.

In order to address the issue of growth management and natural resource protection, while at the same time respond to the need for a modest level of nonresidential growth, the Planning Board found that a reduction in the amount of farmland zoned for nonresidential uses should be reduced. The Board identified only areas within the sewer service area, where onsite septic systems would not be needed to support such growth and groundwater would thereby not be impacted by septic effluent entering the carbonate rock geology. One exception is in the southwest area of the Township where a high-value research manufacturing use that is not in a sewer service area will be permitted to expand. Therefore, the 2006 Land Use Plan identifies a significant reduction in the amount of land designated for nonresidential growth.

As adopted, the 2006 Mater Plan amendments call for a significant reduction in the amount of nonresidential growth in the westerly portion of the Township adjacent to existing developed areas, where infrastructure such as sewer service and existing roads exist. In addition, the 2006 Land Use Plan provides for opportunity to expand existing nonresidential development where the existing zoning designation is retained primarily to permit the continuation and expansion of existing ROM uses. Although these designations will result in the conversion of some farmland to nonresidential use, they are a reduction by more than 50% of the area of the Township currently zoned for such uses. These opportunities are provided so that the Township can attempt to address the imbalance between residential and nonresidential, employment generating land uses, which at present is disproportionately weighted by existing residential development. In addition, these designations acknowledge the existence of infrastructure and existing development patterns that support such uses.

Greenwich Township possesses an unusually picturesque landscape comprised of rolling farmland, riparian corridors, grassland areas, wetlands and steep slope areas that host a diversity of critical environmental habitat. Although the existing ordinance calls for the protection of such natural resources, there are no specific ordinance standards that define strategies or regulations to protect these resources. Existing ordinance provisions do not identify and do not include standards for the protection of the Township's unique views and vistas. The Planning Board designated scenic corridors in the 2006 Master Plan and recommended a scenic viewshed ordinance.

Throughout the 20<sup>th</sup> century, Greenwich Township remained a sparsely populated agricultural community that thrived upon farming highly productive soils. Farmsteads surrounded the historic settlement of Stewartsville, which dates to the birth of the nation and is situated at the core of the community. Many historic farmsteads survive today. The 1998 Master Plan includes a map of potentially historic sites in Greenwich Township, including farmsteads. The ordinance provides for an incentive to retain potentially historic sites and farmsteads in conjunction with residential development. The Township has a Historical Commission, comprised of nine members with staggered terms. However there are no provisions in the ordinance establishing a historic

preservation commission, as provided for under the Municipal Land Use Law. The ordinance contains no historic design guidelines or regulations for the protection and maintenance of the Township's historic resources.

Many of Greenwich Township's historic settlements and farmsteads that survive today are situated on roads that may be best characterized as rural historic roads. The picturesque roads that wind through and traverse the Township's landscape are not designated as rural historic roads in the master plan or in the land use ordinance. Protections are needed to maintain the unique scenic characteristics that serve to reinforce Greenwich Township's essential character as a rural historic community.

### State Development and Redevelopment Plan

The Planning Board participated in the third round of State Development and Redevelopment Plan (SDRP) Cross Acceptance, the process of which has served to redefine current thinking and local policies as they relate to natural resource and protection goals and objectives for the community. This process included identification of potential special / critical resource areas of the Township, which have been determined to be expansive and warrant protections beyond those provided for in the 1998 Master Plan and existing ordinance provisions. These designations were endorsed by the Township Committee in the Township's report to the Warren County Planning Department in 2004. The report sought to effectively implement SDRP policies through a series of designations in the SDRP appropriate to the intent and policies of the Township's vast Rural (PA4), Rural Environmentally Sensitive (PA4B) and Environmentally Sensitive Planning Area (PA5) designations, which correspond to Greenwich Township's rich natural resource base.

The Planning Board and the Township have sought to resolve the inconsistencies identified between the local 1998 Plan and the SDRP through the designations contained in the 2004 Cross Acceptance report to the County and the 2006 Land Use Plan update. The designations set forth in the Cross Acceptance report to the County are pending consideration/acceptance by the State Planning Commission, which is currently in the process of completing Cross Acceptance III.

### Highlands Water Protection and Planning Act

The adoption of the Highlands Water Protection and Planning Act has prompted a complete reassessment of community land use goals and objectives. The land use provisions and regional growth management goals and objectives in the Act have provided a framework for, and have informed local land use policies calling for natural resource protection and growth management. This includes a conservative approach to protecting regionally significant surface and groundwater resources capable of supplying future generations of New Jersey's citizens with potable water.

The Planning Board's review of the groundwater protection goals of the act prompted the municipality to prepare a groundwater resource analysis to determine the

extent to which the Township's expansive limestone geology and groundwater recharge areas may play a vital role in the provision of water to the region in the future. The study is entitled "Evaluation of Groundwater Resources of Greenwich Township, dated November 2005. The 2006 Master Plan Conservation and Land Use Plan recommendations are based upon findings and recommendations of this study, which revealed the presence of vast quantities of groundwater capable of being a regionally significant supply of water to the region. The study is appended to the 2006 Master Plan amendments, and is more fully discussed in the amendments.

The Highlands Act identified preservation areas, which are limited in the Township and will be preserved with a strong set of state-mandated land use regulations that will be enforced by the NJDEP and implemented through a Master Plan conformance process with the Highlands Regional Council. The Planning Area of the Highlands is expansive in Greenwich Township and is characterized by the predominance of prime farmland soils, large contiguous actively farmed agricultural areas, high-value natural resource and environmentally-sensitive landscapes, carbonate rock geology and vast groundwater aquifer capable of being a regionally significant source of potable water for New Jersey. The Planning Board determined that these resources are worthy of a conservative planning orientation, which is reflected in the designation of the Resource Conservation District in the 2006 Land Use Plan amendment to the Master Plan.

The normal planning cycle of a six year review of local plans and development regulations is acknowledged in the Highlands Water Protection and Planning Act, which calls for a periodic review of the Highlands Regional Plan (to be adopted) as it relates to local plans. The Planning Board finds that the regional water supply objectives of the Act, should not be subject to the whims and opportunities of economic cycles, which may call for new development opportunities, particularly where these development pressures may conflict with long-range water supply planning for the residents of the State and region. The Board believes that regionally significant water supplies should be protected with conservative land use policies, particularly in the Planning Area, which may be most vulnerable to future development this thinking is reflected in the 2006 Land Use Plan's Resource Conservation District designation.

Through the adoption of the 2006 Master Plan Conservation and Land Use Plan updates, the Planning Board has sought to establish a high degree of planning consistency and vertically integrate the goals, objectives and policies of the Greenwich Master Plan SDRP designations and their respective policies, the Highlands Act Planning Area goals set forth for the Planning Area in the Act, and the findings of the Groundwater Resources report prepared for the Township in 2005. The result is a conservative planning orientation to land use in the Township, and a comprehensive series of policies, programs and strategies found in the local Conservation Plan and Land Use Plan recommendations.

## **Options for Addressing Issues where Current Protection or Growth Management Measures may be Inadequate.**

The Planning Board compared the Township's 1998 Master Plan and zoning ordinances to an updated statement of goals and objectives (2005/06), which revealed a significant gap and an inherent conflict between updated goals and objectives and the types and intensities of development permitted and encouraged in Greenwich Township's local land use ordinances. Although certain environmental resource protection and growth management policies are being advanced through local ordinances to some degree, the weaknesses in local ordinances that are discussed above provide a basis for identifying recommended updates to local plans and ordinances to address such weaknesses.

The Planning Board's 2006 Master Plan amendments highlighted areas where the goals of the Highlands Water Protection and Planning Act and SDRP policies and strategies can be coordinated with local policies. The Planning Board recommends that local policies should be reflected in the Highlands Regional Plan and the SDRP. In addition, the 2006 amendments identify additional local planning and regulatory measures that will be needed if local natural resource protection and growth management issues identified in the 2006 Master Plan are to be effectively addressed.

The following proposed designations and policies should be reflected in the Highlands Regional Plan and on the SDRP policy map for consistency among the Highlands Plan, the SDRP and the Greenwich Township Master Plan.

Historic & Cultural Site (HCS) designations:

- (a) On the SDRP Policy Map, identify the following Historic and Cultural Site Designations:
  - (1) Hamlet of Stewartsville - Historic District – will require identification of Historic District in Township's Land Use Plan;
  - (2) Potentially historic farmsteads and numerous structures throughout Township as mapped in the Warren County Historic Sites Survey, dated 1992 and all historic designations identified in the 1998 Greenwich Township Master Plan.
  - (3) Designate the portion of Pohatcong Mountain lying within Greenwich Township as Critical Environmental Site (CES), which is a prominent unique natural landscape feature of exceptional aesthetic value for the motoring public on westbound I-78 at the easterly municipal boundary. The site is a visual gateway to Greenwich Township and meets the criteria for either a HCS or CES.
  - (4) Scenic Vistas and scenic corridors. The Township identifies the following scenic roadways which provide public views to prominent unique natural landscapes of exceptional aesthetic value:
    - i. South Main Street from SR 173 to SR 57;
    - ii. Beatty's Road from SR 173 to South Main Street;
    - iii. New Village Road, entire length

- iv. Greenwich Street, from easterly terminus of Wyndham Farm neighborhoods to Main Street in Village of Stewartsville;
  - v. Richline Road from SR 57 to Stewartsville Road;
  - vi. Washington Street & Stewartsville Road to municipal boundary with Franklin Twp.
  - vii. Prospect Street, from SR 57 to Morris & Essex r-o-w;
  - viii. CR 638 (Warren Glen Rd.) from SR173 to Municipal boundary with Pohatcong Twp.;
  - ix. SR 173, from Voorhees Road to CR 644; and from Bloomsbury to South Main Street;
  - x. Ravine Road
  - xi. I-78 from Musconetcong River to US 22 exit ramp.
- (5) Natural landscapes of exceptional aesthetic or cultural value.
- i. Pohatcong Mountain viewed from I-78 east and westbound;
- (b) Critical Environmental Sites - On the SDRP Policy May, identify the following Critical Environmental Sites:
- (1) Critical Grassland Habitat: In the northeasterly portion of the Township, designate a Critical Environmental Site including the Rank 4 grassland habitat area bound by North Main Street, SR 57, the Franklin/Greenwich municipal boundary and Herleman Rd./Willow Grove Rd./Washington St.;
  - (2) Critical Forest Habitat: In the easterly portion of the Township, designate a Critical Environmental Site including the area of the Pohatcong Mountain and all lands lying between two westerly flowing branches of the Pohatcong Creek. This includes Rank 4 Grassland Habitat, Rank 3 Forest Habitat, Steep Slopes;
  - (3) Critical Grassland Habitat: In the southerly portion of the Township, designate a Critical Environmental Site including the Rank 2 grassland habitat area bound by SR 173, Voorhees Road and the municipal boundary with Pohatcong Township and Hunterdon County;
  - (4) Critical Grassland Habitat: In the central portion of the Township, designate a Critical Environmental Site including the Rank 4 grassland habitat area bound by Greenwich Street, South Main Street, I-78 and US Route 22;
  - (5) All reaches of and tributaries to the Pohatcong Creek, the Merrill Creek and the Musconetcong River – these are pristine surface waters worthy of C-1 designation and are of unique scenic and recreational resource value to the residents of the State of NJ;
  - (6) Various sites that are essential to the preservation of the Township’s rural character and exhibit one or more of the following characteristics:
    - i. Wellhead and wellhead protection areas;
    - ii. Critical Slope Areas; and
    - iii. Significant natural features such as ridgelines, gorges and ravines; or unique geologic features (including limestone outcrops).
- (c) Designate the following municipal parkland sites as Park
- (1) Block 18, Lots 3.01
  - (2) Block 23, Lots 2, 5, 7 & 31.01;
  - (3) Block 26, Lot 7

- (d) On the SDRP Policy Map, designate Stewartsville as a Hamlet Center with special historic and cultural significance.
- (e) Specific changes needed in the local plans include amendments to the Wastewater Management Plan and Master Plan:
  - (f) Amend the Waster Management Plan to eliminate inappropriately sited sewer service area designations;
  - (g) Amend the Land Use Plan to replace nonresidential zoning designations with very low density zoning designations that are more compatible with local farmland preservation and natural resource protection goals and objectives.

The 2006 Land Use Plan established as local policy that certain natural resource protection goals of the Highlands Act should be consistently applied in the Regional Plan, whether the resources are found to exist in the Preservation Area or in the Planning Area. These goals are articulated in the 2006 Land Use Plan section discussing the Highlands Water Protection Act, however the following two critical area designations are fundamental to the effective protection of Highlands irreplaceable resources:

- Aquifer recharge areas should be mapped and afforded a special designation on the SDRP Policy Map. The designation should identify these areas as priority protection areas within the Highlands region. Policies should be adopted to protect undeveloped aquifer recharge areas and limit impervious coverage to the maximum extent achievable.
- Prime agricultural soils and soils of statewide importance should be mapped and afforded a special designation on the SDRP Policy Map. Regional growth pressure continues to place demands on the conversion of prime agricultural soils to non-agricultural uses. These soils are a dwindling resource in the State and the SDRP should identify prime agricultural soils as critical resource areas, which should be preserved to the maximum extent achievable. These soils and associated farmland should receive Highlands Critical Resource designation in the Highlands Regional Master Plan, due to their unique ability to respond to the farmland protection and preservation goals of the Highlands Act.

#### 2006 Master Plan Amendments and Reexamination Report Recommendations

The adopted 2006 Master Plan amendments are one step in a multi-year, multi-phase planning effort intended to provide the Township with a comprehensive, innovative municipal planning program to implement natural resource protection and growth management policies and strategies. The following multi-year work program is recommended in the 2006 Reexamination Report to complete the most important Master Plan elements, planning analyses and studies that will serve to more accurately reflect and effectively implement local natural resource protection and growth management goals. The specific items identified by the Planning Board include the following:

1. The preparation and adoption of an updated Farmland Preservation Plan Element, in cooperation with the Township's Agricultural Advisory Committee, in order to expand project areas and establish eligibility for additional farmland preservation Planning Incentive Grant funding.
2. A review and update to the Circulation Plan Element, reevaluating the need for certain roadway alignments in the context of amended Land Use Plan recommendations and consistent with the Resource Conservation District, revised nonresidential zoning classifications and taking into account scenic roadway and scenic viewshed management recommendations as well as other policies developed during the course of the Planning Board's preparation of the Conservation Plan and Land Use Plan amendments.
3. The preparation and adoption of an updated Open Space and Recreation Plan Element, addressing the criteria of both the Municipal Land Use Law and those established by the New Jersey Department of Environmental Protection. This element should undertake a review of current plans for recreation facilities development and identify whether the Hamlen Farm will be sufficient to provide an adequate supply of recreation facilities for current and future Township residents.
4. The preparation and adoption of a Community Facilities Plan Element, showing the existing and proposed location and type of municipal facilities, educational and cultural facilities, and emergency services facilities.
5. The preparation and adoption of a Utility Services Plan Element, analyzing the need for and showing the future general location of water supply and distribution facilities, sewerage and waste treatment facilities, solid waste facilities and related utilities.
6. The preparation and adoption of a Scenic Roads and Views sub-plan element of the Conservation Plan, including an inventory, analysis and design standards.
7. The preparation and adoption of a Historic Preservation Plan Element and guidelines for historic preservation.

The 2006 Master Plan contains an updated Land Use Plan Element that includes revised objectives, policies and standards, and which recommends substantial amendments to the development regulations (Land Use Ordinance, Chapters XIII, XIV, XV, XVI, XVII, XVIII and XIX). In order to maintain consistency between the Master Plan and Ordinance, the following revisions to the development regulations are recommended:

1. The Zoning Map should be amended to comply with the attached Land Use Plan Map, 2006, dated 5/5/05. The development regulations and Zoning Map must be either substantially consistent with the Land Use Plan Element and Housing Plan Element of the Master Plan or designed to effectuate these plan elements.

2. The development regulations should be amended to incorporate revised bulk standards for the Resource Conservation District, Research Office Manufacturing District, and Research Office, as recommended in the Master Plan.
3. The development regulations should incorporate new development standards for the Resource Conservation District conventional subdivisions at .05 dwelling units per acre; and clustering, lot size averaging or open lands designs at a density of .1 dwelling units per acre; both classes of subdivision requiring a mandatory 80% open space/agricultural lands set-aside.
4. The development regulations should be revised to include the Office Professional/Limited Research (OP/LR) Research Office Manufacturing (ROM) and Research Office (RO) Districts as recommended in the Master Plan (which reduce the overall area of the Township and farmland areas to be zoned for such uses.
5. The development regulations should be revised to include development regulations for the Highlands Preservation Area indicating the minimum density standards contained in the NJDEP Emergency Rule for development in the Highlands Preservation Area. A grandfathering provision should be established for existing development in the HPA consistent with the provisions of the Highlands Act and the Emergency Rule.
6. The development regulations should be amended to include Steep Slope, Ridgeline, Hillside, Mountainside Viewshed management and Scenic Corridor development that are recommended in the 2006 Master Plan amendments.
7. The development regulations should be revised to incorporate the recommendations of the Conservation Plan Element relative to geology/aquifers/soil types; farmland/hydrologic function; critical forest and grassland habitat; surface water; woodlands; steep slopes; and energy and air quality.
8. Conditional use regulations for institutional uses, houses worship and government offices should be incorporated into the zoning ordinance for the B-1 and B-2 Districts, as recommended in the Master Plan.
9. Conditional use regulations for hotel/conference center uses should be incorporated into the zoning ordinance for the RO District, as recommended in the Master Plan.

#### Groundwater protection

The following options have been identified to protect groundwater aquifers and ground water quality and quantity in the Township.

- Protect aquifer and groundwater recharge areas and prevent contamination of ground water resources to maintain safe drinking water supplies for future

- regional potable water supplies and to ensure that an ample supply of water is available for local agricultural uses.
- Protect groundwater quality and quantity through the proper management of aquifer recharge areas, wetlands and their transition areas and limestone and fractured bedrock groundwater aquifers.
  - Require compact patterns and arrangements of development to limit impervious surfaces, surface runoff and the potential for water quality impairment; and to maximize groundwater recharge capacity.
  - Limit permitted impervious coverage to maintain maximum groundwater recharge and storage capacities and prevent any compromise in groundwater quality.

### Farmland preservation

The following options are recommended to protect farmland soils and agricultural activities and preserve the ecological function of agricultural areas.

- Implement strategies to retain large contiguous areas of farmland and promote the long-term viability of continued agriculture, such as resource conservation zoning, mandatory clustering and/or open lands zoning to concentrate the loss of farmland to non-agricultural use areas and retain large contiguous areas of farmland.
- Encourage agricultural activities that keep land open and preserve the natural hydrologic cycle of groundwater recharge to maintain groundwater supplies and the availability of water for agriculture and to meet emergent regional potable water demands.
- Establish impervious coverage limits for agricultural land uses that respect the needs of agriculture, but maximize groundwater recharge and limit stormwater runoff volumes entering streams, watercourses and carbonate rock geology, which is highly susceptible to the development of solution cavities and sinkhole formation.
- Continue to vigorously pursue farmland preservation through Township, County and State easement purchase programs. Utilize alternative means of protecting agricultural areas including easement donation and acquisition, purchase of development rights, direct easement purchase, and other creative strategies to preserve as much farmland as possible and the Township's prized agricultural base.
- Establish standards for agricultural buffers to limit potential impacts between agricultural activity and non-residential land uses.
- Permitted residential densities should be reexamined to determine whether sufficient viable agricultural opportunities in areas containing important farmland soils and recharge areas will result if/when development takes place.
- Require open space/open lands set-asides to preserve as much viable agricultural land as possible.

### Threatened and endangered species

Threatened and endangered species are indicators of ecological diversity and environmental quality. Like the canaries in the coalmine, they warn us when we are spoiling the quality of the environment beyond natural capacities. The presence of these species is an indicator of the historic emphasis on land stewardship. The following options are identified to protect and preserve these species.

- Implement a greenway system that protects and unifies environmentally sensitive features by providing conservation easements over floodplain areas, stream corridors, steep slopes, ridgelines and wetlands and their transition areas.
- Protect, critical habitat including woodland and grassland areas, unique habitat and threatened and endangered species habitat areas through the placement of these areas in conservation easement.
- Prepare a threatened and endangered species and declining species study of the Township by coordinating community efforts and State data sources to develop an inventory of species to be protected and strategies for maintaining essential habitat.
- Consider a reduction of permitted residential densities to limit the fragmentation and conversion of critical habitat areas to developed uses and promote the maintenance and preservation of large contiguous areas of critical habitat.
- Utilize zoning strategies and techniques such as clustering, lot size averaging, non-contiguous clustering, open lands zoning, and transfer of development rights to offer a range of development options for the maintenance and protection of interconnected natural lands, air and water systems, critical habitat, particularly threatened and endangered and declining species habitat areas, and large contiguous areas that support biological diversity.
- Wherever possible, limit disturbance and development of meadows, forests, grassland areas, steep slopes, ridgelines, scenic vistas and views, streams and their corridors, groundwater aquifers and recharge areas, wetlands and swampy areas, unique landscapes, and agricultural areas.
- Require mitigation measures such as reforestation, meadow restoration, natural hedgerow treatments, and context sensitive buffering and landscaping to limit impacts to these areas resulting from development.
- Establish and maintain reduced land use densities and intensities, which respect the capacity of the environment to sustain development, while at the same time maintaining the vitality and viability of critical habitat areas and the natural resource conservation and environmental protection objectives of this plan.

### Surface waters

In order to mitigate potential impacts to the Township's surface waters, the following management approaches are recommended:

- Preserve and protect the high quality trout production and trout maintenance waterways in the Township from point and non-point source pollution. Wherever

appropriate, require Best Management Practices (BMP's) such as, but not limited to:

- Enhanced Buffering
  - Created wetlands
  - Multistage stormwater treatment systems
  - Drywell infiltration systems for groundwater recharge
  - Extended basins
  - Bioretention plantings in basins
- Implement a greenway system that protects environmentally sensitive features by placing conservation easements over floodplain areas, stream corridors, wetland and their transition areas.
  - Reduce permitted residential density and impervious coverage standards to minimize potential negative impact to surface waters from non-point source pollution.

### Steep Slopes

Development of steep slopes produces a variety of environmental impacts, including increased soil erosion and sedimentation, decreased surface water quality, decreased soil fertility, increased overland flow, decreased groundwater recharge, and altered natural drainage patterns. In order to reduce the potential for these negative impacts, the Township should consider the following options for ordinance amendments:

- Establish steep slope disturbance standards that relate the intensity of permitted development to the slope gradient, such as the adoption of an ordinance consistent with NJ Highlands Act standards that limit steep slope disturbance.
- Develop standards that limit tree removal and soil disturbance on steep slopes.
- Avoid the disturbance of steep slopes and protect these areas through the placement of conservation easements on these areas at the time of subdivision.
- Require reforestation of open space areas that may provide critical linkages among existing forested areas and where groundwater recharge may be enhanced through the reestablishment of forests

### Woodlands & critical forest habitat

The following strategies are proposed to protect forested critical habitat and woodland areas.

- A woodland conservation ordinance should be adopted to minimize the loss of critical forest habitat, and require reforestation where appropriate.
- Performance standards should be established limiting the extent of forest removal, based upon forest type. Priority should include forested slopes, critical habitat for threatened and endangered species, 100 year floodplains, wetlands, stream corridors and slopes 15% or greater.

- Standards should be established to maintain forest habitat areas that are as large and circular as possible, gradual and undulating at the edges and connected by wildlife corridors wide enough to maintain interior forest conditions (i.e. 300' or greater).
- Development should minimize the disturbance of critical forest habitat.
- Require open space/open lands set asides to limit loss of woodlands and forests and to promote the retention of critical forest habitat.

### Scenic views and vistas

The Township's agricultural landscape and Greenwich's historic settlements and farmsteads are worthy of special protection because these features embody the Township's natural and cultural landscape which are inextricably linked to community character. Protection of these unique scenic attributes that establish Greenwich's essential character should be advanced through the following actions.

- Identify and protect the unique views and vistas that are intrinsically linked to the rural and historic landscape, including, but not limited to important roadside viewsheds and scenic vistas for the protection of these features.
- Protect scenic views and vistas through the careful placement of new development, and require mitigation where practical when scenic views and vistas are to be compromised by new development.
- Protect scenic views and vistas through the placement of these areas in conservation easements at the time of subdivision or whenever development is approved.
- Adopt a comprehensive scenic mountain, ridgeline, hillside and steep slope ordinance to protect Greenwich's values distant views of these land features.
- Adopt development standards to protect undeveloped hilltops by prohibiting hilltop development and directing development to areas that are not prominent in the public view, particularly from scenic corridors and rural historic roads.
- Consideration should be given to reducing permitted densities on steep slope, hillside and ridgeline areas to protect these features from degradation and compromise by development.

### Affordable Housing/Green Design

The Greenwich Township Planning Board engaged in an investigation of 'green design' for affordable housing, which was funded as a separate element of this MP3 grant from the NJ Highlands Council. The Planning Board developed recommendations for incorporating at least some measure of 'green design' in all affordable housing to be constructed in the Township under COAH's third round. The Township's third round Housing Element and Fair Share Plan calls for the Township to 'buy and fix' existing dwellings in the Township and maintaining those remodeled homes as affordable housing. The plan also provides for the creation of accessory apartments. In addition, the Township has a municipal rehabilitation obligation, which will be coordinated with the Warren County Community Development Office. The Township will utilize its

affordable housing trust fund, future development fees and growth-share in-lieu contributions to meet its affordable housing obligation.

Greenwich Township's Third Round Fair Share Plan forecasts that the majority of the affordable housing growth share obligation will be constructed by the private development community in conjunction with nonresidential development that is provided for in the Land Use Plan. The Planning Board identified a policy that all affordable housing constructed under the growth share ordinance should incorporate 'green design' features into all affordable housing units created.

The Planning Board developed a policy to incorporate at least 10% 'green design' components into each affordable housing project. This includes all affordable housing projects, whether subsidized through the County community development program, funded through the Township's affordable housing trust fund, or projects undertaken by the private sector in conjunction with new development. This goal requires that 10% of the cost of affordable housing production in the Township will be attributable to measures, including, but not limited to energy efficiency, building design, orientation, materials used, etc. The following list provides an overview of the goals for designing affordable housing 'green':

- Exceed the specifications of the New Jersey Uniform Construction Code with identifiable benefits to the occupants with respect to indoor air quality, energy efficiency and production, water efficiency and material specification.
- Encourage superior building design that enhances the health and safety of the occupants and improves environmental quality.
- Demonstrate low and moderate-income housing can be attractive and an asset to the community.

#### *Energy*

- Promote implementation of the New Jersey State Sustainability Greenhouse Gas action Plan by applying proven energy-efficient and renewable energy technologies to reduce carbon emissions.
- Incorporate a comprehensive approach to energy-efficient design and construction beyond the requirements of rule 5:43-3.1 (u).
- Incorporate renewable energy technologies such as solar technologies.

#### *Resource Efficiency*

- Promote the design and construction of durable, low-maintenance and long lasting buildings.
- Specify resource-efficient, environmentally preferable, recycled or recyclable and agricultural-based building materials.
- Support a comprehensive approach to water efficiency.
- Manage, minimize and eliminate waste, implementing recycling during and post building construction and over the lifetime occupancy of the building.

#### *Operations and Maintenance*

- Produce housing for low and moderate-income households that has a low total owning, operating and maintenance budget, including purchase costs, energy costs and maintenance costs.

## Sustainable Agriculture

In 2005, the Greenwich Township Planning Board conducted an investigation into the concept of sustainable agriculture, funded through the Highlands Council's MP3 grant to the Township. The fundamental long-term goal for Greenwich Township as stewards of its precious natural resource base is embedded in the concept of sustainability. Sustainable agriculture, sustainable water resources, and a sustainable natural environment are goals that are central to protecting the natural resources and environment with which Greenwich Township has been endowed.

The sustainable agriculture investigation will be ongoing, but it has resulted in an interim report that identifies a series of challenges and findings that are aimed at ensuring the survival of Greenwich Township's farmland base and protection of natural resources for future generations. The finding and recommendations of the Planning Board's sustainable agriculture investigations provide a basis for formulating strategies, policies and regulations for effective management of agricultural lands consistent with local natural resource protection and growth management goals.

## **Appendix B: Sustainable Agriculture Findings and Recommendations**

Greenwich Township  
Land Use Plan Appendix  
Sustainable Agriculture Findings and Recommendations  
NJ Highlands MP3 Planning Grant & Master Plan

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This appendix is the result of Greenwich Township's sustainable agriculture investigations.

The Greenwich Township Planning Board developed this appendix as part of its Land Use Plan update background studies related to resource conservation in the Township. The recommendations contained throughout this document, in part, provide a basis for implementing a land preservation / resource protection land use and zoning strategy, for a majority of the lands in the Township located within the Highlands Planning Area, that are characterized by (1) the presence of high-quality soils (prime soils and soils of statewide significance); (2) actively farmed areas, which account for approximately 60% of the Township's land mass; and (3) the threat of loss of these precious resources, which assumes one of the highest local land use priorities in conjunction with retention and preservation of groundwater recharge areas and maintenance of Greenwich Township's prolific groundwater reserves, which are a vital resource to the region.

### Introduction

Greenwich Township is located in westerly-most portion of the State near New Jersey's border with Pennsylvania at Phillipsburg. The Township is located in the Highlands physiographic province and may be characterized primarily by its scenic agricultural landscape. The Township is traversed by State Route 57 in the northerly portion of the Township, I-78 in the south-central portion of the Township. US Route 22 bounds the municipality with Pohatcong Township on the west. The primary population center in the Township is located in the westerly portion of the Township to the east of Route 22 and west of Stewartsville.

A majority of Greenwich Township's land base is agricultural land, most of which remains actively farmed, a sizeable portion of which has been protected through farmland preservation. The Township's court-ordered rapid growth during the 1990's resulted in dramatic increases in the population and the rapid conversion of highly productive agricultural lands into residential neighborhoods and commercial development that is primarily situated in the westerly area of the Township.

The new population brought with it increased demand for local services including education, police, fire and rescue, recreation and municipal government. In 2006, Greenwich Township's residents are focused on the responding to fiscal challenges of delivering services to respond to these demands. Much progress has been made including completion of a new elementary school, an addition to the elementary school, and acquisition of land for a new community park and municipal facilities. Much remains to

be done, however including new or expanded facilities for police, fire, rescue, recreation and municipal service offices.

Greenwich Township offers its residents an excellent quality of life, which makes the Township a very inviting community in which to live. Many Township residents commute along I-78 to the major population and employment centers located to the west. At the same time residents enjoy life in comfortable suburban neighborhoods immersed within a rural community that has remained remarkably untouched by development since the area was settled about the time of the nation was established.

While much of the agricultural landscape remains intact, the regional appetite for sprawl development threatens to convert Greenwich Township's remaining agricultural land to non-agricultural uses. The local response to regional growth pressure includes municipal farmland preservation investments to protect the remaining agricultural base, and rural zoning strategies which have served to slow the pace of development and temporarily allow for the continuation of farming on Greenwich Township's highly productive agricultural soils. Farmland preservation efforts have been fruitful, with a number of farm parcels preserved to date in conjunction with County and State preservation programs. Despite these efforts, additional strategies will need to be implemented if the long-term survival of the agricultural base is to be assured in the future.

The enactment of the Highlands Water Protection and Planning Act occurred as Greenwich Township was in the process of updating its Master Plan. This legislation prompted local efforts focused on protecting lands within the Township that have been identified in the Act as 'Planning Area', which will likely not be afforded the maximum protection from development under the Highlands Regional Plan when it is adopted in the summer of 2006.

Greenwich Township's landscape is endowed with a wealth of natural resources that are worthy of the highest degree of protection under the Highlands Regional Plan. These resources include productive agricultural soils, high quality surface waters, critical habitat, forested slopes, and underlying limestone geology. Agricultural soils, high quality surface waters, critical habitat and forests are observable within the landscape. However, there is a potentially vital groundwater resource that lies beneath the surface of the ground, which may prove to be a vital water supply for future generations within the Highlands region, much as the Township's productive farm soils are a vital dwindling resource in New Jersey. Greenwich Township's natural resources rise to a level of regional significance, which Greenwich Township seeks to protect for the benefit and enjoyment of today's residents and to be available to respond to the needs of future generations to come.

Perhaps the fundamental long-term goal as stewards of Greenwich Township's precious natural resource base is embedded in the concept of sustainability. Sustainable agriculture, sustainable water resources, and a sustainable natural environment are goals that are central to protecting the natural resources and environment with which

Greenwich Township has been endowed. Ensuring the survival of these resources for future generations is the challenge that the Township now faces.

*Sustainability - Meeting the needs of the present generation without compromising the ability of future generations to meet their own needs (as defined by the Brundtland Commission, 1987);*

Although this definition has become widely publicized, the term sustainability is not limited to one precise definition. Below are additional definitions for sustainability that may assist in establishing a framework for planning:

*The concept of meeting the needs of the present without compromising the ability of future generations to meet their needs. In nature conservation terms, it refers to the use of a natural resource in a way where it can be renewed, such that the environment's natural qualities are maintained. ([www.jncc.gov.uk/earthheritage/module/glossy.htm](http://www.jncc.gov.uk/earthheritage/module/glossy.htm))*

*The term originally applied to natural resource situations, where the long term was the focus. Today, it applies to many disciplines, including economic development, environment, food production, energy, and lifestyle. Basically, sustainability refers to doing something with the long term in mind, (several hundred years is sufficient). Today's decisions are made with a consideration of sustaining our activities into the long term future ([ag.arizona.edu/futures/home/glossary.html](http://ag.arizona.edu/futures/home/glossary.html)).*

*As defined by the US EPA, sustainability refers to the ability of an ecosystem to maintain a defined/desired state of ecological integrity over time. ([glei.nrri.umn.edu/default/glossary.htm](http://glei.nrri.umn.edu/default/glossary.htm))*

Sustainable Agriculture.

Preserving the agricultural landscape and maintaining opportunities for farming are important planning objectives for Greenwich Township. As part of the Township's MP3 funded planning activities, the Planning Board conducted a 'sustainable agriculture' workshop at a public meeting on November 28, 2005 with invited guests brought together to form a sustainable agriculture work group. The meeting was advertised to the public and included the following attendees:

- Susan Craft, Ex. Dir., NJ SADC Farmland Preservation Program;
- Eileen Swan, former municipal mayor, open space and farmland preservation consultant;
- Christine Danis, NJ Highlands Council Planner;
- Dr. Steven DeBroux, Professor of Agronomy and Environmental Sciences, Delaware Valley College;

- George and Melanie DeVault, farmers from the Lehigh Valley, growers of high value crops and value added products engaged in direct sales to the public and producer's only farmers market in Emmaus, PA;
- Robert Santini, local farmer;
- Sam Santini, local farmer;
- Cliff Oberly, local dairy farmer;
- Greg Blaszk, Greenwich Township Committeeman, Open Space Preservation Committee liaison.
- Planning Board Members Mayor Brian Visconti, Committeeman Frank Marchetta, Jim Adams, Tom Bolger, Ken Hoser, Doris Rayna, Tim Gale. Also present was David Banisch, PP, planning consultant.

AGENDA  
Greenwich Township Planning Board  
November 28, 2005

- I. Purpose: The purpose of this meeting is for the Greenwich Township Planning Board to conduct an investigation into agricultural sustainability. This meeting is a 'brainstorming session', which the Board is conducting with invited guests that have specialized expertise and backgrounds on this topic, and who have been asked to share their thoughts and comments on the topic of agricultural sustainability with the Planning Board.

This meeting is an activity that is part of the Board's Highlands Council Municipal Planning Partnership Program (MP3) Grant, which the Board has received to develop a series of recommendations and policies that may assist the Township and other communities in the NJ Highlands with efforts to

- preserve agriculturally productive farmland soils;
- promote farming as an economically viable industry; and
- preserve realistic opportunities for farming as a way of life in Greenwich Township.

- II. Introduction of invited guests.

- III. Discussion.

The Board will focus the evening's discussions on the following areas of interest:

1. Sustainable agriculture – what is it?
2. Identify areas of concern to farmers that should be addressed in local land use policies and identify possible farmland retention strategies and programs;
3. Greenwich Township's farmland base could be described as a cattle, corn, soybean, hay area. The Planning Board would like to hear 'thinking outside of

the box' ideas on specialized farming, and ideas that may apply to farms as small as 20 to 30 acres in size, as well as larger farmland tracts; and

4. Identification of alternative strategies that are targeted to preserving the Township's farmland base.

For example, are ordinance provisions needed to

- permit farmers to construct processing facilities to support specialized forms of agricultural production;
- permit farmers to supplement farm income by creating other part-time businesses on the farm (i.e. repair or welding shop, cabinet-making shop, various and sundry cottage industry activities and retail sales limited to products produced on the farm).

Should the Township consider an effort to establish a sustainable agriculture 'incubator' – such as establishing partnerships with academic institution(s), state and County government, private agricultural interests, venture capitalists, etc. to encourage 'sustainable agriculture' as an industry in the Township. Who would be the partners in such an effort?

5. Comments on fiscal impacts of agricultural land in the community:
  - A. Municipal fiscal impacts - farmland maintained as agricultural land vs. conversion to nonagricultural land; and
  - B. Improving the level of economic activity conducted on existing agricultural lands - transforming present day farming activity to the next generation of profitable agriculture and farming.

The workshop began with introductions and a review of a paper entitled "What is Sustainable Agriculture", that provides a USDA commentary on the question. This was reviewed to frame the workshop discussion, as follows:

### **Sustainable agriculture – what is it?**

**Sustainable Agriculture seeks to identify methods** that will help all producers continue to produce an adequate and safe food supply that can thrive through the next millennium. It integrates all elements of management -- pesticides, fertilizers, wastes, energy, economics, etc.

Sustainable agriculture has been defined in several ways. For example, it has been defined as a system that can indefinitely sustain itself without degrading the land, the environment, or the people. It reflects our concern with the long-term viability of agriculture.

#### *As defined by Congress, sustainable agriculture is:*

"an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

6. satisfy human food and fiber needs;
7. enhance environmental quality and the natural resource base upon which the agricultural economy depends;

8. make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
9. sustain the economic viability of farm operations; and
10. enhance the quality of life for farmers and society as a whole."

*In short, Sustainable Agriculture is:*

**Economically viable:**

- If it is not profitable, it is not sustainable . . .

**Socially supportive:**

- The quality of life of farmers, farm families, and farm communities is important . .

**Ecologically sound:**

- We must preserve the resource base that sustains us all . . .

The following are the summary findings and recommendations of the Planning Board's sustainable workshop, which are broken down under the headings found on the agenda.

**Identify areas of concern to farmers that should be addressed in local land use policies and identify possible farmland retention strategies and programs;**

Food Dollar – farmers receive diminishing share of food dollar;

Mr. George DeValut presented a slide show to explain the farmer's diminishing share of the food dollar and illustrate how he and his wife farm their 20 acres.

- In 2005, the farmer's share of the food dollar was 19 cents of the dollar;
- In 1990, the farmer's share was 30 cents of the dollar; and
- In 1950's the farmer's share was about 50 cents of the dollar.

The loss of the farmer's share of the dollar, 'the other side of the dollar', 81 cents, or 81%, is found in what USDA calls the 'marketing bill' for farm products. The marketing bill is the portion of the dollar spent on labor, transportation, packaging, advertising, delivery (stores) and profits for people who don't actually produce the food, but are in the chain of processing and delivery of the farmer's products to the consumer. The diminishing share of the dollar has taken a toll on farmer's profitability.

- Farmer's share of the food dollar vs. 'marketing bill'

The DeVault's reported that the key to sustainability is high value crops, the method of production and delivery of the product to the market. They farm a 20-acre farm in the Lehigh Valley. They intensively farm their land.

- High value crops - labor intensive; husband and wife are the labor force;
- Grow vegetables and flowers;
- Direct sales to the public – off the farm and through the local farmer's market;
- Special event type productions/sales at farm i.e. celebrating holidays
- Uses inexpensive high tunnels to increase production and maintain sustainability, some tunnels are heated;

- Does not require a lot of expensive equipment;
- Sells membership subscriptions to the public (\$50.00 a year), which entitles members to come to the farm and receive farm grown products weekly –the farmer grows what they want, which may change annually; and
- Estimates 19,000 farmers farm this way and derive a full-time living.

Potential municipal responses to the issue of farmer’s share of diminishing ‘food dollar’ are listed below. The Township should implement policies that will assist in making farming more profitable if it to be retained on a long-term and sustainable basis.

- Review ordinance provisions and determine whether changes are needed to reduce costs to the agricultural community (ordinances are how the community treats the agricultural community);
- Educate all local government entities, Township Committee, Planning and Zoning Boards, local officials, clerks, etc., on local priorities to accommodate farmers legitimate business needs on an expedited basis;
- Review taxation practices to determine whether farm buildings are being over taxed.

#### Public awareness and perception of agriculture

1. Public awareness of local agricultural production and why local commitments are needed to retain agriculture;
2. Perception that agriculture is an interim use; need to overcome that perception;

Mr. Santini raised the concern that the public should have a greater awareness of the local agricultural community. He cited the need to educate the public about what is grown in the Township, and why farmland is important. Mr. Santini noted that soy beans are used in McDonald’s hamburgers and that most residents are probably unaware that they are used in the products that they consume. Mr. Santini primarily grows corn and soy beans on much of the farmland in the Township, which is rented.

Dr. DeBroux recommended a regional planning effort including Greenwich Farmers and farms and farmers in the surrounding area to raise awareness and help promote the agricultural industry.

Mr. DeVault explained that it is his experience that the more interaction he has with customers; the more they understand what goes into producing whatever crop or product is being grown and sold. Mr. Oberly, a dairy farmer, noted that the public would get in the way of his dairy operation.

SADC Executive Director Susan Craft suggested that ‘the municipality could play an active role in marketing agriculture to the public’. She observed that people relate to agriculture as though it is an interim use; until something else takes it place. That

perception will have to be overcome if the agricultural base is going to be preserved. Once the farmland is lost to another use, it is probably lost forever.

Committeeman Marchetta noted that the Township is purchasing signs to tell the public that Greenwich Township is an agricultural community. He cited the local 4% open space tax as evidence of Township resident's commitment to preserve farmland. He suggested that more could be done to raise awareness such as dedicating a booth at the Township's Community Day celebration to help farmers promote agriculture.

- Municipality can play an active role in marketing agriculture to the public;
- Efforts may be needed to raise awareness of the importance to retain agriculture in the community; some efforts may be conducted by a farm business, other efforts may require municipal and/or farm community leadership;
- Efforts will be needed to overcome the public perception that agriculture is not an interim use;

#### Farmland retention – Greenwich Township's identity as an agricultural community

Ms. Swan suggested that beyond educating the public as to what is grown locally other efforts may be needed to establish Greenwich's identity as an agricultural community with the farm community. She suggested that all governmental bodies including the Township Committee, Planning Board and Zoning Board of Adjustment should evaluate how the agricultural community is being handled and acknowledge whether things have to be restructured if agriculture is to survive.

Ms. Swan noted that positive fiscal impacts accrue to the local tax base if farmland is retained and not converted to nonagricultural uses. Both residential and nonresidential land uses create demands for municipal services, which farmland does not generate. An ANJEC (Association of New Jersey Environmental Commissions) fiscal impact study was cited, which documents positive fiscal benefits to a municipality when farmland is retained.

Ms. Swan explained that the ANJEC study challenges the wisdom of the nonresidential ratables chase citing examples where positive fiscal benefits did not result as is commonly believed. Nonresidential growth often spurs the need for more housing. In addition, the transient nature of many nonresidential uses sometimes results in underutilized real estate buildings when market conditions shift. Committeeman Marchetta agreed and noted that even though Greenwich has provided its fair share of affordable housing, the third round rules now require the production of more affordable housing obligations in proportion to the amount of nonresidential development created, which suggests a mixed fiscal picture if farmland is to be abandoned in favor of nonresidential development.

The subject of public access hiking trails was raised as a means of providing additional farmland preservation benefits to the public. It was suggested that establishing a trail across an agricultural landscape may be one way of achieving of public appreciation for

the public investment. A concern was raised that trails may be intrusive to the farmer/property owner. One solution suggested was that trails should be established along roads and perhaps the perimeter of farmland, not through it. Another benefit may be that trails may be an agricultural community asset, which could help promote agri-tourism.

Mr. Santini commented that questions are raised by the public as to why a municipality should preserve land in NJ when there is a large land resource out west. He noted the public frustration with farm equipment on roads, such as slow moving combines, tractors and other farm equipment. Mr. Oberly explained that people like to slow down and appreciate the view of cows in the landscape, but it is another matter when the cow is in the road holding up traffic. His experience is that the residents like farmland but they don't want it to interfere with their life, especially when they're in a hurry. Increased traffic was noted as a potential negative impact if smaller, high value crop farms with direct sales to the public are encouraged. Successful direct sales operations should be expected to generate increased traffic volume, a concern often raised by the Planning Board.

- The Township's identify as an agricultural community will be the product of number of policies and practices that may have to be put in place to promote the agricultural industry.
- The Township Committee, Planning Board and Zoning Board of Adjustment should evaluate how the agricultural community is handled by these entities. Regulations and practices should be restructured if necessary to promote agriculture in the community.
- Land Use regulations that encourage nonresidential 'ratable' development conflict with retaining agriculture and farmland. The Township should adopt land use regulations that promote agricultural uses and farmland retention; and eliminate provisions that conflict with this objective.
- Strategies aimed at fostering the public's proprietary interest in farmland preservation, such as establishing public hiking trails adjacent to preserved farmland should be evaluated as a means of constituting the Township's identity as an agricultural community in the hearts and minds of Greenwich's residents.
- Promoting continued agricultural use of the land in Greenwich is likely to result in public inconveniences from time-to-time, such as farm machinery slowing traffic on local roads. Such trade-offs may be necessary if the Township's productive and scenic farmland base is to be retained.

#### Sustainable agriculture – changing production and practices

Susan Craft noted the dynamic and changing aspect to agriculture and that farmers' need to decide what they will grow. Over time, agricultural production in New Jersey has changed from poultry to fruits to vegetables to nursery stock, in response to market conditions. She said that what agriculture will change to, no one knows. Mr. Oberly followed that comment explaining that he has survived as a dairy farmer for years with

no changes, and that nothing keeps him from changing what he farms. His concern is whether there will be anyone there in 20 years to farm.

- Sustaining agriculture over time in the community will involve changing agricultural production and practices over time.
- Retaining Greenwich Township's productive farmland and scenic landscape will require an understanding by the municipality that what is grown cannot be regulated.

**'Thinking outside of the box' - ideas on specialized farming, and ideas that may apply to farms as small as 20 to 30 acres in size, as well as larger farmland tracts**

Ms. Swan talked about her work in her town's local farmland preservation program in Hunterdon County. She found that most farmers want to farm but that a hostile or difficult environment can discourage farmers from continuing to farm. She used the example of utilizing public funding to preserve a farm, but discouraging farmers by prohibiting farm labor quarters on the farm; requiring paved parking areas for farm stands and requiring a permit for a farmer to allow the public to come onto the farm to buy products that are grown on the farm.

Mr. Santini observed that efforts seem to be targeted to save the 'family' farm, but when that fails the corporate farm takes over. It was noted that the average age of a farmer in New Jersey is 55 years of age. Dr. DeBroux noted that most farmers' capital is tied up in their land and machinery, and consequently selling the farm is an attractive option as farmers age and approach retirement. Dr. DeBroux explained that transferring the farm to younger people that are willing to farm is the problem. Younger people are not established and normally don't have the money to buy the farm from the aging farmer.

One alternative approach to transfer a farm to a younger farmer involves linking the retiring farmer with young people that are interested in and capable of farming, but lack the capital to purchase the farm. The approach is for the farmer to hire the young person as a laborer and provide the young farmer with some income and a home on the farm. The young farmer in this example is paid by the farmer with dairy cattle. Over time, the young farmer builds up a herd and capital but this requires time (i.e. 10 years). This approach, known as bartering or sometimes referred to as a time-sale, can work but requires a farmer that is willing to use that approach.

Dr. DeBroux also explained that another complicating factor is that the farmers' wealth is not only tied up in land; it is also tied up in expensive machinery. This can pose another issue for the farmer that may not easily trust a young inexperienced person to safely and carefully operate expensive machinery. Another issue is a division of thinking/approach to farming. The young farmer may have new ideas and energy that may conflict with the farmers' established approach to farming.

State, county and local funding are vital components for farmland preservation. One thing missing in farmland preservation is a source of funding for would-be farmers to buy

farmland. Preserved farmland is expensive in NJ and young would-be farmers need help in buying preserved farmland. A program should be established at the State level, similar to the farmland preservation program, which requires county and local cost-share, to assist young farmer to buy a farm.

Greenwich is located along the I-78 corridor, approximately 60 miles west of Newark, NJ. Bethlehem and Allentown Pennsylvania lie a short distance to the west and Philadelphia is approximately 80 miles to the south. Within the rapidly suburbanizing northeast where rural landscapes are giving way to sprawling development, Greenwich Township is well positioned to accommodate opportunities for specialized farming within easy reach of major markets via interstate highways.

One emerging opportunity for agriculture on smaller farms, such as those 20 to 30 acres, is farming specialty crops, vegetables, fruits, and horticultural crops that are in high demand by consumers within the region. Opportunities exist for farmers to incorporate value-added processes into farming operations to sell foods to niche markets in the region, such as ethnic foods catering to the specialized needs of certain religious communities. Proximity to the major cities presents the opportunity for farmers to sell crops and value added products to restaurants and specialty markets in the region, where there is high demand for specialized farm products.

Mr. DeVault explained that of the 20 or so farmers in Emmaus, PA farmers market, some of them sell to the Green Markets in Manhattan, some sell down in Philadelphia, others in Easton and Nazareth and some farmers even UPS goods into New York City. Diversity in marketing, as well as production, is the key.

Mr. DeBroux stated that financial incentives are needed to help farmers see a way to pass their land onto future farmers. The farm is their retirement asset. Susan Craft explained that the SADC is looking at ways to help capitalize the transfer of ownership of farms to younger farmers. The SADC is also looking at the issue of additional housing on farms, which could facilitate the approach outlined by Dr. DeBroux above. Mr. DeBroux suggested that anything that the farmers can do to create an environment for small farmers is the healthiest direction to go.

- Farmers want to farm; local regulations should support, rather than frustrate farmers' efforts to continue to farm.
- Efforts focused on saving the family farm may have limited success if the farm fails.
- A funding mechanism to transfer ownership from older farmers to young farmers is one of the central components to sustaining agriculture in the community.
- Creating an environment for young farmers to get started in the agricultural industry on smaller tracts of land (20 – 30 acres) may be the key to addressing the aging farmers financial needs.
- Opportunities exist for specialty or high value farm products, including vegetables, fruits and value added processed products.

- Proximity and highway access to major markets provide the opportunity to create smaller farms (i.e. 20 – 30 acres) for more intensive, higher value farming than the conventional agriculture now being conducted throughout the Township.

## **Appendix C: Conservation Plan Element**

### **Analysis of Natural Resource Protection & Growth Management Issues**

#### **Greenwich Township – Master Plan Update**

##### **Conservation Plan Element**

### Introduction

This Conservation Plan Element has been prepared in accordance with the Municipal Land Use Law (M.L.U.L.) as found at N.J.S.A. 40:55D-28(8), which provides that the Planning Board may prepare and, after public hearing adopt or amend a master plan, or component parts thereof, to guide the use of lands within the municipality in a manner which protects public health and safety and promotes the general welfare. The purpose of the Conservation Plan is to identify the terrestrial and aquatic natural resources in the Township, and establish policies appropriate to their protection. It is the goals and objectives, strategies and policies of this plan that will serve to guide the careful management and sustainability of the Township’s natural resources over time.

### Municipal Land Use Law

The Municipal Land Use Law describes the contents of the Conservation Plan Element at N.J.S.A. 40:55D-28(8), as a plan

“providing for the preservation, conservation and utilization of natural resources, including to the extent appropriate,

- energy,
- open space,
- water supply,
- forests,
- soil,
- marshes, wetlands, harbors, rivers and other waters,
- fisheries,
- endangered or threatened species wildlife and other resources,

and which systemically analyzes the impact of each other component and element of the master plan on the present and future preservation, conservation and utilization of those resources;”

N.J.S.A. 40:55D-2 identifies the purpose of the M.L.U.L. and the statutory authority for municipal land use planning and regulation in New Jersey. More than one-half (eight of fifteen) of the purposes of the M.L.U.L. charge the Planning Board with a mandate to protect the environment, prevent urban sprawl, and protect the State’s natural resources. The Planning Board has prepared this Conservation Plan in response to this statutory charge and to conserve natural resources and promote the maintenance of a clean and healthy environment. The eight purposes of the law are listed below.

- (a) To encourage municipal action to guide the appropriate use of or development of all lands in the state, in a manner which will promote the public health, safety, morals and general welfare;
- (b) To secure safety from fire, flood, panic, and other natural and man-made disasters;
- (c) To provide adequate light, air and open space;
- (d) To ensure that the development of individual municipalities does not conflict with the development and general welfare of neighboring municipalities, the county and the State as a whole
- (e) To promote the establishment of appropriate population densities and concentrations that will contribute to the well-being of persons, neighborhoods, communities and regions, and the preservation of the environment;
- (g) To provide sufficient space in appropriate locations for a variety of agricultural, residential, recreational, commercial, industrial uses, and open space both public and private, according to their respective environmental requirements in order to meet the needs of all New Jersey citizens;
- (j) To promote the conservation of historic sites and districts, open space, energy resources and valuable natural resources in the State and to prevent urban sprawl and degradation of the environment through improper use of the land;
- (n) To promote utilization of renewable energy sources; and
- (o) To promote the maximum practicable recovery and recycling of recyclable materials from municipal solid waste through the use of planning practices designed to incorporate the State Recycling Plan goals and to compliment municipal recycling programs.

### Goals and Objectives

The 1998 Greenwich Township Master Plan identified a series of environmental land use planning policies that are coordinated with natural resource conservation goals and objectives. These included

- Protecting rural, open space areas from inappropriate suburban sprawl type development;
- Protecting existing stream corridors and preserving wooded areas;
- Encouraging the preservation of natural vegetation and preventing the unnecessary cutting of trees along stream corridors;
- Reducing impervious coverage resulting from over-intensive development and sprawl subdivision patterns and controlling the rate and quality of stormwater runoff and the potential discharge of pollutants to ground and surface waters through land development regulations;
- Reducing disturbance within floodplain areas whenever possible
- Promoting the retention of open space throughout the community including the preservation of trees and natural vegetation; and
- Requiring appropriate setbacks from stream corridors.

Thus, the 1998 Master Plan identified a series of environmental protection goals and objectives for the future land use in the Township.

Since the adoption of the 1998 Master Plan, the Environmental Commission prepared an Environmental Resources Inventory (ERI) for Greenwich Township, which was adopted in May 2003. The ERI was prepared with Township funding, the aid of a grant from the Association of New Jersey Environmental Commissions, and hours of dedication of the volunteer Greenwich Township Environmental Commission members. The goal of the ERI was to provide township officials and residents with information as to the existence and the condition of the Township's natural resources, with the hope that the Township would develop and embrace policies for the responsible management of these resources, which are critical for not only maintaining clean air, clean water, and outdoor recreation, but to also maintain the Township's natural plant and wildlife systems.

The 3002 ERI informs this Conservation Plan element through the following series of chapters in the Inventory, which discuss the Township's natural resources. These include:

- Geology
- Aquifers
- Hydrology
- Topography
- Land Use/Land Cover
- Soil Types
- Open Space
- Historic Sites

These chapters, in part, set forth the basis for identification of a series of Conservation Plan goals and objectives, and for conservative land use policies, which will protect the Township's natural resources. The Planning Board has identified the following goals and objectives for this Conservation Plan, which build upon, refine and expand the 1998 Master Plan goals and objectives.

1. Protect groundwater aquifers and surface water quality and quantity.
2. Promote conservation of groundwater resources, through the careful management of recharge areas for protection of underlying aquifers, which are potentially valuable regional water supply resources;
3. Prevent contamination of ground water resources, and maintain safe drinking water supplies;
4. Protect and maintain environmentally sensitive natural resources including floodplains, stream corridors, steep slopes, ridgelines, wetlands and their transition areas, important woodlands, grasslands and unique critical habitat areas.

5. Reduce land use densities and intensities commensurate with the capacity of the environment to sustain development and as necessary to implement the goals, objectives and policies of this plan.
6. Preserve and protect high quality Category 1 (C-1) waterways, and where possible institute measures such as enhanced riparian buffering and restoration to renovate surface water quality.
7. Recognize and protect the Township's unique views and vistas.
8. Protect and preserve important farmland soils.
9. Identify wellhead protection and recharge areas.
10. Offer a range of development options for the maintenance and protection of interconnected open lands.
11. Encourage pedestrian and public transit and linkages.
12. Limit disturbance and development of forests, meadows, grassland areas, steep slopes, ridgelines, scenic vistas and views, streams and their corridors, groundwater aquifers and recharge areas, wetlands and swampy areas, unique landscapes, and agricultural areas.
13. Protect historic sites, farmsteads, districts and the historic character of the cultural landscape.
14. Identify and protect critical resource areas.

The following goals and objectives are identified in the Highlands Water Protection and Planning Act, for the Highlands Planning Area. The Planning Board identifies these goals and objectives as supplements to the goals and objectives listed above, for the portion of the Township included within the Highlands Planning Area.

1. Protect, restore, and enhance the quality and quantity of surface and ground waters therein;
2. Preserve to the maximum extent possible any environmentally sensitive lands and other lands needed for recreation and conservation purposes;
3. Protect and maintain the essential character of the Highlands environment;
4. Preserve farmland and historic sites and other historic resources;
5. Promote the continuation and expansion of agricultural, horticultural, recreational, and cultural uses and opportunities;

6. Preserve outdoor recreation opportunities, including hunting and fishing, where permitted by law;
7. Promote conservation of water resources;

### State Development and Redevelopment Plan

The State Development and Redevelopment Plan (SDRP) offers guidance in the formulation of land management and natural resource conservation policy. The SDRP identifies three planning areas within Greenwich Township including the Suburban Planning Area (PA2), the Rural/Environmentally Sensitive Planning Area (PA4B) and the Environmentally Sensitive Planning Area (PA5). These designations acknowledge the existing suburban development served by wastewater collection infrastructure in the westerly portion of the Township (PA2), and recognize the valuable agricultural resources and environmentally sensitive natural features (PA4B & PA5) that Greenwich Township seeks to protect from the siege of development pressure that threatens to transform these valued resources to suburban sprawl.

Within the region, suburban development is consuming what was once a vast agricultural and natural landscape. The transformation of rural and open natural lands to residential neighborhoods brings with it the loss of irreplaceable natural and economic resources. Unchecked, suburban sprawl will forever alter the rural, natural and cultural landscape that Greenwich Township seeks to protect and preserve. Greenwich acknowledges the SDRP Rural and Environmentally Sensitive planning area designations and embraces the challenge in maintaining and protecting these areas.

The SDRP describes Rural Planning Area as follows:

*“Prudent land development practices are required to protect these resources and retain large contiguous areas of agricultural land. If a viable agricultural industry is to be sustained in the future, the conversion of some of the lands to non-farm uses must be sensitive to the areas predominant rural character and agricultural land base. Throughout New Jersey, some Rural Planning Areas are subject to greater development pressure than other areas. Without greater attention to maintaining and enhancing our rural areas, these economic activities are at risk. Tools and techniques need to be tailored to address the distinctive situation. In particular, new development may require additional attention in areas with environmentally sensitive features.” (underlined emphasis added)*

For the Environmentally Sensitive Planning Area, the State Plan offers the following description:

*“The Environmentally Sensitive Planning Area contains large contiguous land areas with valuable ecosystems, geological features and wildlife habitats particularly in the . . . Highlands region, . . . The future environmental and economic integrity of the*

*state rests in the protection of these irreplaceable resources. . . Environmentally Sensitive Planning Areas are characterized by watersheds of pristine waters, trout streams and drinking water supply reservoirs; recharge areas for potable water aquifers; habitats of endangered and threatened plant and animal species; coastal and freshwater wetlands; prime forested areas; scenic vistas; and other significant topographical, geological or ecological features, . . . These resources are critically important not only for the residents of these areas, but for all New Jersey citizens.*

*The Environmentally Sensitive Planning Area is highly vulnerable to damage of many sorts from new development in the Environs, including fragmentation of landscapes, degradation of aquifers and potable water, habitat destruction, extinction of plant and animal species and destruction of other irreplaceable resources which are vital for the preservation of the ecological integrity of New Jersey's natural resources. . . New development in these Environs has the potential to destroy the very characteristics" (environmental sensitivities) "that define the area". (underlined emphasis added)*

The SDRP promotes the retention of large open land areas in PA4, 4B & 5, and the Plan defines "large contiguous area".

*"When applied to habitat, (large contiguous area) means the area of undisturbed land required to maintain a desired community of plants and animals", and "when applied to farmland, large contiguous area means the amount of contiguous farmland usually considered necessary to permit normal farm operations to take place on a sustained basis."*

The Township is endowed with large contiguous land areas with valuable ecosystems, geological features and critical habitat areas. Whether it is the maintenance of large contiguous areas for farmland, the protection of environmentally-sensitive areas and/or the protection of valuable groundwater recharge areas and aquifers, Greenwich's stewardship of these areas requires policies and management techniques to sustain the landscape in such a way that the long-term viability and function of these lands is assured. Greenwich seeks to manage these resources consistent with the SDRP policy orientation for the Environmentally Sensitive Rural Planning Area and the Environmentally Sensitive Planning Area.

From Greenwich's large contiguous areas of farmland, environmentally sensitive lands and forested slopes, flow pristine C-1 waters that feed the rivers, and overland flows that recharge potable groundwater aquifers. Greenwich's woodlands, farmland, wetland and grassland resources provide important critical habitat for endangered and threatened species. The Township's prime forested areas, scenic farmland areas, undisturbed hillsides and mountainous topography are important resources within a rapidly developing region where these features are being transformed to a sprawling suburban landscape. These resources are critically important not only for the residents of the region, but for all New Jersey citizens and the protection of these features assumes the highest priority.

## Geology / Aquifers / Soil Types

Greenwich Township is located within the Highlands Physiographic Province. Underlying geology, aquifers and Greenwich Township's soil types are uniquely capable of recharging and storing large quantities of groundwater. The recently enacted Highlands Water Protection and Planning Act has brought to light the need to appropriately protect these resources, owing to the tremendous regional demand and future needs for potable water sources in the northerly portion of the State.

The primary goal of the Act is to:

*“protect, restore, and enhance the quality and quantity of surface and ground waters therein;”*

In addition to other natural resource protection and preservation goals, the Act also identifies the goal to:

*“promote conservation of water resources;”*

These goals in the Act flow from a series of findings and declarations that the Legislature set forth in the Act. The Act focuses on the unique function that the Highlands serves for the residents of New Jersey. The Act was adopted to ensure that a safe and plentiful supply of water will be assured for New Jersey's citizens today and in the years to come. At C.13:20-2 Findings, declarations relative to the "Highlands Water Protection and Planning Act."

*“The Legislature further finds and declares that the New Jersey Highlands is an essential source of drinking water, providing clean and plentiful drinking water for one-half of the State's population, including communities beyond the New Jersey Highlands, from only 13 percent of the State's land area; that the New Jersey Highlands contains other exceptional natural resources such as clean air, contiguous forest lands, wetlands, pristine watersheds, and habitat for fauna and flora, includes many sites of historic significance, and provides abundant recreational opportunities for the citizens of the State.”*

The Legislature further finds and declares that *there are approximately 110,000 acres of agricultural lands in active production in the New Jersey Highlands; that these lands are important resources of the State that should be preserved; . . . “since 1984, 65,000 acres, or over 100 square miles, of the New Jersey Highlands have been lost to development;” . . . “because of its proximity to rapidly expanding suburban areas,” . . . “the existing land use and environmental regulation system cannot protect the water and natural resources of the New Jersey Highlands against the environmental impacts of sprawl development.*

*“ . . . because of its vital link to the future of the State's drinking water supplies and other key natural resources, is an issue of State level importance that cannot be left to the uncoordinated land use decisions of 88 municipalities, seven counties, and a myriad of private landowners that the State should take action to delineate within the New Jersey Highlands a preservation area of exceptional natural resource value that includes watershed protection . . . ”*

Interestingly, the Act acknowledges the need to protect the water supply for communities beyond the New Jersey Highlands. The Act calls for the preservation of farmland that are important resources for the State. The Act cites the pace of development and states that “because of its vital link to the future of the State's drinking water supplies and other key natural resources, is an issue of State level importance that cannot be left to the uncoordinated land use decisions of 88 municipalities, seven counties, and a myriad of private landowners.”

For Greenwich Township, this series of findings and declarations have particularly special meaning. Greenwich Township is underlain by carbonate rock-aquifers, that have the capacity to store and supply significant quantities of groundwater. 90% of Greenwich Township is underlain by these formations, which the Township chose to investigate following the adoption of the Act. The Township found abundant groundwater resources within its borders that may be uniquely capable of responding to the purposes of the Act.

Greenwich Township was divided into two areas: (1) about 10% is Preservation Area, which generally includes those portions of the municipality underlain by Precambrian rock (generally a poor water producing aquifer): and (2) approximately 90% is Planning Area, which includes those portions of the Township underlain by carbonate rock-aquifers (generally a very good water producing aquifer). The portion of the Township that is best suited to respond to the Legislature’s intent to protect the Highlands’ vital link to the future of the State's drinking water supplies, is the Planning Area portion of the Township.

The Act calls for rigorous environmental protection standards for the Preservation Area portion of the Highlands. However, it is the Planning Area portion of Greenwich Township that includes the groundwater resources that are the highest priority for the State’s future needs.

The Act calls for a regional master plan, which is to be adopted in 2006 and reexamined every six years. This is similar to the M.L.U.L. review and update cycle for municipal master plans. The purposes of the Act are directed at ensuring an adequate supply of water for New Jersey’s citizens for the long-term, well out into the future beyond the short-term 6-year planning horizon. If vital groundwater resources are not adequately protected in the short term, these supplies may not available 10, 20, 30 or more years into the future when needed to respond to the demands of New Jersey’s ever increasing population. Therefore, Greenwich Township has identified planning for the preservation of water supply needs of New Jersey’s future generations, which assumes the highest priority and should be focused on the Planning Area portion of the municipality.

An “Evaluation of Groundwater Resources of Greenwich Township, Warren County, New Jersey” dated November 2005 identified a series of findings and policies for the protection of Greenwich Township’s groundwater resources, including the following which are abbreviated below:

12. Greenwich Township understands that its groundwater resources have significant value for municipal residents and possibly others beyond its boundaries. The Township understands the need for protecting vital water resources so that they are not diminished or damaged. Greenwich Township recognizes its important location and role in preserving resources for downstream communities.
13. The Township’s groundwater resources serve as a potential reservoir for areas of New Jersey with significantly greater populations. As a result of the local population growth, much greater demand has been applied to the resources within the municipal boundaries and the potential reservoir capabilities of the aquifer systems for other areas of the State has been somewhat diminished. The Township is concerned with protecting these potential reservoirs before they are further diminished or permanently damaged and understands that current population trends could quickly overwhelm groundwater resources. Their understanding and planning is similar to the thinking of the leaders of New Jersey’s eastern cities in the 19<sup>th</sup> and early 20<sup>th</sup> centuries when they realized a need to protect upstream reservoirs and groundwater resources to ensure that the citizens of these cities had sufficient water to meet demands of the late 20<sup>th</sup> century.
14. N.J.A.C 7:9B indicates that all of the streams in Greenwich Township are high-quality surface-water resources worthy of significant protective measures.
15. As C1 waters, streams are protected from degradation resulting from discharges such as those from wastewater treatment plants, which limits options for disposal of wastewater to groundwater discharges. Greenwich’s soils will limit the operation of wastewater leaching systems.
16. The structural geology of Greenwich Township indicates that the rocks beneath this municipality have a high potential for the storage and transmittal of large quantities of groundwater within the carbonate rocks. The structural and bedrock geology of Greenwich Township indicate that this Township *may be one of the best long-term resources for water supply in New Jersey.*
17. Ninety percent or approximately 6,293-acres of Greenwich Township are underlain by carbonate rocks, where groundwater is stored. The openings in the rock can transmit very large quantities of water sometimes in excess of 1000 to 2000 gpm.

18. For the same reason that carbonate rock aquifers are capable of very high well yields, they are also extremely susceptible to contamination from anthropogenic sources. Solution features and sinkholes can rapidly transmit man-made or man-introduced contaminants into these prolific water resources. Because of the nature of these aquifers, additional measures are often necessary to protect water quality and quantity. The filling, grouting, or sealing of solution cavities can significantly reduce groundwater recharge and greatly increase surfacewater runoff. The sealing of these solution openings will affect the long-term water resources of Greenwich Township and the region.
19. Wells located by qualified geologists using best available technologies in carbonate rock-aquifers can often yield in excess of 1000 gpm. A well with a long-term sustained yield of 1000 gpm could produce more than 1.4 million gallons of water per day and based on a usage rate of 100 gallons per day per person, could provide sufficient water for more than 14,000 people. A series of properly located wells in a well field or combination of well fields could feasibly sustain a small to moderately sized city located elsewhere in New Jersey.
20. It is very likely that the groundwater resources of Greenwich Township are equivalent if not greater than the surface-water storage capacity of Spruce Run Reservoir, one of New Jersey's largest reservoirs. If the porosity of the carbonate rock-aquifers beneath Greenwich Township is closer to 20 percent than 2 percent, the total potential volume of water in storage beneath the Township would be nearer 123 billion gallons, which would be more than twice the size of Round Valley Reservoir, which is the largest reservoir in New Jersey with a capacity of 55 billion gallons.
21. The groundwater resources of the carbonate rock-aquifers of Greenwich Township could sustain the water-supply demands of at least 15,700 persons per day without resulting in adverse impacts to the aquifer during drought conditions similar to the "Drought of Record". Given the hydrogeologic characteristics of the carbonate rock-aquifers and the relationship of these aquifers with the streams in the Township, it is possible that the dependable yield of the carbonate rock-aquifers could be much higher than 20 percent of drought recharge. If it were assumed that 50 percent of recharge during a drought could be withdrawn without resulting in adverse impacts, the groundwater resource of Greenwich Township could sustain a population of 39,000 persons. If properly protected, the Township's carbonate rock-aquifer resources likely could sustain the population of a small city. However, additional development or increasing populations within the Township will likely diminish the quantity and quality of water that could be obtained.
22. If Greenwich Township protects the groundwater resources of its carbonate rock-aquifers by concentrating development and preserving areas underlain by these rocks, especially where highly fractured, one of New Jersey's best untapped resources will be available for future generations.

The overall purpose of the Highlands Act is to ensure that the Highlands landscape and its natural systems, which contribute to regional water supply needs, is adequately protected from loss due to over-development. The Planning Board embraces this land and water conservation planning orientation and seeks to responsibly manage the Township's resources, which establish the essential character of Greenwich Township.

Greenwich Township is predominantly underlain by limestone formations, which are capable of rapid groundwater recharge and through which water can move at rapid rates through cavities in the rock. Protecting these geologic and land features assume a high local and regional priority.

Fractured limestone and dolomite aquifers prevail in Greenwich Township (approximately 90% of the Township). High groundwater yields are commonly associated with these formations. There are minor igneous and metamorphic rock aquifer areas, associated with Scott's Mountain in the northeast corner of the Township, and Pohatcong Mountain in the southeast portion of the Township, which account for approximately 10% of the Township. These formations are typically much lower groundwater yielding aquifers than the limestone and dolomite aquifers.

The Soils section of the Greenwich Township ERI identifies the Washington-Bartley soil group as the predominant soils in Greenwich Township. The ERI breaks down the Township's soils as 60% Washington soils, 15% Bartley soils and 25% minor soils, and offers the following descriptions of the soils:

- Washington soils are deep, well drained, and nearly level to steep.
- Bartley soils are deep, moderately well drained, and gently sloping or sloping.
- The minor soils are well-drained, deep Edneyville and Annandale soils, well-drained, moderately deep Wassaic soils, somewhat –excessively-drained Parker soils, and poorly drained Cokesbury soils. These soils are characterized as nearly level to steep, deep, well-drained or moderately well drained, loamy soils.

Taken together with the underlying geology and aquifers, the protection of Greenwich's soils, which have the capacity to recharge underlying aquifers, assumes a high local and regional priority.

The ERI also includes a discussion of the Township's agricultural soils, and identifies the approximate extent of soils with the following agricultural characteristics.

- 70% of the Township is characterized as Prime Farmland soils;
- 15% soils of Statewide Importance; and
- 15% are lower rank soils.

The ERI mapping indicates that the largest contiguous areas of prime farmland soils tend to correspond to the floors of limestone valleys in the Township. Prime farmland soils include the best combination of physical and chemical characteristics for producing food,

feed, forage, fiber, and oilseed crops. Prime soils have the quality, growing season, and moisture supply needed for economical production and sustained high yield crops, when treated and managed according to acceptable farming methods.

The second category, soils of Statewide Importance, are nearly prime and economically produce high yields of crop when treated and managed according to acceptable farming method. Some Statewide Important soils may produce yields as high as Prime Farmland soils if conditions are favorable.

Soils are more fully discussed in An “Evaluation of Groundwater Resources of Greenwich Township, Warren County, New Jersey” dated November 2005, which is an appendix to the Master Plan.

The importance of identifying potential aquifers and recharge areas is two-fold. The first is to review land use policies to insure compatibility with the need to protect the areas that overlay these formations. If development occurs at a density that is relatively low and impervious surfaces are limited, areas can remain viable for aquifer recharge. The second is to continue to identify areas for land preservation in order to limit future development potential to preserve this regionally valuable resource and maintain groundwater quality.

The limestone formations take on added significance due to the effect of dissolution and weathering. Water in combination with carbon dioxide and/or organic carbon can chemically react with limestone and dissolve sections of rock forming solution channels such as cavities, caverns, and sinkholes. These enlarged openings can store and transmit vast quantities of water. Limestone/dolomite aquifer systems are some of the most prolific in New Jersey (NJDEP 1996).<sup>1</sup> This is more fully discussed and documented along with site specific data for Greenwich Township in An “Evaluation of Groundwater Resources of Greenwich Township, Warren County, New Jersey” dated November 2005.

Although site-specific data is needed to identify actual yields and specific capacities, the limestone formations are known to be excellent groundwater producing formations and their integrity should be protected, as they are particularly susceptible to groundwater contamination. The protection of aquifer recharge areas is critical to protecting water quality and appropriate strategies are needed to maintain their integrity. Development activity in these areas of the Township should be minimized to protect groundwater quality. Permitted impervious coverage should be severely limited in these areas to minimize the potential for compromising groundwater recharge capacities and groundwater quality.

On the ridges and mountains, groundwater is transmitted through fractured bedrock, where aquifers are characterized as openings between rock that can be separated by a few inches or several feet. Since these rocks are not porous, the groundwater capacities depend on the size of the fractures between the weathered rock. Therefore, water quality in these aquifers can be highly susceptible to degradation from groundwater contaminants, such as those transmitted from septic systems, particularly in individual wells. Together, the limestone and fractured weathered rock formations each require

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<sup>1</sup> Mulhall, Evaluation of Groundwater Resources of Lebanon Township, Hunterdon County, NJ

careful management to protect water quality and maintain sufficient quantities for well dependent water users.

An important component of wetland function is groundwater recharge. Since wetlands are regulated by the State and Federal governments, the Township is preempted from adopting conflicting regulations. However, management of protected wetlands and transition areas remains an important issue, and site design decisions affect wetlands ecosystems. Wetland systems support critical habitat for threatened and endangered species and a system to periodically monitor and enforce conservation easement restrictions should be developed by the Township.

The following activities have been identified to protect groundwater aquifers and ground water quality and quantity in the Township.

- Protect aquifer and groundwater recharge areas and prevent contamination of ground water resources to maintain safe drinking water supplies for future regional potable water supplies and to ensure that an ample supply of water is available for local agricultural uses.
- Protect groundwater quality and quantity through the proper management of aquifer recharge areas, wetlands and their transition areas and limestone and fractured bedrock groundwater aquifers.
- Require compact patterns and arrangements of development to limit impervious surfaces, surface runoff and the potential for water quality impairment; and to maximize groundwater recharge capacity.
- Limit permitted impervious coverage to maintain maximum groundwater recharge and storage capacities and prevent any compromise in groundwater quality.

#### Farmland / Hydrologic Function

Protecting farmland takes on added significance when viewed in the context of hydrologic function as the open character of these lands permits groundwater recharge that is critical to aquifer recharge and groundwater availability. The conversion of agricultural lands to non-agricultural use introduces impervious coverage that reduces groundwater recharge as stormwater runoff is directed away from soils disrupting the natural cycle.

In addition to the loss of groundwater recharge, the introduction of non-agricultural uses, particularly residential uses, to agricultural areas results in land use conflicts as the proximity of housing to agriculture can result in private nuisance actions. To avoid such conflicts large contiguous agricultural areas should be retained to the maximum extent achievable and development should be limited, and where permitted, concentrated so that the loss of farmland is minimized. Similarly, appropriate separation between agricultural and non-agricultural uses should be maintained. In this way, agriculture as a viable economic activity can be protected.

The following activities are recommended to protect farmland soils and agricultural activities and preserve the ecological function of agricultural areas.

- Implement strategies to retain large contiguous areas of farmland and promote the long-term viability of continued agriculture, such as resource conservation zoning, mandatory clustering and/or open lands zoning to concentrate the loss of farmland to non-agricultural use areas and retain large contiguous areas of farmland.
- Encourage agricultural activities that keep land open and preserve the natural hydrologic cycle of groundwater recharge to maintain groundwater supplies and the availability of water for agriculture and to meet emergent regional potable water demands.
- Establish impervious coverage limits for agricultural land uses that respect the needs of agriculture, but maximize groundwater recharge and limit stormwater runoff volumes entering streams, watercourses and carbonate rock geology, which is highly susceptible to the development of solution cavities and sinkhole formation.
- Continue to vigorously pursue farmland preservation through Township, County and State easement purchase programs. Utilize alternative means of protecting agricultural areas including easement donation and acquisition, purchase of development rights, direct easement purchase, and other creative strategies to preserve as much farmland as possible and the Township's prized agricultural base.
- Establish standards for agricultural buffers to limit potential impacts between agricultural activity and non-residential land uses.
- Permitted residential densities should be reexamined to determine whether sufficient viable agricultural opportunities in areas containing important farmland soils and recharge areas will result if/when development takes place.
- Require open space/open lands set-asides to preserve as much viable agricultural land as possible.

### Critical Forest and Grassland Habitat

In 1993, the New Jersey Department of Environmental Protection Endangered and Non-game Species Program (ENSP) initiated a move to a landscape level approach for endangered species protection. With suburbanization and development occurring in all areas of the State, an increasing amount of habitat that could potentially support threatened and endangered species was being lost daily. ENSP developed the "Landscapes" Program digital data, which identify critical forest and grassland habitat.

Greenwich Township is rich in critical habitat that can support populations of threatened and endangered species. The Landscapes database shows that the northerly portion of the Township (i.e. north of I-78) is predominantly critical habitat including critical forest and grassland habitat. A majority of this portion of the Township is designated Rank 4 Critical Grassland Habitat, with Rank 3 and Rank 5 Forest Critical occurring along the Pohatcong Mountain and the mountainous portion of the Township north of State Route 57. NJ Landscaped Program data shows that Rank 2 Critical Grassland skirts Rank 5 Forest habitat north of Route 57.

South of I-78, critical habitat designations include Rank 2 grassland habitat in some undeveloped farmland areas and Rank 3 Forest Habitat is occurs along the southerly-most portion of the municipality. Rank 2 Forest Habitat is shown along the Pohatcong Creek, where the Creek carries a Trout Maintenance designation (between South Main Street and State Route 173. Minor designations of Emergent habitat and forested wetlands occur along the Pohatcong and Merrill Creek riparian corridors north of I-78 where the streams carry a Trout Maintenance and Trout Production C-1 rating.

In fact, there isn't much of Greenwich Township that isn't suited as habitat for threatened and endangered species. The Township is endowed with expansive grassland habitat areas, forested habitat areas and critical habitat along the Township's stream corridors. Most of these habitat types have documented presence of State threatened and endangered species.

Threatened and endangered species are indicators of ecological diversity and environmental quality. Like the canaries in the coalmine, they warn us when we are spoiling the quality of the environment beyond natural capacities. The presence of these species is an indicator of the historic emphasis on land stewardship. The following activities are identified to protect and preserve these species.

- Implement a greenway system that protects and unifies environmentally sensitive features by providing conservation easements over floodplain areas, stream corridors, steep slopes, ridgelines and wetlands and their transition areas.
- Protect, critical habitat including woodland and grassland areas, unique habitat and threatened and endangered species habitat areas through the placement of these areas in conservation easement.
- Prepare a threatened and endangered species and declining species study of the Township by coordinating community efforts and State data sources to develop an inventory of species to be protected and strategies for maintaining essential habitat.
- Consider a reduction of permitted residential densities to limit the fragmentation and conversion of critical habitat areas to developed uses and promote the maintenance and preservation of large contiguous areas of critical habitat.
- Utilize zoning strategies and techniques such as clustering, lot size averaging, non-contiguous clustering, open lands zoning, and transfer of development rights to offer a range of development options for the maintenance and protection of interconnected natural lands, air and water systems, critical habitat, particularly threatened and endangered and declining species habitat areas, and large contiguous areas that support biological diversity.
- Wherever possible, limit disturbance and development of meadows, forests, grassland areas, steep slopes, ridgelines, scenic vistas and views, streams and their corridors, groundwater aquifers and recharge areas, wetlands and swampy areas, unique landscapes, and agricultural areas.

- Require mitigation measures such as reforestation, meadow restoration, natural hedgerow treatments, and context sensitive buffering and landscaping to limit impacts to these areas resulting from development.
- Establish and maintain reduced land use densities and intensities, which respect the capacity of the environment to sustain development, while at the same time maintaining the vitality and viability of critical habitat areas and the natural resource conservation and environmental protection objectives of this plan.

### Surface water

In 1998, the DEP adopted new Surface Water Quality Standards for water bodies statewide. The DEP applied several different classifications to the Township's surface waters that relate to water quality as well as a variety of uses and maintenance standards that will ensure their maintenance. The surface waters in Greenwich Township are predominantly classified as FW2-TM (C2) Trout Maintenance Waters and include most reaches of the Pohatcong Creek in the Township. The Merrill Creek and the southeasterly-most reach of the Pohatcong Creek is designated TP (C1), or Category 1 Trout Production Waters. The Musconetcong River which adjoins the southerly municipal boundary is nominated for C1 Wild and Scenic River designation.

DEP's use and maintenance standards for these waters are described as follows:

*“Category One Waters shall be protected from any measurable changes (including calculable or predicted changes) to the existing water quality. Water quality characteristics that are generally worse than the water quality criteria, except as due to natural conditions, shall be improved to maintain or provide for the designated uses where this can be accomplished without adverse impacts on organisms, communities or ecosystems of concern. Therefore, these waters are protected from changes in water quality.”*

For streams and rivers classified as FW2-TM (C2), the TM denotes Trout Maintenance status, whereby a water body supports populations of trout, although these waters do not support spawning trout. The C2 indicates a Category 2 anti-degradation policy, as follows:

*“For Category Two Waters, water quality characteristics that are generally better than, or equal to, the water quality standards shall be maintained within a range of quality that shall protect the existing/designated uses, as determined by studies acceptable to the Department, relating existing/designated uses to water quality. Where such studies are not available or are inconclusive, water quality shall be protected from changes that might be detrimental to the attainment of the designated uses or maintenance of the existing uses. Water quality characteristics that are generally worse than the water quality criteria shall be improved to meet the water quality criteria.”*

Trout Production and Trout Maintenance differ from a planning perspective, as they carry different anti-degradation policies. The Trout Production waters carry the C1 designation, which require that the high quality of these waters must be maintained, and protected from any measurable changes. The Trout Maintenance C-2 waterways are slightly less restrictive, requiring protection “from changes that might be detrimental to the attainment of the designated uses or maintenance of the existing uses.”

The Morris Canal is the only non-trout surface water in the Township and is subject to the C-2 anti-degradation policy of the DEP’s surface water quality standards. The Canal no longer functions as a canal in Greenwich Township and does not contain water, so the DEP designation appears to be somewhat of an anomaly. Irrespective of DEP’s rating, all surface waters should be afforded careful planning consideration if critical habitat is to be protected and a diversity of species is to be encouraged.

Greenwich’s pristine waters and trout streams originate in upland reaches of the Pohatcong Creek and the Merrill Creek. Almost all of Greenwich’s surface water courses provide recharge to the Pohatcong Creek, which flows to the Delaware River. Greenwich Township is located in one of the fastest growing regions of the State that will continue to grow in the future, and the recently enacted Highlands Water Protection and Planning Act has included Greenwich in the Highlands Planning Area, which may leave these surface waters particularly vulnerable to degradation if not properly managed. Protection of these watercourses assumes the highest priority, not only for the Township’s residents, but also for the general welfare of residents of the region.

High surface water quality is dependent on preventing point and non-point source pollution from entering waterways. Non-point source pollution can be mitigated by local land use strategies and management approaches. Non-point source pollutants include septic system effluent, agricultural runoff, stormwater runoff and construction activities.

The DEP’s Stormwater Management Rules, which became effective in February 2004, require enhanced buffering for development projects that adjoin C-1 waters. DEP determined that a 300-foot buffer is necessary to prevent water quality degradation and to protect the attributes for which Category One waters have been designated. Therefore all developments adjacent to C-1 surface waters must provide the required buffer when proposed development will result in the disturbance of an acre or more of land or impervious coverage of a quarter of an acre or more. However, unless development or another activity triggers the threshold disturbance or impervious coverage limit, the buffer is not required, which may suggest the need for a municipal program of requiring enhanced buffering along riparian corridors in situations when existing development receives a local approval such as a variance.

In order to mitigate potential impacts to the Township’s surface waters, the following management approaches are recommended:

- Preserve and protect the high quality trout production and trout maintenance waterways in the Township from point and non-point source pollution. Wherever

appropriate, require Best Management Practices (BMP's) such as, but not limited to:

- Enhanced Buffering
- Created wetlands
- Multistage stormwater treatment systems
- Drywell infiltration systems for groundwater recharge
- Extended basins
- Bioretention plantings in basins
- Implement a greenway system that protects environmentally sensitive features by placing conservation easements over floodplain areas, stream corridors, wetland and their transition areas.
- Reduce permitted residential density and impervious coverage standards to minimize potential negative impact to surface waters from non-point source pollution.

### Woodlands

- Protect existing forested areas and implement strategies that encourage a diverse network of interconnected forests
- Identify and protect critical habitat forests from fragmentation

Woodlands and forested areas are locally important natural resources that serve a variety of functions and uses. Removal of trees and other vegetation can result in ecological, hydrological, and economic impacts. Woodlands affect local climatic conditions near or within their boundaries, such as the cooling effect on trout streams. Though somewhat limited as a percentage of Greenwich's overall land cover, Greenwich's forested areas are categorized as critical habitat by the NJDEP Natural Heritage Program's Biological Conservation Database (BCD). This forest habitat supports threatened and endangered species in the region and provides an important resource to the protection of these species.

Woodlands and other native vegetation perform a series of important functions related to the ecological balance.

- They stabilize steep slopes and reduce soil erosion and surface runoff, absorb pollutants and promote aquifer recharge, because of the high moisture holding capacity of forest soils.
- Forests produce oxygen, and affect local climatic conditions near or within their boundaries, such as the cooling effect on trout streams.
- Woodlands provide habitat for plants and animals and can establish critical linkages among natural systems and open space areas such as stream corridors, wetlands and agricultural areas, and protected areas such as public lands and conservation easement areas.
- Forests establish important open space and recreation lands.

- Forests enhance the visual character of the community, including ridgelines and scenic corridors.
- Woodlands serve to create a feeling of privacy and seclusion in neighborhood areas and reduce noise impacts.
- Woodlands and other native vegetation provide visual diversity in the terrain, enhancing the value of property.
- Woodlands provide a renewable resource that can be harvested and sold, thereby providing an economic benefit to landowners.

A fundamental aspect of preserving woodland function is preventing fragmentation and degradation of forests and vegetation cover. Forests establish connecting linkages among other sensitive landscape features such as wetlands, steep slopes and critical grassland habitat. The Township's forests are primarily situated on mountainous and steep slope terrain. This plan seeks to protect Greenwich's forested areas from fragmentation and ensure their health and function as an underpinning of the biodiversity in the Township. The following strategies are proposed to protect forested critical habitat and woodland areas.

- A woodland conservation ordinance should be adopted to minimize the loss of critical forest habitat, and require reforestation where appropriate.
- Performance standards should be established limiting the extent of forest removal, based upon forest type. Priority should include forested slopes, critical habitat for threatened and endangered species, 100 year floodplains, wetlands, stream corridors and slopes 15% or greater.
- Standards should be established to maintain forest habitat areas that are as large and circular as possible, gradual and undulating at the edges and connected by wildlife corridors wide enough to maintain interior forest conditions (i.e. 300' or greater).
- Development should minimize the disturbance of critical forest habitat.
- Require open space/open lands set asides to limit loss of woodlands and forests and to promote the retention of critical forest habitat.

### Steep slopes

- Protect steep slopes from erosion and degradation resulting from permitted development and vegetation removal.

Development of steep slopes produces a variety of environmental impacts, including increased soil erosion and sedimentation, decreased surface water quality, decreased soil fertility, increased overland flow, decreased groundwater recharge, and altered natural drainage patterns. In order to reduce the potential for these negative impacts, the Township should:

- Establish steep slope disturbance standards that relate the intensity of permitted development to the slope gradient, such as the adoption of an ordinance consistent with NJ Highlands Act standards that limit steep slope disturbance.

- Develop standards that limit tree removal and soil disturbance on steep slopes.
- Avoid the disturbance of steep slopes and protect these areas through the placement of conservation easements on these areas at the time of subdivision.
- Require reforestation of open space areas that may provide critical linkages among existing forested areas and where groundwater recharge may be enhanced through the reestablishment of forests

#### Scenic views and vistas

- Recognize and protect unique views and vistas.
- Protect undisturbed scenic mountain, hillside, ridgeline and steep slope views and vistas for the scenic enjoyment of all NJ citizens.

Greenwich Township's rolling Highlands landscape provides the backdrop for an abundance of scenic views and vistas, both short range and expansive long views of the Township's hilly and mountainous terrain. Greenwich's essential character and sense of place are defined by the natural and cultural landscape around which the community developed over time, and the wealth of natural resources that have shaped the community. The Township's scenic views and vistas are an important element in the perceived quality of life in Greenwich. The primary stewards of these resources in the community are the local review agencies. The local development review process plays the primary role in shaping and protecting the visual character of the landscape after development. These are the agencies best positioned to encourage the protection of the scenic views and vistas of the Township.

As part of the Township's participation in Cross Acceptance III, the Planning Board designated a subcommittee charged with cataloguing the Townships scenic corridors and an inventory of scenic corridors has been compiled. This planning effort should be expanded to include identification of "rural historic roads" and the identification of strategies and standards that seek to limit the transformation of the historic character of the Township's rural roads, many of which are under the jurisdiction of the County and the State. This may require an amendment to the Circulation Plan Element of the Master Plan.

Scenic views and vistas viewed from the Township's scenic corridors establish the Greenwich's essential rural character. This plan calls for an ordinance amendment to protect scenic rural historic roads and roadside features by first requiring avoidance of the unique rural historic features that establish community character and if that's not possible, replanting hedgerows, and replacing natural features to the extent practicable. A minimum setback of 200' should be maintained along rural historic roads and scenic corridors to protect the quality of the viewshed from the road.

Hilltop and mountains, ridgelines hillsides and Greenwich Township's rolling farmland landscape vistas are worthy of special protection. Forest clearing and/or development of hillsides and ridgelines can be particularly detrimental in compromising the untouched character of these areas as they exist today. This plan calls for a ridgeline, hillside and

mountainside protection ordinance, the object of which is to prohibit ridgeline development and limit clearing of trees on ridgelines and hillsides so that these scenic resource features remain intact and undisturbed. Additionally the ridgeline, hillside and mountainside protection ordinance should require that when hillside development does occur, a visual ‘down-slope’ screen of mature forest remains undisturbed and placed under conservation easement to prevent future clearing that may result in altering the undisturbed hillside or mountainside forested condition. Where there is no existing vegetation, screen plantings should be required to maintain the integrity of undisturbed views and vistas along scenic corridors. Along ridgelines and hilltops, a buffer would be established, within which no disturbance would be permitted so that the scenic view of these areas will remain undisturbed.

The Pohatcong Mountain and Scotts Mountain are particularly pronounced scenic hillside and ridgeline vistas viewed from most locations in the Township. Other landforms, such as rolling hills, hillsides, steep slopes and ridgelines are also valued scenic views and vistas to be protected and maintained for the enjoyment of all NJ citizens. Distant views of these scenic views and vistas require protection. The Township’s agricultural landscape and Greenwich’s historic settlements and farmsteads are likewise worthy of special protection because these features embody the Township’s natural and cultural landscape which are inextricably linked to community character. Protection of these unique scenic attributes that establish Greenwich’s essential character should be advanced through the following actions.

- Identify and protect the unique views and vistas that are intrinsically linked to the rural and historic landscape, including, but not limited to important roadside viewsheds and scenic vistas for the protection of these features.
- Protect scenic views and vistas through the careful placement of new development, and require mitigation where practical when scenic views and vistas are to be compromised by new development.
- Protect scenic views and vistas through the placement of these areas in conservation easements at the time of subdivision or whenever development is approved.
- Adopt a comprehensive scenic mountain, ridgeline, hillside and steep slope ordinance to protect Greenwich’s values distant views of these land features.
- Adopt development standards to protect undeveloped hilltops by prohibiting hilltop development and directing development to areas that are not prominent in the public view, particularly from scenic corridors and rural historic roads.
- Consideration should be given to reducing permitted densities on steep slope, hillside and ridgeline areas to protect these features from degradation and compromise by development.

#### Energy and Air Quality

- Encourage energy efficiency and protect air quality through the location, design, and construction of new development.

Energy conservation and utilization is shaped by a host of factors. Local land use regulations determine future land use patterns, which have a direct effect on air quality and energy use. Protection of air quality is largely dependent on regional, state, national, and even international factors. Management approaches that the Township can initiate to mitigate air pollution and promote energy conservation include the following:

- Arrange development in compact forms to minimize energy consumption and retain existing wooded areas and large contiguous areas, by utilizing development techniques such as clustering, lot size averaging and agricultural protection zoning.
- Encourage multi-use development forms in locations such as commercial districts and centers that will maximize utilization of the land and reduce reliance on the automobile.
- Encourage pedestrian and public transit and linkages wherever practical and encourage ridesharing and alternative transportation systems (buses, car and van pooling, bicycling, and walking).
- Reduce the need for vehicular trips by facilitating better interconnections among residential, commercial, office, and recreational uses.
- Encourage energy conservation through subdivision design, building design, building orientation, and the evaluation of microclimate conditions such as solar access and wind direction.
- Design bikeways, pedestrian walkways and other routes to maximize opportunities for non-motorized travel in existing and new development.
- Recommend landscaping standards that provide buildings with maximum solar access, shading, and wind protection.

This Conservation Plan Element sets forth a series of State Development and Redevelopment Plan, NJ Highlands Act and municipal goals, objectives and policies that are aimed at the preservation and conservation of Greenwich Township's natural resource base. The conservation policies set forth in this Plan reflect the Greenwich Township Planning Board's policy to be responsible stewards of the limited natural resource with which the Township has been endowed. The Planning Board will continually evaluate new policies that may evolve at the various levels of planning, and embrace those policies, which may serve to reinforce the policies and recommendations set forth in this Conservation Plan and contribute to the protection of Greenwich Township's rich natural resource base.

## **Appendix D: Land Use Plan Element**

### **Greenwich Township – Master Plan Update**

#### **Land Use Plan Element 2006**

##### Executive Summary / Introduction

Greenwich Township is located in Warren County in the northwest portion of New Jersey, approximately 60 miles west of Manhattan and approximately 65 miles north of Philadelphia. The Township may be best characterized by wide expanses of rolling scenic farmland fields lined with hedgerows, and picturesque pristine trout streams. The Township is situated within the Highlands physiographic province, surrounded by a dramatic landscape of forested mountain ridgelines. The Township's 10.55 square miles or approximately 6,754 acres area of land is endowed with a wealth of irreplaceable natural resources and environmentally sensitive habitat, which establish the basis for the Land Use Plan's focus and concentration on natural resource conservation.

Throughout the 20<sup>th</sup> century, the Township remained a sparsely populated agricultural community that thrived upon farming highly productive soils. Farmsteads surrounded the historic settlement of Stewartsville, which dates to the birth of the nation and is situated at the core of the community. Many historic farmsteads survive today. A modest amount of post-war residential development grew at the outskirts of Stewartsville.

In the late 20<sup>th</sup> Century, the landmark Mount Laurel NJ Supreme Court decisions along with the NJ Fair Housing Act adopted by the NJ Legislature in the 1980's, had the effect of rapid suburban court ordered growth in Greenwich Township, which dramatically increased the population. This court ordered housing, joined by additional suburban growth, resulted in Greenwich Township experiencing population growth from just 1,783 persons in 1980 to a reported population of 5,223 in 2004. Despite this growth, the Township's land base remains predominantly agricultural today, and much of the rural character remains much as it has for more than two centuries.

In 2004, the Highlands Water and Protection Act was signed into law, primarily in response to two factors: (1) the need to protect water resources that emanate from the region and provide water to approximately one-half of New Jersey's population; and (2) the need to dramatically limit unchecked suburban sprawl-type growth, which has been consuming the unspoiled natural resources of the Highlands Region upon which New Jersey's population depends for its water. The Act divided the Highlands region into two areas, including the "Preservation Area" and the "Planning Area". The Act had the effect of designating a majority of Greenwich Township within the Highlands region Planning Area.

The Highlands Water Protection and Planning Act implements series of strict mandatory growth controls to limit development in the Preservation Area. Preservation Area

mandatory growth controls do not extend to the Planning Area. However, the Act does identify resource protection goals for the Planning Area that are appropriate to Greenwich Township's natural resource base, which this plan seeks to advance.

Prior to the adoption of the Highlands Water Protection and Planning Act, Greenwich Township was actively protecting its natural resource base, through the preservation of farmland and open space and rural conservation zoning strategies. The Township enacted a local farmland and open space tax, the revenue from which has been used with County and State funding sources to preserve farmland and open space. To date, there have been significant public investments in farmland and open space preservation in Greenwich Township. Ongoing collection of the local farmland and open space tax revenue continues to generate funding for coordinated land preservation efforts, which continue today and are expected to continue well into the future.

Prior to the adoption of the Highlands Act, the Township began an update of the Master Plan. Greenwich Township's participation in the State Development and Redevelopment Plan Cross Acceptance III included preparation of a Cross Acceptance report to the Warren County Freeholders, in which the Planning Board inventoried and the governing body endorsed a series of designations and strategies for resource conservation in the Township. The report calls for the designation of critical environmental resources for enhanced recognition and protection, including threatened and endangered species habitat, high-quality (C-1) surface water and steep slope protections, scenic corridors and viewsheds, identifying areas of exceptional aesthetic value viewsheds (including the Pohatcong Mountain), and critical resource designation for farmland soils and groundwater aquifers and their recharge areas. At the time the Highlands Water Protection and Planning Act was adopted by the Legislature and signed into law by the Governor, Greenwich Township had begun to advance resource conservation as the primary land use goal for the municipality.

After the Act became law, the Greenwich Township Planning Board and Township Committee prepared a groundwater resources report in 2005 to document the existence of water resources within the municipality, which may be of value to the region as a long-term public water resource. Greenwich Township's geology is best characterized as carbonate rock or limestone, which is generally known to be a highly productive groundwater aquifer. This resource was highlighted in the Environmental Commission's 2003 Environmental Resources Inventory, which inventoried the Township's limestone geology as an important natural resource as well as calling attention to the pervasive problem of sinkhole development due to the rapid movement of water through the carbonate rock. The Township's groundwater resources report completed in 2005 confirmed that Greenwich's limestone geology is a significant groundwater resource that requires protection if it is to remain a valuable asset to the regions water supply in the future, which is acknowledged in the Conservation Plan Element of the Master Plan.

Resource conservation is the fundamental planning principle upon which this Land Use Plan is based. In developing this Land Use Plan, the Planning Board conducted a review of the prior Land Use Plan and existing zoning and found that the type and intensity of

development permitted in local ordinances is inconsistent with resource conservation principles. The Board found that development permitted in accordance with local zoning would result in the loss of irreplaceable natural resources with significant value to the residents of Greenwich, as well as the residents in the region. As such, the Planning Board concluded that the Land Use Plan and zoning ordinance should designate a Resource Conservation District, consistent with local goals and objectives as well as State and Highlands Region goals and objectives to conserve critical natural resources.

This Land Use Plan includes a statement of updated goals and objectives, State and Highlands Regional goals and policies, and a series of land use strategies for the protection of Greenwich Township's natural resource base. This plan also identifies opportunities for a modest amount of nonresidential growth to bring some balance to the disproportionate imbalance of land uses, which have evolved in recent years. The overall strategy of resource conservation is the underpinning of this Land Use Plan, which is established to ensure that Greenwich Township's natural resource base survives into the future and to ensure that the natural functions of irreplaceable resources are maintained to contribute to the health, safety and welfare of generations to come.

This master plan update coordinates with the Township's Environmental Resource Inventory, the Conservation Plan Element, the 2005 Groundwater Resources Report, the purposes of the Municipal Land Use Law (N.J.S.A. 40:55D-2), Highlands Protection goals and State Plan policies to establish sound land use and environmental protection policies that will ensure the protection of the Township's wealth of agricultural and critical ground and surface water resources and other environmental resources. This plan addresses important land use issues and environmental challenges that confront the municipality today and are expected to continue in the future. This plan establishes local land use policies designed to preserve Greenwich Township's essential character and to ensure the survival of the Township's agricultural and environmentally sensitive landscape despite persistent regional growth development pressures that threaten the very survival of these resources, and if altered, would forever alter the Township's destiny. Through careful, well-reasoned and balanced land use policies and regulations, the prized agricultural and environmentally sensitive landscape that defines Greenwich Township can be protected for today's residents and future generations to come. Precious groundwater resources can be protected for future generations.

This Land Use Plan identifies resource conservation policies as the foundation for land use planning, environmental protection and farmland retention in Greenwich Township. Greenwich Township has chosen resource conservation as the planning principle to respond to the constant threat of loss to development of productive farm fields, productive soils and groundwater recharge systems, woodlands, steep slope areas, and critical habitat areas. The goal of natural resource protection has prompted the Planning Board to establish policies that are designed to protect these resources, while at the same time provide for sensible use of the land and water resources upon which all residents and natural systems depend.

## Land Use Plan – Statutory Authorization

This Land Use Plan has been prepared in accordance with the Municipal Land Use Law (M.L.U.L.), which at N.J.S.A. 40:55D-28.b. provides for:

- (1) A statement of objectives, principles, assumptions, policies and standards upon which the constituent proposals for the physical, economic and social development of the municipality are based;
- (2) A land use plan element
  - (a) taking into account and stating its relationship to paragraph (1) hereof, and other master plan elements provided for in paragraphs (3) through (13) hereof and natural conditions, including, but not necessarily limited to, topography, soil conditions, water supply, drainage, flood plain areas, marshes, and woodlands;
  - (b) showing the existing and proposed location, extent and intensity of development of land to be used in the future for varying types of residential, commercial, industrial, agricultural, recreational, educational and other public and private purposes or combination of purposes; and stating the relationship thereof to the existing and any proposed zone plan and zoning ordinance; and
  - (c) showing the existing and proposed location of any airports and the boundaries of any airport safety zones delineated pursuant to the “Air Safety and Zoning Act of 1983,” P.L. 1983, c. 260 (C. 6:1-80 et seq.); and
  - (d) including a statement of the standards of population density and development intensity recommended for the municipality;

## Statement of Goals and Objectives

This land use plan coordinates with the Conservation Plan, which identifies a statement of goals and objectives that also serve as many of the goals and objective of this plan. Much of the statement of goals and objectives discussion in the Conservation Plan is provided below and is supplemented for the Land Use Plan. A discussion of the purposes of the M.L.U.L., policies of the SDRP and Highlands Water Protection and Planning Act are incorporated herein as goals to this plan.

## Purposes of the MLUL.

N.J.S.A. 40:55D-2 identifies the purposes of the M.L.U.L., which establish the statutory authority for municipal land use planning and regulation in New Jersey. More than one-half (eight of fifteen) of the purposes of the M.L.U.L. charge the Planning Board with a mandate to protect the environment, prevent urban sprawl, and protect the State’s natural resources. The Planning Board has prepared the Master Plan to discharge its statutory responsibility to conserve natural resources, protect farmland and natural systems, and promote the maintenance of a clean and healthy environment. Those eight purposes of the law are listed below.

- (e) To encourage municipal action to guide the appropriate use of or development of all lands in the state, in a manner which will promote the public health, safety, morals and general welfare;
- (f) To secure safety from fire, flood, panic, and other natural and man-made disasters;
- (g) To provide adequate light, air and open space;
- (h) To ensure that the development of individual municipalities does not conflict with the development and general welfare of neighboring municipalities, the county and the State as a whole
- (f) To promote the establishment of appropriate population densities and concentrations that will contribute to the well-being of persons, neighborhoods, communities and regions, and the preservation of the environment;
- (h) To provide sufficient space in appropriate locations for a variety of agricultural, residential, recreational, commercial, industrial uses, and open space both public and private, according to their respective environmental requirements in order to meet the needs of all New Jersey citizens;
- (k) To promote the conservation of historic sites and districts, open space, energy resources and valuable natural resources in the State and to prevent urban sprawl and degradation of the environment through improper use of the land;
- (p) To promote utilization of renewable energy sources; and

#### State Development and Redevelopment Plan

The State Development and Redevelopment Plan (SDRP) offers guidance to the Planning Board in the formulation of land management and natural resource conservation policy. The SDRP designates much of Greenwich Township as Rural Planning Area (PA4), Rural/Environmentally Sensitive Planning Area (PA4B) or the Environmentally Sensitive Planning Area (PA5). These designations recognize the valuable agricultural resources and environmentally sensitive natural features that Greenwich Township seeks to protect from the siege of development pressure within the region that threatens to transform these valued resources to suburban sprawl. The suburban planning area, Planning Area 2 is included on the SDRP Policy Map acknowledging the existence of the developed sewer service area in the westerly portion of the Township.

Within the Highlands Region, suburban development is consuming what was once a vast agricultural and natural landscape. The transformation of rural and open natural lands to residential neighborhoods brings with it the loss of irreplaceable natural and economic resources. Unchecked, suburban sprawl will forever alter the rural, natural and cultural landscape that Greenwich Township seeks to protect and preserve. Greenwich acknowledges the SDRP Rural and Environmentally Sensitive planning area designations and embraces the challenge in maintaining and protecting these areas.

SDRP guidance for management of the Rural Planning Area has been provided, as follows:

“Prudent land development practices are required to protect these resources and retain large contiguous areas of agricultural land. If a viable agricultural industry is to be sustained in the future, the conversion of some of the lands to non-farm uses must be sensitive to the areas predominant rural character and agricultural land base. Throughout New Jersey, some Rural Planning Areas are subject to greater development pressure than other areas. Without greater attention to maintaining and enhancing our rural areas, these economic activities are at risk. Tools and techniques need to be tailored to address the distinctive situation. In particular, new development may require additional attention in areas with environmentally sensitive features.”

For the Environmentally Sensitive Planning Area, the State Plan offers the following:

“The Environmentally Sensitive Planning Area contains large contiguous land areas with valuable ecosystems, geological features and wildlife habitats particularly in the . . . Highlands region, . . . The future environmental and economic integrity of the state rests in the protection of these irreplaceable resources. . . Environmentally Sensitive Planning Areas are characterized by watersheds of pristine waters, trout streams and drinking water supply reservoirs; recharge areas for potable water aquifers; habitats of endangered and threatened plant and animal species; coastal and freshwater wetlands; prime forested areas; scenic vistas; and other significant topographical, geological or ecological features, . . . These resources are critically important not only for the residents of these areas, but for all New Jersey citizens.

The Environmentally Sensitive Planning Area is highly vulnerable to damage of many sorts from new development in the Environs, including fragmentation of landscapes, degradation of aquifers and potable water, habitat destruction, extinction of plant and animal species and destruction of other irreplaceable resources which are vital for the preservation of the ecological integrity of New Jersey’s natural resources. . . New development in these Environs has the potential to destroy the very characteristics” (environmental sensitivities) “that define the area”.

The SDRP promotes the retention of large open land areas in PA4B & 5, and the Plan defines “large contiguous area”.

“When applied to habitat, (large contiguous area) means the area of undisturbed land required to maintain a desired community of plants and animals”, and “when applied to farmland, large contiguous area means the amount of contiguous farmland usually considered necessary to permit normal farm operations to take place on a sustained basis.”

The Township is endowed with large contiguous land areas with valuable ecosystems, geological features and wildlife habitats that support critical habitat. Whether it is the maintenance of large contiguous areas for farmland or to protect environmentally-sensitive areas, Greenwich’s stewardship of these areas requires policies and management techniques to sustain the landscape in such a way that the long-term

viability and function of these lands and natural systems may be assured. Greenwich seeks to manage these resources consistent with the SDRP policy orientation for the Environmentally Sensitive Rural Planning Area and the Environmentally Sensitive Planning Area.

SDRP Policies seek to maintain the viability of agricultural areas and the function of natural systems through strategies aimed at the protection of these resources and coordinated growth policies that orient new development adjacent to either Centers, or existing developed areas with infrastructure capable of supporting development. Development should be compact, and innovative development approaches, such as clustering or open lands zoning will be needed to discourage sprawl-type patterns of development that would fragment and destroy the very resources that the Rural and Environmentally Sensitive Planning Area designations seek to protect.

### Highlands Water Protection and Planning Act

On Tuesday, August 10, 2004 Governor McGreevey signed the Highlands Water Protection and Planning Act into law. This law designates a Highlands Region, which is divided into two primary management areas, including (1) a Preservation Area and (2) a Planning Area. The entirety of Greenwich Township is included within the Highlands Region. The majority of the Township is designated Planning Area and includes all areas of the Township lying north of CR 639 and south of SR 57. The areas south of CR 639 and north of SR 57 are designated Preservation Area.

The legislation identifies goals and objectives, upon which the highlands regional master plan will be based. The legislation sets forth separate goals for the Preservation Area and the Planning Area, which are listed below. Natural resource protection, ground and surface water protection, historic preservation, farmland preservation, scenic and cultural resource protection, recreation and smart growth planning goals, as articulated in this plan, are identified by the Greenwich Township Planning Board as goals and objectives of this plan.

### Highlands Preservation and Planning Area Goals

Section 10 of the legislation states the following (underlined emphasis added):

- a. The goal of the regional master plan with respect to the entire Highlands Region shall be to protect and enhance the significant values of the resources thereof in a manner which is consistent with the purposes and provisions of this act.
- b. The goals of the regional master plan with respect to the preservation area shall be to:
  - (1) protect, restore, and enhance the quality and quantity of surface and ground waters therein;
  - (2) preserve extensive and, to the maximum extent possible, contiguous areas of land in its natural state, thereby ensuring the continuation of a Highlands

environment which contains the unique and significant natural, scenic, and other resources representative of the Highlands Region;

(3) protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, wetlands, vegetated stream corridors, steep slopes, and critical habitat for fauna and flora;

(4) preserve farmland and historic sites and other historic resources;

(5) preserve outdoor recreation opportunities, including hunting and fishing, on publicly owned land;

(6) promote conservation of water resources;

(7) promote brownfield remediation and redevelopment;

(8) promote compatible agricultural, horticultural, recreational, and cultural uses and opportunities within the framework of protecting the Highlands environment; and

(9) prohibit or limit to the maximum extent possible construction or development which is incompatible with preservation of this unique area.

c. The goals of the regional master plan with respect to the planning area shall be to:

(1) protect, restore, and enhance the quality and quantity of surface and ground waters therein;

(2) preserve to the maximum extent possible any environmentally sensitive lands and other lands needed for recreation and conservation purposes;

(3) protect and maintain the essential character of the Highlands environment;

(4) preserve farmland and historic sites and other historic resources;

(5) promote the continuation and expansion of agricultural, horticultural, recreational, and cultural uses and opportunities;

(6) preserve outdoor recreation opportunities, including hunting and fishing, on publicly owned land;

(7) promote conservation of water resources;

(8) promote brownfield remediation and redevelopment;

(9) encourage, consistent with the State Development and Redevelopment Plan and smart growth strategies and principles, appropriate patterns of compatible residential, commercial, and industrial development, redevelopment, and economic growth, in or adjacent to areas already utilized for such purposes, and discourage piecemeal, scattered, and inappropriate development, in order to accommodate local and regional growth and economic development in an orderly way while protecting the Highlands environment from the individual and cumulative adverse impacts thereof; and

(10) promote a sound, balanced transportation system that is consistent with smart growth strategies and principles and which preserves mobility in the Highlands Region.

### Land Use Goals and Objectives:

This Master Plan embraces the fundamental goals of the SDRP and Highlands Act. This plan also endorses and incorporates into this Land Use Plan the purposes of the Municipal Land Use Law, which call for the conservation of natural resources, protection of farmland and natural systems, and for promoting the maintenance of a clean and healthy environment, which are consistent with the resource conservation goals and objectives of this plan. The following list identifies locally identified goals and objectives for this land use plan, in addition to those identified above.

- To establish farmland preservation and the retention of priority agricultural soils as the highest land use priority.
- To protect groundwater recharge areas and groundwater reserves through the maintenance of these areas in their undeveloped state so as to preserve and provide a regional water supply resource for the residents of New Jersey.
- To protect, restore, and enhance the quality and quantity of surface and ground waters therein;
- Identify land use strategies that will permanently retain large contiguous tracts of farmland to ensure the survival of this valuable natural resource and farming as a way of life in Greenwich Township.
- Coordinate permitted agricultural activities with the need to limit impervious coverage to maintain maximum groundwater recharge of groundwater aquifers.
- Identify a comprehensive strategy for assisting individual landowners in retaining agriculturally viable farmland and for encouraging innovative economically viable agricultural uses that are compatible with the Township's existing neighborhoods and developed areas.
- Establish a series of farm compatible land use options including home-based businesses options and agricultural related land uses, such as farm stands, that could assist in supplementing family farm income.
- Maintain a municipal farmland preservation program that will build upon State Agriculture Development Board and County Agriculture Development Board development easement purchase programs and prior public investments in farmland preservation.
- Discourage the conversion of productive agricultural lands to non-agricultural uses and to preserve productive soils, which are under threat of development.
- Establish farmland and environmentally sensitive land protection strategies through agricultural protection and resource conservation zoning techniques that will retain these natural resources to the greatest extent achievable, while at the same time providing limited opportunities growth in areas of the Township with available infrastructure that can support desired levels of development.
- Establish performance and design standards that will ensure that the greatest amount of farmland will be preserved as part of a limited growth management strategy.
- Discourage sprawl development patterns by managing the arrangement of growth through zoning techniques such as mandatory clustering, lot averaging, open

- lands zoning, noncontiguous clustering, and through the use of other tools and regulatory techniques.
- Identify sites for public acquisition to respond to the existing and emergent needs of the Greenwich residents.
  - Establish design and performance standards that will protect environmentally sensitive and critical habitat lands including floodplains, stream corridors, wetlands, steep slopes, forested areas, and grasslands areas.
  - Establish zoning standards that will limit the impact of new development on existing neighborhoods and developed areas.
  - Establish design standards to maintain and reinforce rural character and the protection of scenic resources, including important scenic viewsheds and areas of exceptional aesthetic value.
  - Provide for limited nonresidential growth to address the imbalance between residential and nonresidential, employment generating land uses, which is disproportionately weighted by residential development.
  - Provide for growth of existing research/office/manufacturing land uses to retain existing employers and enhance the employment and nonresidential tax ratable base of the Township.
  - Establish zoning provisions to permit professional, office and limited research uses in the westerly portion of the Township immediately adjacent to the sewer service area and interstate highway to provide for growth in the Township's nonresidential tax base.
  - Identify critical resource designations in the Highlands Regional Plan, consistent with critical habitat, steep slope, farmland, groundwater recharge, and other goals of the Highlands Regional Plan.

### Existing Land Use

In 1980, Greenwich Township's population stood at 1,738. In 1990, the Census reported a population of 1,899 for the Township. The 2000 Census identified a population of 4,365 persons and the NJ State Data Center estimated the population in 2004 at 5,223 accounting for an increase of 858 persons or an additional 16% over 2000. Between 1980 and 2004, the Township's population grew by just over 300%. To show the amount of land needed to accommodate this growth, a comparison of changes in land use between the 1998 Master Plan and 2006 Existing Land Use (see Existing Land Use Map, prepared by Finelli Consulting Engineers) provides a perspective on how changes in land use translate into population growth.

Greenwich Township has experienced rapid growth since 1990. As a rural community grows, land use inevitably changes as lands once used for farming or other purposes are developed to accommodate new uses. In Greenwich Township, this may be seen in the loss of farmland. The following table compares Table 1, Existing Land Use in the 1998 Master Plan to Existing Land Use 2006:

Table 1 - Comparison of 1998 Land Use to Existing 2006 Land Use

Land Use Category	1998 <sup>1</sup>		2006 <sup>2</sup>		Change Acres / Percent
	Total Acres (rounded)	Percent (%) of Total Acres (rounded)	Total Acres (rounded)	Percent (%) of Total Acres (rounded)	
Residential	<b>1,121</b>	<b>18</b>	<b>1,454</b>	<b>21.4</b>	<b>324 / 3.4</b>
Agriculture	<b>4,293</b>	<b>70</b>	<b>3,908</b>	<b>57.6</b>	<b>-403 / -12.4</b>
Preserved Farmland			461	6.8	
Farm Q.			1,463	21.6	
Farm Q. & Farm House			1,984	29.2	
Park & Open Space			108	1.6	
Industrial	55	1	56	.8	-
Commercial	102	2	187	2.7	78 / .7
Vacant	389	6	216	3.2	-144 / -2.8
Public / Quasi Public	119	2	323	4.8	
Religious	17	1	25	.4	10
Total	6096	100	6,277	92.5	

<sup>1</sup>Source: 1998 Greenwich Township Master Plan;

<sup>2</sup>Source: Existing Land Use Map, Greenwich Township Tax Map

Note: Township is listed by the NJDCA, Division of Local Government Services as having a total area of 6,754.55 acres. Total area of the Township varies due to the change in technologies available when calculating the 1998 and 2006 data provided.

Despite the loss of farmland to residential development and the resulting population growth cited above, land use in Greenwich in 2006 remains predominantly agricultural. There remains 57.6% or approximately 3,890 acres of farmland, including approximately 460 acres of preserved farmland, approximately 1,455 acres of farm qualified land and approximately 1,972 acres of farm qualified land including farm dwellings. The next leading land use category accounting for a sizeable portion of the Township is the public/quasi public land use category accounting for 4.8% of the land base or approximately 323 acres of land. Vacant land accounts for 3.2% or approximately 216 acres of the Township's land base. Together, these lands use categories account for just over 65% or nearly two-thirds of the Township.

Following farm use, the next leading land use category is land devoted to residential use, accounting for 21.4% of the Township's land base or approximately 1,454 acres of land. A modest amount of land is devoted to commercial (employment generating) uses, including commercial uses at 2.7% or approximately 187 acres of land and industrial uses at just .08% or approximately 56 acres of land.

The comparison provided in Table 1 shows that the largest category from which farmland was lost is the residential land use category, which accounted for 324 acres of the 403 acre loss in Agriculture land. This is followed by the commercial category, which grew by 78 acres of land between 1998 and 2006. A modest loss in farmland may be

attributable to the open space category, for which there were two substantial purchases during the time period, including the County’s acquisition of Block 23, Lot 7, a 51-acre park, and the Township’s acquisition of the 92-acre Hamlen Farm (Block 26, Lot 7).

Changes in land use may also be seen in a review of tax information that is compiled annually by the State of New Jersey. The New Jersey Department of Community Affairs, Division of Local Government Services provides statistical data on all municipalities in New Jersey. For Greenwich Township, the following table shows changes in land use expressed in two ways, the number of parcels devoted to each property tax classification and the aggregate value of each classification.

Table 2  
Comparison of Historic Tax Data 1998 & 2004 Property Value Classification

Classification	1998	2004	6-year Change in Value	6-year % Change in Value
Vacant land	330	89	-241	-73%
Value	15,154,200	3,875,000	-11,279,200	-74%
Percent of total	7%	7%		
Residential parcels	959	1,747	788	82%
Value	172,875,100	<b>461,184,690</b>	288,309,590	166%
Percent of total	75%	<b>80%</b>		
Farmland parcels	48	49	1	2%
Value	8,922,300	10,865,400	1,943,100	22%
Percent of total	4%	2%		
Farmstead parcels	<b>118</b>	<b>110</b>	<b>-8</b>	7%
Value	1,595,440	2,412,000	816,560	-51%
Percent of total	.06%	.04%		
Commercial parcels	37	40	3	8%
Value	24,295,600	<b>77,021,200</b>	52,725,600	217%
Percent of total	10%	<b>14%</b>		
Industrial parcels	5	<b>5</b>	No change	-
Value	8,761,350	<b>14,709,000</b>	5,947,650	67%
Percent of total	4%	<b>3%</b>		
Apartment parcels	-	-	-	
Apartment values	-	-	-	
Total Value	231,603,990	570,067,290	338,463,300	246%

SOURCE: NJ Department of Community Affairs, Division of Local Government Services, Property Tax Information, Historical Data for 1998 & 2004

- Residential land use accounts for 80% of property valuation in the Township;
- Commercial and industrial land use accounts for less than 20% of property valuation; a modest gain was seen in the percentage of commercial property valuation, while the percentage of industrial property value fell by 1%; and

- There was a loss in the number of farmsteads reported, which fell from 118 to 120, and the property value of this category, expressed as an overall percentage of property value, dropped accordingly.

The comparison of Existing Land Use changes between the 1998 Master Plan and 2006 shows a 12.4% loss in the acreage of farmland during that time. This accounts for approximately 1% of the Township's total area. However, the comparison in Property Value Classification shows that as a percentage of property value in the Township, the value of agricultural land including farmsteads was reduced by approximately 2%. Conversely, the increase in residential property value increased by 5% associated with a 3.4% increase in acreage devoted to that use. Similarly, the commercial property value classification increased by 4% of the total, while the percentage of the Township's land mass devoted to commercial uses grew by just .07%. Interestingly, the Industrial land use category, which did not change during this period, was reduced by approximately 1% of the total. While the Existing Land Use comparison spans an eight-year period and the comparison of property value classification spans a six year period, Table 2 provides an interesting view of changes in land use potentially impacting the overall tax base of the community.

At the same time that the Township's land use changed modestly, population grew substantially. As mentioned above, the Township's population between 2000 and 2004 grew from 4,365 to 5,223, or 20% in just four years. Of particular concern is the modest increase in farmland and farmstead property value (\$2,759,660) compared to a substantial increase of residential property valuation, which grew by \$288,309,590, or more than 10 times that of the farmland and farmstead parcels. It appears that the loss in farmland and farmsteads may translate into growth in the residential category, which brings with it not just the loss of an irreplaceable resource, but also a substantial increase in municipal service costs that results in a financial burden to all taxpayers.

## **Greenwich Township's Legacy**

### Agricultural Retention

Retention of valuable open land and agricultural land responds to the highest priority land use objectives in Greenwich Township, and at least two of the major goals of this Land Use Plan: (1) to protect and preserve prime agricultural soils, which are an irreplaceable resource; and (2) to maintain large contiguous undeveloped areas that serve as critical recharge areas for vast groundwater reserves that are stored in aquifers beneath the surface of the ground and are of benefit to the residents of New Jersey beyond the Township's boundaries.

Greenwich Township is endowed with two valuable natural resources, which include (1) prime farmland and (2) tremendous groundwater reserves that are expected to be critically important to sustaining the population of the region in the future. Greenwich Township's prime farmland soils have long been recognized as its most valuable natural

resource. Past generations have depended on the productive capacities of these soils to derive their livelihood. If properly managed, this natural resource will yield benefits to future generations of farmers and consumers. The survival of Greenwich Township's prime farmland soils as a productive natural resource depends on managing the resource properly and preventing the loss of productive soils to development pressures that are expected to continue well into the future.

Of the Township's approximately 10.55 square miles, approximately 77% of its land base is characterized as prime farmland, according to data provided by the NJDEP entitled Soil Survey Geographic Database (SSURGO), distributed through the Natural Resource Conservation Service (NRCSA) Tabular Data version 2.2 (see map entitled "Farmland Capability, Greenwich Township, Warren County NJ, dated April 2006). Approximately 11% of Greenwich Township's soils are characterized by SSURGO as Statewide Important soils. Despite the fact that there have been a series of suburban developments that have consumed a portion of these natural resources, much of this natural resource base survives intact, and limiting its loss in the future assumes a high priority in this Land Use Plan.

In New Jersey, a parcel cannot qualify for farmland assessment unless it contains at least five (5) acres, and if the dwelling is included on the property, this minimum increases to six (6) acres. However, since some nonproductive lands may not qualify for farm assessment, a six (6) acre minimum will not assure the potential for preferential farmland tax assessment.

Conflicts between farm and non-farm uses can frequently result in a loss of farmland or farm uses. Agricultural retention objectives have prompted many localities to adopt large lot zoning strategies to retain agricultural lands for farm use and to discourage non-farm uses in agricultural areas. If the farmland base is not protected in the near term, farming may decline sharply with a critical mass of farmland converted to non-farm uses. Viable agriculture cannot be expected to succeed if new development proceeds according to the currently permitted density. Such zoning permits the entry of large numbers of non-farm residences and the conflicts they inevitably bring.

Recommended techniques for preserving agriculture in moderate strength farming areas include comprehensive planning, agricultural zoning, maximum building lot sizes for non-farm development, and establishment of urban growth or village boundaries. A review of the professional literature and research from the American Farmland Trust, the Smart Growth Network, the American Planning Association and the New Jersey Pinelands Commission indicate that large lot zoning for a minimum lot size of 20 to 45 acres is appropriate as an agricultural protective zoning technique, when non-farm residences are to be permitted. In addition, lot size averaging and off-site clustering can be useful land use techniques, when the proper balance is achieved between permitted densities and lot area requirements.

New Jersey courts have recently upheld 10-acre agricultural zoning as a reasonable means to retain agriculture and protect the agricultural land base of a community.

Bedminster Township in nearby Somerset County and East Amwell Township, Hunterdon County are two examples where agricultural zoning strategies were found to be valid use of municipal zoning powers when zoning validity was challenged. Additionally, environmental protection weighed heavily into the Bedminster decision in which involved lands included in the Township's Environmentally Sensitive Planning Area. These court decisions are consistent with appropriate agricultural land use strategies for the protection of agricultural areas identified by the National Agricultural Lands Study (NALS) (Coughlin & Keene, 1981) which found that half of the communities surveyed relied on a large minimum lot areas the principal density control in the agricultural zone. Most of these communities were in or adjoining metropolitan areas. Within the communities surveyed by NALS, minimum lot sizes ranged from ten (10) acres to six hundred forty (640) acres.

Greenwich Township's natural resource base includes many of the agricultural and environmentally-sensitive land characteristics of its neighboring Highlands Planning Area municipality, Bedminster Township, which includes a vast area of environmentally sensitive agricultural lands, in which the Courts have endorsed that municipality's land stewardship zoning. Similarly, East Amwell Township is a community in the rural planning area where the Courts have found that the basis for that Township's 10-acre zoning is a valid and well reasoned land management strategy to protect its agricultural base of relatively large lots, consistent with its SDRP Rural Planning Area designation.

As noted in Greenwich Township's 2005 Groundwater Resources report "The structural geology of Greenwich Township indicates that the rocks beneath this municipality have a high potential for the storage and transmittal of large quantities of groundwater within the carbonate rocks. The structural and bedrock geology of Greenwich Township indicate that this Township may be one of the best long-term resources for water supply in New Jersey." In effect, Greenwich Township's underlying geology, aquifers and Greenwich Township's soils are uniquely capable of recharging and storing large quantities of groundwater.

Thus, the added critical resource of Greenwich Township's carbonate rock geology overlain by large contiguous tracts of undeveloped farmland appears to respond to two important goals of this land use plan: (1) to protect and preserve valuable prime agricultural soils, which are an irreplaceable resource; and (2) to maintain large contiguous undeveloped areas that serve as critical recharge areas for vast groundwater reserves that are stored in aquifers beneath the surface of the ground.

It is noteworthy that the NJ Supreme Court upheld 40-acre zoning in the Pinelands in what is known as the Gardner decision. In Gardner, the Court found that a 40-acre minimum lot size requirement was found to be valid under the policies of the Pinelands Comprehensive Management Plan, a regional land management plan that focuses growth into areas that are appropriate and designated for higher densities, while maintaining open areas for continued viable agriculture and natural resource protection, such as the 40-acre zoning district which was the subject of the court challenge. This is a similar

situation to the State Plan policies for Planning Area 4, 4B and Planning Area 5, as found throughout Greenwich Township, which are designated for protection of large contiguous environmentally sensitive and agriculturally productive areas, and where zoning is an effective technique to achieving these and groundwater resource protection goals.

In 1997, The American Farmland Trust (AFT) examined a range of approaches to retaining farmland, and recommended “**Agricultural Protection Zoning**” (APZ) as a zoning technique used **to support and protect farming by stabilizing the agricultural land base**. The AFT is a nationwide nonprofit organization dedicated to protecting agricultural resources, founded by a group of concerned farmers in 1980. AFT's mission is to stop the loss of productive farmland and to promote farming practices that lead to a healthy environment. AFT defines APZ as ordinances that allow no more than one house for every 20 acres, support agricultural land uses and significantly restrict non-farm land uses.

As described by AFT, APZ is a zoning technique used to support and protect farming by stabilizing the agricultural land base. APZ designates areas where farming is the desired land use, generally on the basis of soil quality as well as a variety of locational factors. Other land uses are discouraged. APZ ordinances vary in what activities are permitted in agricultural zones. The most restrictive regulations prohibit any uses that might be incompatible with commercial farming. The density of residential development is limited by APZ. Maximum densities range from one dwelling per 20 acres in the eastern United States to one residence per 640 acres in the West.

APZ ordinances establish procedures for delineating agricultural zones and defining the land unit to which regulations apply. They specify allowable residential densities and permitted uses, and sometimes include site design and review guidelines. Some local ordinances also contain right-to-farm provisions and authorize commercial agricultural activities, such as farm stands, that enhance farm profitability. Occasionally, farmers in an agricultural protection zone are required to prepare conservation or farm management plans.

The definition of APZ varies with jurisdiction and by region of the country. A minimum lot size of 20 acres, combined with other restrictions, may be sufficient to reduce development pressures in areas where land is very expensive and farming operations are relatively intensive. Several county APZ ordinances in Maryland permit a maximum density of one unit per 20 acres. In areas where land is less expensive and extensive farming operations such as ranches predominate, much lower densities may be required to prevent fragmentation of the land base. In Wyoming and Colorado, counties are not permitted to control subdivision of lots that are larger than 35 acres. The 35-acre provision has led to the creation of hundreds of 35-acre "ranchettes" in both states, fragmenting ranches into parcels that are too small for successful commercial ranching.

Many towns and counties have agricultural/residential zoning that allows construction of houses on lots of one to five acres. Although these zoning ordinances permit farming, their function is more to limit the pace and density of development than to protect

commercial agriculture. In fact, such ordinances often hasten the decline of agriculture by allowing residences to consume far more land than necessary. AFT defines APZ as ordinances that allow no more than one house for every 20 acres, support agricultural land uses and significantly restrict non-farm land uses. Greenwich's rich, fertile and productive farmland is worthy of such protection. The Resource Conservation District designation identified for Greenwich Township in this plan, is not intended to slow the pace of development, but rather maintain large contiguous areas of farmland for continued agricultural use, protect existing critical habitat and an exceptional groundwater resource for the survival of these resources into the long-term future.

The courts first validated zoning as a legitimate exercise of police power in the 1920s, giving local governments broad authority to regulate local land use. Rural counties in California, Pennsylvania and Washington began using zoning to protect agricultural land from development during the mid-1970s. In 1981, the National Agricultural Lands Study reported 270 counties with agricultural zoning. In 1995, an informal AFT survey found nearly 700 jurisdictions in 24 states with some form of APZ.

APZ helps reserve the most productive soils for agriculture. It stabilizes the agricultural land base by keeping large tracts of land relatively free of non-farm development, thus reducing conflicts between farmers and their non-farming neighbors. Communities also use APZ to conserve a "critical mass" of agricultural land, enough to keep individual farms from becoming isolated islands in a sea of residential neighborhoods. APZ also helps promote orderly growth by preventing sprawl into rural areas, and benefits farmers and non-farmers alike by protecting scenic landscapes and maintaining open space. Greenwich's remaining agricultural landscape may well be an appropriate candidate area for the application of Agricultural Protection Zoning.

APZ can also limit land speculation, which drives up the fair market value of farm and ranch land. By restricting the development potential of large properties, APZ is intended to keep land affordable to farmers. A strong ordinance can demonstrate to farmers that the town or county sees agriculture as a long-term, economically viable activity, instead of an interim land use. APZ also helps promote orderly growth by preventing sprawl into rural areas, and benefits farmers and non-farmers alike by protecting scenic landscapes and maintaining open space, and in Greenwich Township, protecting groundwater as a critical resource that may be used in the future to respond to the ever increasing demand for water by New Jersey's residents.

APZ also protects equity. Webster's New World Dictionary defines "equity", in part as fairness; impartiality; justice; and anything that is fair or equitable." In Greenwich Township, there has been significant public investment in preserving farmland and open space. Steady growth in preserved farmland demonstrates the public interest in preserving farmland, which will be best served through APZ strategies that reinforce these public expenditures and protect the Township's agricultural base. Zoning strategies should be implemented that effectively assure the protection of these limited resources, protect public equity, build upon prior public investments and enhance quality of life.

## BENEFITS

- APZ is an inexpensive way to protect large areas of agricultural land.
- By separating farms from non-agricultural land uses, APZ reduces the likelihood of conflicts between farmers and non-farming neighbors.
- APZ helps prevent suburban sprawl and reduces infrastructure costs.
- Compared to purchase of conservation easement and transfer of development rights programs, APZ can be implemented relatively quickly.
- APZ is easy to explain to the public because most landowners are familiar with zoning.
- APZ is flexible. If economic conditions change, the zoning can be modified as necessary.

Source: American Farmland Trust, Saving American Farmland: What Works (Northampton, Mass., 1997).

In 2005, the Greenwich Township Planning Board conducted an investigation into the concept of sustainable agriculture. The fundamental long-term goal for Greenwich Township as stewards of its precious natural resource base is embedded in the concept of sustainability. Sustainable agriculture, sustainable water resources, and a sustainable natural environment are goals that are central to protecting the natural resources and environment with which Greenwich Township has been endowed. The sustainable agriculture investigation will be ongoing, but it has resulted in an interim report that identifies a series of challenges and findings that are aimed at ensuring the survival of Greenwich Township's farmland base and protection of natural resources for future generations. The findings and recommendations of the Planning Board's sustainable agriculture investigations provide a basis for management of agricultural lands consistent with the goals of this land use plan and the report on sustainability is included as an Appendix to this plan element.

This Land Use Plan acknowledges and embraces the findings and recommendations of Greenwich Township's 2005 Groundwater resources report, which was prepared to document the groundwater resources of the Township. The findings and recommendations contained in the report directly respond to the Highlands Planning Area goal 'to protect, restore, and enhance the quality and quantity of surface and ground waters' in the Highlands Planning Area. A summary of the recommendations of the 2005 report are incorporated into the Conservation Plan and are by reference incorporated herein. For a more complete discussion of this planning objective, refer to the Greenwich Township Conservation Plan, dated May 2006.

### Resource Conservation District Subdivision Development Techniques

As part of the development of this Land Use Plan, the Planning Board reviewed a series of subdivision and zoning techniques to determine how conventional subdivision could be replaced with other zoning techniques that may serve to better advance local, State and Highlands goals and objectives for resource conservation and avoid 'sprawl'

development patterns that are associated with conventional subdivision design. The Appendix entitled “Resource Conservation District Subdivision Techniques”, which may be found in the appendices of this Plan includes materials that the Planning Board reviewed in this analysis.

The analysis reviewed a ‘natural resource conservation limitations’ approach, which involves the reduction of constrained land from the overall area of a tract to calculate unit yield. This zoning technique does have the effect of considering only ‘good’ land, that is land that is unconstrained, when determining unit yield. This technique also provides the benefit of establishing a minimum area for each lot, if a minimum improvable lot area standard is used in conjunction with this technique. This zoning technique was contrasted with conventional subdivision design and concluded that it may be a useful tool in ensuring that areas of a tract inappropriate for development could be better protected when subdivision is proposed.

The Resource Conservation District analysis included an evaluation of an ‘open lands’ or clustering type subdivision approach that was contrasted with conventional subdivision design. This included a conventional subdivision configuration based upon a base density of one dwelling unit per 20 acres of land, which may be increased when a minimum open lands set aside of 80% of a tract area is provided as a by-product of subdivision. The open lands or cluster arrangement permits an increase in residential density to one dwelling unit per 10 acres of land, provided that the residential lots created are arranged on lots not larger than 2 acres.

One approach that should also be considered is allowing lot-size averaging in accordance with the clustering approach described above. This would be based upon the base density of 1 dwelling unit per 20 acres of land, with an incentive to lot-size average at a density of 1 dwelling unit per 10 acres provided that not less than 80% of the gross tract area is provided as permanently deed restricted open lands. Under this subdivision option, the overall open lands goal may be achieved, while at the same time provide flexibility of design with a variety of lot sizes.

Whether lots clustering, open lands, lot-size averaging or a hybrid of the three are utilized, the primary objective to maintain at least 80% open lands should be maintained. In addition to the 80% open lands requirement, the Resource Conservation District zone should require that not less than 50% of the ‘unconstrained land’ of a tract is included in the 80% open lands area. Unconstrained land is defined as land that is not encumbered by wetlands, transition areas, state open waters, floodplain areas, riparian corridors, Category 1 (C-1) buffer areas, areas, steep slope areas in excess of 20%, existing easement areas, and roads and Highlands special or critical resource protection areas.

## **Appendix E: Green/sustainable Affordable Housing**

### **Greenwich Township NJ Highlands Council -MP-3 Project Green/sustainable Affordable Housing**

This report addresses a series of activities included in Task 2 of Greenwich Township's MP3 Grant, which provides for an investigation into green/sustainable affordable housing development techniques and strategies and requires a paper identifying findings related to the Planning Board's investigation into this subject. This is a final draft report for your review and comment. Your prior comments from March have been incorporated into this final draft report.

Task 2 – Analyze affordable housing needs and develop innovative strategies to provide for affordable housing

- This task includes an evaluation of alternative affordable housing strategies to respond to the Township's third round growth share affordable housing obligation.
- This task includes a review and re-evaluation of the affordable housing options that are included in COAH's rules to determine which options may be most suitable to Greenwich Township's proposed needs including the potential to utilize innovative design approaches, including green building initiatives and rehabilitation options. This task will prepare a document that will identify opportunities for the provision of affordable housing after evaluating the Township's third round affordable housing needs and opportunities within developed portions of the municipality.

This task requires that the Board evaluate a range of innovative affordable housing strategies, including:

- Green building design – sustainable, economically;
- Mixed use development (where appropriate, possibly in connection with redevelopment of underdeveloped, distressed or vacant properties);
- Research affordable housing techniques referencing sources such private-non-profits and affordable housing approaches taken outside within the State and outside of New Jersey that may be appropriate to the Township's land use objectives;
- Review of Greenwich Township's potential opportunities for creating affordable housing, where identified innovative strategies may be appropriate to Greenwich Township; and
- Provide a paper that highlights innovative techniques found attractive to the municipality and identify COAH rules and policies that may be incongruous with local opportunities for affordable housing.

Evaluation of Alternatives for Providing Affordable Housing (as per COAH rules)

COAH’s Third Round Rules at 5:94-4.4 through 4.23 identifies alternative affordable housing strategies that may be used to respond to a municipal affordable housing obligation. Each of these options was analyzed by the Greenwich Township Planning Board in the context of the Township’s Third Round Affordable Housing obligation, which has been estimated as follows:

Third Round Rehabilitation & Growth Share Obligation:

Rehabilitation Obligation: **7 rehabilitation units**  
 Residential growth share: 22.77  
 Nonresidential growth share: 50.22  
 Total Growth Share: 72.99 = **73 affordable housing units**

The Planning Board and Township Committee identified the following fair share plan, which was derived from the options authorized at N.J.A.C. 5:94-4.4 through 5:94-4.23, in its petition to COAH for third round substantive certification:

**Greenwich Township’s Third Round Fair Share Plan:**

<u>Third Round Growth Share:</u>	73
1. Surplus credits (prior rounds production):	-30
	<u>43</u>
2. Growth Share Ordinance (single-family for sale units)	-4
	<u>39</u>
3. Growth share ordinance rental housing (family rentals to be constructed on site with office development projected during third round)	-19
	<u>20</u>
4. Age-restricted rental or for-sale units (to be constructed on site with nonresidential (office) development projected during third round)	-10
	<u>10</u>
5. Buy and Fix & Accessory Apartments <sup>1</sup>	-10
Remaining third round growth share obligation:	<u>0</u>
 <u>Rehabilitation obligation:</u>	 7
1. County Administered CDBG Rehabilitation Program & municipally funded rehabilitation activities (four completed after 4/1/00; one in pipeline to be completed autumn 05)	-5
	<u>2</u>
2. Continue County CDBG and municipally-funded rehabilitation	-2
Remaining third round rehabilitation obligation	<u>0</u>

<sup>1</sup>May be replaced with Regional Contribution Agreement (RCA), which the Township may pursue with a receiving municipality for 10 or more units.

The Township has an affordable housing trust fund, which may be used to subsidize the cost for production of (1) Buy and Fix units, (2) Accessory

Apartments and (3) Rehabilitation units. The fund currently includes sufficient funding for these components of the plan, which account for 17 of the projected third round production.

### Mixed Use

The fair share plan and the Township's growth share ordinance anticipates a level of nonresidential development that will be required to provide affordable housing production on site in conjunction with the uses provided for in the underlying nonresidential zoning district. The Greenwich Township Planning Board has evaluated mixed-use development options, such as neo-traditional neighborhood design for implementation in the local land use ordinances. The mixed use approach was found to be undesirable in connection with providing affordable housing for essentially three reasons:

- (1) The affordable housing obligation forecast for the third round is expected to be the result of a modest amount of nonresidential growth, which is provided for in the local zoning. There is currently an imbalance of residential development relative to nonresidential development - nonresidential development will redress this land use imbalance and provide employment generating tax ratables;
- (2) Lands zoned for nonresidential growth is adjacent to a large amount of commercial development, which is the result of court-ordered growth – more commercial land uses established in a mixed use, compact neo-traditional design would result in additional commercial uses that are not needed locally;
- (3) Mixed use development would encourage market-rate residential development, which is not a local land use goal.

The predominant land use in the Township is agriculture. There are few areas appropriate for mixed use development, since growth is only envisioned for a modest amount of undeveloped land included in the sewer service area. There are only a few sites that may be appropriate for redevelopment, which are located in remote areas of the municipality, distant from commercial and civic uses, and are not appropriate for locating affordable housing. Vacant land is essentially agricultural land, which is a land use that the municipality wishes to encourage, rather than convert it to mixed use development to accommodate affordable housing. Therefore, the Planning Board does not envision, nor has it planned for a location for mixed use affordable housing development opportunities in the municipality that would include a neo-traditional design and a mix of commercial and residential uses.

### Growth Share Ordinance

The growth share ordinance permits a developer of residential or nonresidential development to (1) construct the affordable housing on site; (2) construct the

affordable housing off site; and (3) respond to its obligation through the payment of money to the Township's affordable housing trust fund through a provision in the ordinance called a payment-in-lieu of construction. The first two options are fairly straightforward, construction on- or off-site. The third option requires that the payment in lieu of construction to be paid in an amount equal to the proportion to the affordable housing obligation generated by the development. For example, if one-half of an affordable housing unit is the obligation generated by a development; one-half of the cost of production of an affordable housing unit will have to be paid to the Township to address the growth share obligation.

The Township has recently had to calculate the amount of production of an affordable housing unit in order for a developer that generated less than one dwelling unit of affordable housing obligation; and it was impractical to construct the dwelling on site. The amount of the payment in lieu of construction was calculated by subtracting the cost of a for-sale affordable dwelling from the cost of a market rate unit. This difference represented the subsidy, or the cost to the Township for acquiring a market-rate unit and reselling it as an affordable dwelling unit. The calculated subsidy was estimated to be approximately \$250,000 (\$247,200) per unit, which suggests that the cost for production of affordable housing municipalities that have not adopted growth share ordinances and are not actively engaged in addressing their obligation may potentially incur a very significant cost to taxpayers under COAH's growth share rules if a municipality is forced to produce it's affordable housing growth share.

### Onsite Growth Share Construction

#### Residential subdivision-

The Greenwich Township Growth share ordinance requires onsite production of affordable housing in connection with new residential and nonresidential developments. As such, the Planning Board approved construction of four units of affordable housing in conjunction with a cluster subdivision, known as the Mansions, which as initially proposed included the construction of four single-family affordable units within the subdivision to address the growth share obligation. The preliminary subdivision plans initially identified separate lots for each affordable housing growth share unit to be constructed. The plan was then revised to identify two duplex units, instead of four single-family detached dwellings.

A subsequent plan revision reduced the number of market-rate units due to the location of a utility right-of-way extending through the tract of land, which could not be relocated as originally anticipated. This resulted in a reduction in the number of market-rate units. With that reduction in the number of market-rate units, the affordable housing growth share obligation was reduced, and the number of affordable housing growth share units was reduced to three units, which are to be combined into one large 3-unit affordable housing building.

The Board approved the one large 3-family affordable housing building, which is to be constructed on a lot within the subdivision. The nature of the residential development is such that fairly large market-rate homes are expected to be constructed. The Board found that the larger 3-family affordable housing dwelling would have the effect of visually blending in with the market-rate housing since the building is expected to have a similar building mass to the market-rate units, and would therefore be more compatible with the size and scale of the market rate units provided.

#### Nonresidential development

The Township's Master Plan calls for a variety of nonresidential development, and the Land Use Plan for primarily large-scale research, office, manufacturing and professional office developments. The Township's growth share ordinance permits the developer of a nonresidential development to construct the affordable housing generated by that development on site. It is envisioned that under such circumstances, the affordable housing would be planned for during the preliminary site plan application review process. It is further anticipated that under such circumstances, the affordable housing would most likely be located on site away from the nonresidential buildings, and arranged in such a manner as to physically separate the housing from the more intensively used portions of the site.

#### Green / Sustainable Affordable Housing – in NJ and outside of NJ

In November 2005, the Planning Board reviewed a series of 'sustainable' and 'green building' affordable housing principles, goals and objectives, which may be incorporated into the growth share ordinance. This will require further evaluation to identify mechanisms, such as either development incentives or municipal subsidies for production of green affordable housing.

The New Jersey Department of Community Affairs, Division of Housing identifies the "New Jersey Affordable Green Program", which is a comprehensive affordable green building and energy efficiency program for developers building projects utilizing NJDCA funding. This program sets forth a series of conservation building design and construction principles to be incorporated into affordable housing projects. The goals and objectives identified for this program may be found at:

<http://www.state.nj.us/dca/dh/gho/documents/njaggoalsandobjectives.pdf> , and are as follows:

New Jersey Green Homes Office  
New Jersey Affordable Green Program  
Objectives and Goals

Sustainable Development 5:43-2.4 / (a) 10

*Siting and Land Use*

- Demonstrate the implementation of the New Jersey State Development and Redevelopment Plan by designing developments which reduce sprawl, reduce impact of vehicular traffic and urban and suburban runoff consistent with the New Jersey Department of Environmental Protection's watershed rules.
- Encourage superior land use that minimizes damage and, where possible, improves environmental quality.
- Promote infill development, the use of Brownfield sites and urban areas, and avoiding currently usable agricultural land.
- Reduce the dependence on automobiles and encouraging mass transit, alternative and human powered transportation.
- Build community and promoting security by site and building design.
- Foster the appreciation of, and connection to, the natural world through land-use and building design.

*Building Design*

- Exceed the specifications of the New Jersey Uniform Construction Code with identifiable benefits to the occupants with respect to indoor air quality, energy efficiency and production, water efficiency and material specification.
- Encourage superior building design that enhances the health and safety of the occupants and improves environmental quality.
- Demonstrate low and moderate-income housing can be attractive and an asset to the community.

*Energy*

- *As required by rule 5:43-3.1 (u) all Balanced Housing Project housing units must be an Energy Efficient Housing Unit (Energy Star Unit) see Energy Star document.*
- Promote implementation of the New Jersey State Sustainability Greenhouse Gas Action Plan by applying proven energy-efficient and renewable energy technologies to reduce carbon emissions.
- Incorporate a comprehensive approach to energy-efficient design and construction beyond the requirements of rule 5:43-3.1 (u).
- Incorporate renewable energy technologies and/or alternative power generation technologies, favoring the more cost-effective of these technologies.

*Resource Efficiency*

- • Promote the design and construction of durable, low-maintenance and long lasting buildings.
- Specify resource-efficient, environmentally preferable, recycled or recyclable and agricultural-based building materials.
- Support a comprehensive approach to water efficiency.
- Manage, minimize and eliminate waste, implementing recycling during and post building construction and over the lifetime occupancy of the building.

*Operations and Maintenance*

- Produce housing for low and moderate-income households that has a low total owning, operating and maintenance budget, including purchase costs, energy costs and maintenance costs.

NJDCA funded projects require conformity with the NJ Energy Star program, however it is not clear whether the ‘Siting and Land Use’ and ‘Building Design’ requirements are applicable to all projects funded through the NJDCA, or just affordable housing projects funded through the NJDCA Balanced Housing Program.

The NJ Green Affordable Green Program’ provides a series of checklists to guide design in a manner consistent with the affordable housing green design principles. A sample of which is provided below, which provides an overview of general development management, materials, and construction issues:

GREEN DESIGN CHECKLIST	
Project name	
General Issues	UPDATED:
JOB SITE RECYCLING - GRASS PAVERS PED X-ING/TRAFFIC CALMING PAVING NATIVE PLANTING (STORM WATER RECHARGE) SOUTHSIDE SHADE TREE PLANTINGS WELL SOURCE IRRIGATION COMMUNITY GARDEN NATURE TRAILS RECYCLED PARKING STOPS RECYCLED SITE FURNITURE (2) TOT LOTS/RECYCLED EQUIP PUBLIC TRANSIT SHELTER PASSIVE SOLAR WATER HEATER (COM. BLDG) - WATER EFFICIENT WASHERS (COM. BLDG) ENERGY EDUCATION	
SLAB INSULATION - ADVANCED FRAMING - ARCHITECTURAL OVERHANGS - EEBA WINDOW FLASHINGS - CELLULOSE WALL INSULATION - HARDI PLANK SIDING/TRIM - EXTERIOR PAINT - PRIVATE GARDEN FENCING RAIN WATER CISTERNS - FIBERGLASS DOORS -	

REALLOCATING WINDOW AREA -  
 LOW 'E' GLAZING WINDOWS -  
 LINOLEUM FLOORING -  
 SUSTAINABLE HARDWOOD FLOORS -  
 RECYCLED CONTENT CARPET -  
 ZERO VOC PAINT-  
 ZERO FORMALDAHYDE CABINETS -  
 ZERO FORMALDAHYDE COUNTERS -  
 ENERGY EFFICIENT REFRIGERATOR -  
 LOW FLOW PLUMBING FIXTURES -  
 AMERICAST STEEL TUB -  
 COMBO WATER HEATER/FAN COIL UNIT-  
 12 SEER AC UNIT -  
 PANASONIC VENT, FAN W/ AIR CYCLER -  
 DUCT SEALING/ALL DUCTS INSIDE -  
 PROGRAMMABLE THERMOSTATS -  
 COMPACT FLUORESCENT / LED LIGHTING -

SEE SHEET (2) FOR INDIVIDUAL BUILDING PROGRESS

The NJDCA touts the NJ Green Affordable Green Program as “the only statewide green affordable housing program in the country” that “has become a national model for green affordable housing. It has increased the use of innovative green materials and design and building technologies in over 2,000 affordable homeownership and rental units in the State and has over 37 projects participating in the program.” However, the Greenwich Township Planning Board also reviewed a document entitled “Greening Portland’s Affordable Housing”, which is prepared by the Portland Development Commission (PDC) and City of Portland Green Building Initiative, Portland Oregon. The Portland Oregon document identifies “design and construction guidelines to improving performance, tenant health, and long-term durability in affordable housing.”

The PDC Design and Construction Guidelines may be found at <http://www.sustainableportland.org/AHGuidelines.pdf> . The document cites the purpose of the guidelines “to establish goals and standards to increase the environmental performance and durability for all affordable housing in Portland.” The PDC document includes a statement of ‘Sustainable Development’, which offers the following observation:

“Designing, building, and maintaining buildings that are sustainable is an ambitious long-term goal that will require a long-term process of rethinking building design and construction and learning from our experiences. In most instances this is a common sense approach to development that prevents further depletion of natural resources, water quality, air pollution, and global warming” . . . “The goal is to develop affordable housing that:

- Are durable and long lasting
- Are cost effective to build and practical to maintain

- Use natural resources and materials efficiently; use materials and products based on their life-cycle environmental impacts.
- Conserve water usage, reduce runoff, and treat waste on-site.
- Maximize energy conservation and efficiency; use renewable energy resources.
- Reduce building footprints, simplify building shapes, and maximize space efficiency (smaller is better).
- Optimize building orientation; integrate natural daylight and ventilation.
- Are healthy by eliminating toxic and harmful materials and finishes in facilities and their surrounding environment.
- Support transportation alternatives.
- Reduce, reuse and recycle materials in all phases of construction and deconstruction; reduce harmful waste products produced during construction.
- Apply maintenance and operational practices that reduce or eliminate harmful effects on people and the natural environment.
- Is designed for future flexibility, expansion, and building demolition; capable of safe and efficient deconstruction

The PDC manual advises that “The guidelines are broken into six major categories. Each category area contains a number of cost effective thresholds as indicated in bold. They represent a new base level of performance. **These new thresholds have been integrated into the PDC Rental Housing RFP process as required criteria. All RFP project proposals must demonstrate and commit to the comprehensive inclusion of these threshold criteria to receive funding awards through the RFP process. . .**”

The criteria categories are listed in the manual as follows:

## Criteria Categories

- 1. Enhanced Design & Site:** Sustainable design and site planning integrates design and construction strategies to minimize environmental site impacts, reduce construction costs, maximize energy and resource conservation, improve operational efficiencies, and promote alternative transportation by providing good access to transit, pedestrian, and bike systems.
- 2. Energy Conservation:** Energy conservation helps maximize tenant comfort and reduce utility bills. Conservation measures also slow the accumulative impacts of energy production and delivery; extraction of non-renewable natural resources, degradation of regional air quality, global warming, and increased concentration of pollutants.
- 3. Water Conservation:** Water conservation practices help reduces both water and the energy used to deliver and heat water for tenant use. In addition water conservation cuts down on the amount of water discharged from a building, lessening the amount of untreated discharges into the

Columbia and Willamette Rivers and the stress on the City's wastewater treatment facilities.

**4. Conserving Materials & Resources:** Reducing, reusing, and recycling building materials helps conserve local and regional natural resources.

There are many green building products on the market and techniques like advanced framing that contribute to more durable and less toxic buildings.

**5. Enhanced Indoor Air Quality** - Minimize exposure of construction and building occupants to toxic materials. Use safe, biodegradable materials and alternatives to hazardous materials. Require and monitor safe handling and disposal of any hazardous materials.

**6. Operations & Maintenance:** The most overlooked element of green building is operations and maintenance (O & M) practices. O & M practices impact both the bottom line building owner's costs and tenant's health, comfort, and safety. Green building O & M practices enhances both environmental quality and the economic performance. Building O & M goals should protect the tenant health; maintaining proper building temperature and humidity; promote the ventilation, dilution, and removal of airborne contaminants; eliminate the use of toxic cleaners and pesticides, and provide appropriate lighting and acoustics. In addition, appropriate O & M by tenants and building occupants.

The PDC guide including checklists for evaluating design and construction practices and materials is appended to this report. The noteworthy aspect of the PDC guide is that it is used by the Commission when making decisions on RFP's submitted to the Commission for funding. Thus, the PDC, and the NJDCA incorporate green building design and construction principles and techniques as prerequisite elements in granting funds for affordable housing production. As such, these agencies have the ability to implement these cost-saving, sustainable construction practices into affordable housing projects, which they fund.

#### Potential Impediments to Green/Sustainable Affordable Housing

It is a concern that the development community may resist incorporating green design into affordable housing projects. The payment in lieu calculation indicated previously in this report indicates that the production of affordable housing can be quite considerable, and it is not known how much adding another requirement such as green design may add to an otherwise expensive undertaking. The Planning Board has yet to develop a series of incentives to encouraging green/sustainable affordable housing design.

As mentioned above, Greenwich Township has adopted a growth share ordinance that requires affordable housing production in accordance with COAH's new growth share formula. This ordinance essentially requires the development community to produce affordable housing at the rate at which development generates a local growth share affordable housing obligation. The

addition of an enhanced performance standard for affordable housing production raises a concern that a green design requirement may be subject to challenge by developers that wish to construct their obligation utilizing traditional, cost effective construction practices, rather than utilizing a series of green design guidelines that most engineers/planners do not have much familiarity.

COAH rules do not require green affordable housing production. At the State level, green/sustainable affordable housing production requirements are attached to NJDCA funding provided for such development projects. In the case of the private development community, it is anticipated that there will be substantial resistance to municipal regulations that go beyond the growth share requirement (i.e. green/sustainable building design). Although green/sustainable building design will yield operating and maintenance cost benefits, there is a substantial learning curve that may be difficult to overcome to provoke the private development community into incorporating such designs and construction techniques into providing affordable housing.

Typical zoning incentives such as increase floor area ratio (FAR), could be used to incentivize green/sustainable affordable housing production, however this approach would likely be resisted by the municipality. This is because an increase in FAR translates into a higher affordable housing obligation, which in turn results in an increase in the cost to deliver services, which would be borne by the local taxpayer. Thus, in the absence of State authorizing legislation requiring that all affordable housing be designed and constructed consistent with green/sustainable construction principles and techniques; or without growth share relief from COAH for using an incentive such as FAR, the municipality may be essentially left with financial participation in affordable housing production as the most likely means of achieving green/sustainable affordable housing development. In an era of high taxes and competing demands on the local taxpayer's dollar, the municipality is not likely to pass this expense on to the taxpayer.

Simply requiring green/sustainable affordable housing production in local growth share ordinances may also have practical constraints. For example, is such a requirement likely to be challenged on its legal merits, and if so, will such a challenge be one, which the municipality is likely to defend. In this case, the municipality may need the assistance of authorizing legislation to adopt such ordinance requirements.

In the absence of authorizing legislation, one approach may be to establish NJDCA funding preferences to affordable housing projects in municipalities that require green/sustainable affordable housing design and construction. If the NJDCA were able to provide such assurances, and establish procedures to fast-track funding green/sustainable affordable housing production, the concept may gain acceptance and municipalities may be more likely to adopt local ordinances requiring green affordable housing design.

If municipalities had enabling legislation from the Legislature, which required a target of 50% green affordable housing production, and if the Governor ordered preferential funding consideration to housing projects that achieve a minimum level of 50% green affordable housing design, these design techniques may become widely employed on a statewide level. Energy efficiency is especially important to affordable housing design, particularly in light of the recent energy price spikes, which take the greatest toll on low- and moderate-income households as a proportion of the annual household income. A comprehensive set of policies and regulations at the state regulatory and funding agency level would help advance the purpose of affordable housing for the people being served by affordable housing production.

Despite these concerns, the Greenwich Township Planning Board has determined that a modest minimum commitment for green design is appropriate, and has identified a policy in the 2006 Land Use Plan that affordable housing should be constructed with at least 10% of the production cost of an affordable dwelling dedicated to green design components and/or practices such as energy efficiency. The policy to implement 'green' or 'sustainable' design, construction and efficiency requirements in local affordable housing projects, was adopted in May 2005, and the Housing Plan was adopted prior to the development of this policy, which suggests that during the COAH substantive certification process, this policy should be added to the Housing Plan as well.

The Land Use Plan policy calls for the 10% green design commitment in all affordable housing production in Greenwich Township, whether it is municipally sponsored, or constructed by the private sector as the 'growth-share' component of a project. The Township's affordable housing fair share plan includes a variety of strategies in response to the third round growth share. These include a 'buy and fix' program, which involves (1) the municipal acquisition of a home in need of rehabilitation, (2) rehabilitation of the home; and (3) resale of the home as an affordable dwelling. In addition, the Township's fair share plan includes a provision for accessory apartments to existing single-family dwellings. Adding a green design or energy efficiency to the production cost of these units will ultimately assist the affordable household occupying the units created.

With the 10% minimum commitment to green design, the Planning Board has taken the first step in advancing green design in affordable housing. It is hoped that once the private sector and the Township gain experience using these design and construction techniques, the level of commitment to green design will increase. Ultimately, it is hoped that a commitment to green design, and the use of alternative energy such as solar, will in combination reduce the cost of operation with other green design techniques. In addition it is hoped that local regulations requiring green design techniques and practices will increase their usage and make it easier for the development community to increase their incorporation of such building techniques in development.