INTRODUCTION

Background:

Situated on New Hampshire's southern border, Plaistow relies on groundwater resources located within its boundaries as the principal source of domestic water. Most of Plaistow is located in the Little River watershed, a sub-watershed of the Merrimack River basin (HUC 01070002). A major portion of Plaistow's surface water resources is comprised of wetlands, most of which are associated with the Little River and its tributaries. These wetlands serve many functions, including potential groundwater recharge.

The Town of Plaistow does not, itself, have a municipal water supply system. Rather, domestic water is supplied by 52 active public water supply systems (all of which rely on groundwater) with 72 active wells. These systems are located throughout Plaistow and supply water to residential developments, schools, daycare centers, workplaces, restaurants, and various commercial and industrial uses. In addition, there are numerous private wells throughout the town.

Portions of Plaistow—particularly along the Route 125 corridor—are heavily developed. As New Hampshire's population increases, so too will development pressures in Plaistow. According to municipal population growth projections prepared by the former Office of State Planning (now the Governor's Office of Energy & Planning), Plaistow's population is projected to increase 39 percent between the years 2000 and 2020. Municipal Population Projections, 2000 to 2020, N.H. Office of State Planning (Oct. 1997) (Updated Jan. 1999). Neighboring communities are anticipated to experience similar, and even greater, population growth. These development pressures, if not properly managed, could have substantial detrimental effects on the quality, and possibly the quantity, of Plaistow's groundwater resources. These detrimental effects could result from direct and cumulative impacts resulting from new land uses overlying Plaistow's groundwater resources, as well as new impervious surfaces which can interfere with groundwater recharge and contribute to degradation.

Plaistow has been engaged in numerous efforts to address groundwater resource concerns. The Conservation Commission and other stakeholders—including representatives of some of the Town's many public water supply systems—have worked with the Northeast Rural Water Association to develop a groundwater protection plan. This effort has focused on increasing local awareness of groundwater issues, and also is exploring the possibility of a BMP inspection program. In addition, Plaistow provided a 40% match, with 60% funding from the N.H. Department of Environmental Services, to develop data and conduct a GIS mapping of all of the town's stormwater drainage infrastructure. This information will provide a better understanding of the interrelationships between impervious surface runoff, groundwater recharge, and surface water quality. In addition, Plaistow plans to conduct a town-wide build-out analysis, which will provide important information about the layout and impacts associated with future growth under current zoning regulations.

Plaistow's concern for its groundwater supply also is evidenced in the Natural and Water Resources section of its Master Plan Update. A primary and explicit goal set forth in the Update is to "[p]rotect and enhance environmentally sensitive natural resources areas in order to maintain their ecological integrity and/or to promote public health and safety." The first objective in achieving this goal is to "[e]nsure a safe and adequate water supply for all citizens through proper management of land, water supply areas, and aquifer recharge areas."

Project Purpose and Description:

The purpose of this project is to identify and recommend opportunities for Plaistow to enhance its local land use regulations to better protect the sustainability of its groundwater resources—both in terms of quality and quantity. In arriving at the recommendations contained in this report, the following tasks were accomplished by the Conservation Law Foundation (CLF) in conjunction with the Plaistow Conservation Commission:

Review of Plaistow's GIS Study Relative to Stormwater Drainage Infrastructure.

As stated above, Plaistow received funding support from the Department of Environmental Services to conduct a Geographic-Information-Systems (GIS) mapping of its stormwater drainage infrastructure. At the onset of this project, it was believed that the GIS mapping exercise would be completed in the Summer of 2002, and that its results could be helpful to efforts to review, and recommend improvements to, Plaistow's land use regulations as they pertain to groundwater sustainability. Accordingly, the Conservation Commission and CLF originally planned to await completion of the GIS mapping study to determine whether or how its findings might be relevant to the issue of groundwater recharge and groundwater quality, as related to current and future land uses. The technological and logistical complexities of the GIS mapping, however, have caused that study to take considerably longer than the Conservation Commission originally expected. On May 1, 2003, CLF and the Conservation Commission met to review and discuss the status of the GIS mapping study. At that time, it was determined that awaiting completion of the GIS mapping study would significantly delay this project, and that this project could and should proceed without the further delay that would result from awaiting completion of the GIS mapping exercise.

Meeting of Interested Stakeholders.

The Conservation Commission publicized and organized a meeting of interested stakeholders, held on May 29, 2003 at the Plaistow Public Library, to identify issues of concern regarding the interrelationship between land use and groundwater quality/quantity. In addition to providing general public notice, the Conservation Commission coordinated invitations to Plaistow's Planning Board, Board of Selectmen, and interested stakeholders. The Conservation Commission and CLF facilitated the meeting to identify issues and concerns relating to current

and future land use and development trends in Plaistow; the relationship between those trends and the sustainability of Plaistow's drinking water resources; and potential regulatory strategies for protecting those resources.

Review of Plaistow's Land Use Regulations.
Following the initial stakeholders' meeting, CLF reviewed Plaistow's zoning, subdivision, and site plan review ordinances to identify opportunities to enhance the protection of Plaistow's groundwater resources in terms of both groundwater quality and quantity. This assessment included consideration of innovative land use regulations aimed at minimizing impervious surfaces associated with future development, and protecting particularly important areas from incompatible land uses that could adversely affect groundwater quality and quantity. It also included consideration of relevant best management practices and enhanced site plan regulations. CLF and the Conservation Commission met on May 6, 2004 to discuss CLF's preliminary, draft recommendations. Members of the Conservation Commission, as well as Town Planner Leigh Komornick, provided preliminary general feedback; Conservation Commission Chair Timothy Moore subsequently provided additional, detailed feedback in writing.

Presentation of Initial Findings/Recommendations to Conservation Commission and Stakeholders.
The Conservation Commission coordinated a public meeting for June 17, 2004 for a presentation and discussion of CLF's preliminary recommendations. The Conservation Commission provided public notice of the meeting, as well as invitations to interested stakeholders. CLF presented its preliminary recommendations and obtained input from those in attendance. CLF also made clear that additional comments and input could be provided in writing up to June 25, 2004.

Preparation of Final Recommendations.
With input received at the June 17, 2004 public meeting, as well as with input received from the Department of Environmental Services following its review of the preliminary report, CLF prepared a final report outlining recommendations for enhancing Plaistow's land use regulations to better protect the sustainability of its groundwater resources.

Presentation of Final Recommendations to Board of Selectmen, Planning Board and Zoning Board of Adjustment.
The Conservation Commission organized and publicized a joint meeting of the Board of Selectmen, the Planning Board and the Zoning Board of Adjustment to take place on June 30, 2004. CLF and the Conservation Commission presented the final recommendations to, and provided an opportunity for comments and questions from, members of the boards.

Publication of Final Recommendations.
To provide other communities with a resource for better protecting their source waters through local land use regulations, CLF and the Conservation Commission will explore opportunities to publicize this report on the world-wide web.

Overview of Recommendations:

The recommendations that follow address issues related to protecting both the *quality* and the *quantity* of Plaistow's groundwater resources. Land use regulatory strategies discussed under **Objective I** pertain to protecting groundwater quality primarily by preventing contamination. **Objective II** addresses the issue of protecting groundwater quantity by minimizing the impacts of development to ensure aquifer recharge. **Objective III** also addresses the issue of groundwater quantity, but focuses on the issue of water *consumption* by outlining strategies to minimize water used for irrigation. The report concludes with miscellaneous recommendations that do not fit into any one of the above Objectives.

It is important to note that the scope of this report—and the recommendations contained in it—relate specifically to local land use regulations as a means of protecting groundwater resources. There are other, complementary approaches that should not be overlooked in Plaistow's efforts to enhance the long-term sustainability of its groundwater supplies. For example, whereas the land use regulations addressed in this report would apply only prospectively to future land uses, health ordinances addressing groundwater health and safety concerns can be applied to both future and *existing* land use activities. Moreover, mandatory inspection programs, such as inspections of potential-contamination-sources in sensitive areas (such as wellhead protection areas) can provide critical protections, and can address both future and existing land uses. Such programs, particularly in coordination with a re-classification of Plaistow's groundwater pursuant to RSA 485-C:9, also could play an important role in protecting groundwater quality.

It also is important to note that this report contains recommendations which, collectively, are rather numerous. The most effective and manageable way to pursue recommended changes may be for the Town to identify its highest priorities and address them accordingly. Finally, it is critical to note that, like many environmental resources, groundwater is not subject to political boundaries. While Plaistow is limited to its own political boundaries in protecting the long-term sustainability of its groundwater resources, it should consider the inherently regional nature of this issue and consider inter-municipal efforts in coordination with neighboring communities.[1]

[1] Much of the aquifer underlying large portions of Plaistow extend into neighboring communities. Moreover, substantial portions of wellhead protection areas originating in Plaistow extend across town lines into Newton and Atkinson. *See* Attachment 1. Some small portions extend across *state* lines into neighboring Massachusetts communities.

OBJECTIVE I:
PROTECT GROUNDWATER QUALITY BY PREVENTING CONTAMINATION

Because Plaistow relies so heavily on groundwater as its source of domestic water, it is essential that it protect the *quality* of this resource. To do so, Plaistow should continue to regulate land uses to ensure that activities occurring within the town do not result in groundwater contamination. Plaistow can do so in the following ways.

1. STRENGTHEN PROTECTIONS WITHIN THE AQUIFER PROTECTION DISTRICT

Plaistow's zoning ordinance already contains provisions establishing an Aquifer Protection District (APD) with safeguards intended to protect groundwater resources. These APD regulations provide a good foundation for protecting the quality of Plaistow's extensive aquifer resources. Based on approaches discussed in the Department of Environmental Services' Model Groundwater Protection Ordinance, *see* Attachment 2, as well as concepts that are currently being studied in the town of Belmont, Plaistow's existing protections can be enhanced as follows.

1.1 *Ensure that high risk activities are prohibited from occurring within the APD.*

1.1.1. Amend the introductory language in Zoning Ordinance § 220-133D, pertaining to prohibited uses in the APD, as follows:

"Prohibited uses. The following uses are prohibited in the Aquifer Protection ~~Zone~~ ***District*** except where permitted to continue as a***n existing*** nonconforming use***:*** ~~or where anyone planning to engage in such activities can demonstrate to the satisfaction of the Planning Board that no degradation to the aquifer will occur. Such uses shall include, but not be limited to:~~

1.1.2. Amend existing language in Zoning Ordinance § 220-133D, listing uses that are prohibited in the APD, as follows.

- "(7) ~~Dumping of snow containing de-icing chemicals brought from outside the Aquifer Protection district~~.***The siting or operation of a snow dump, except that on-site snow storage areas shall be allowed***."
- "(9) ~~*Waste from d*~~***D***ry-cleaning establishments ***involving the use of dry-cleaning chemicals***."
- "(10) ~~Waste from a~~The storage, discharge or disposal of waste from automotive service and repair shops and junk and salvage yards."
- "(11) ~~Waste from l~~***L***aundry and car wash establishments not served by a central municipal sewer."

1.1.3. Amend Zoning Ordinance § 220-133D, listing uses that are prohibited in the APD, by adding the following additional prohibited uses identified in DES' Model Groundwater Protection Ordinance:[2]

- "The siting or operation of a hazardous waste disposal facility as defined under RSA 147-A."
- "The siting or operation of a wastewater or septage lagoon."
- "Storage of liquid petroleum products, except the following:
  a. normal household use, outdoor maintenance, and heating of a structure;
  b. waste oil retention facilities required by statute, rule, or regulation;
  c. emergency generators required by statute, rule, or regulation;
  d. treatment works approved by NH DES for treatment of ground or surface waters;
  provided that such storage, listed in items a. through d. above, is in free-standing containers within building or above ground with secondary containment adequate to contain a spill 110% the size of the containers' total storage capacity."
- "Sludge monofills and septage lagoons."
- "Storage of animal manure unless covered or contained in accordance with the specifications of the United States Natural Resources Conservation Service."
- "Facilities that generate, treat, store, or dispose of hazardous waste subject to Env-Wm 500-900 except for:
  a. household hazardous waste centers and events regulated under Env-Wm 401.03(b)(1) and Env-Wm 501.01(b); and
  b. water remediation treatment works approved by NH DES for the treatment of contaminated ground or surface waters."
- "Non-sanitary treatment works which discharge to the ground and that are subject to Env-Ws 1500, except the following:
  a. the replacement or repair of an existing treatment works that will not result in a design capacity greater than the design capacity of the existing treatment works;
  b. treatment works approved by NH DES designed for the treatment of contaminated groundwater."
- "Storage of regulated substances, unless in a free-standing container within a building or above ground with secondary containment adequate to contain 110% of the container's total storage capacity;"
- "Storage of commercial fertilizers, unless such storage is within a structure designated to prevent the generation and escape of contaminated runoff or leachate."

[2] The list of prohibited uses assumes that Plaistow does not create an inspection program to ensure ongoing, continued compliance of land use activities with performance standards (including best management practices) designed to protect groundwater quality. If Plaistow chooses to establish a mandatory inspection program to ensure that necessary performance standards and BMPs are followed, some of the recommended prohibited uses can be allowed. *See* DES Model Groundwater Protection Ordinance (Attachment 2).

1.1.4. Amend Zoning Ordinance § 220-133D to prohibit the following additional uses in the APD:

- The composting, use or land application of biosolids and/or septage.
- Sand and gravel excavation and other mining within 8 vertical feet of the seasonal high water table.

1.1.5 Amend Zoning Ordinance § 220-133E(1), pertaining to "permitted uses" within the APD, as follows:

"Any use permitted ***in the underlying zoning district*** by Articles IV and V of the Town of Plaistow Zoning Ordinance, except as prohibited in Subsection D of this section."

1.1.6. Amend Zoning Ordinance § 220-133F(1)(b), pertaining to sand and gravel excavation as a conditional use within the APD, as follows: "Sand and gravel excavation and other mining which is proposed to be carried out ***to*** within eight vertical feet of the seasonal high water table and provided that periodic inspections are made by the Planning Board or its agent to determine compliance."

1.2 ***Adopt performance standards for those uses, including conditional uses, allowed in the APD.***

To ensure protection of groundwater resources within the Aquifer Protection District, permitted uses (including conditional uses) can be required to comply with performance standards that minimize the risk of contamination. DES' Model Groundwater Ordinance (Attachment 2) contains detailed descriptions of the sort of performance standards—including certain best management practices—that can be required of land uses operating within the APD to provide enhanced protection of groundwater resources. *See* Model Groundwater Ordinance (Attachment 2) § 6. Certain uses, including residential uses, should be exempt from these performance standards. *See* Model Groundwater Ordinance (Attachment 2) §11. To ensure proper, long-term implementation of performance standards, an inspection program will be necessary. As stated in footnote 2, above, if Plaistow develops and implements such an inspection program, it may make sense to *allow* several of the uses listed as "prohibited" in section 1.1.3, above. If Plaistow chooses to impose performance standards on uses allowed within the APD, it should do so by amending § 220-135(B), using § 6 of DES' Model Groundwater Ordinance as guidance.

1.3 ***Decrease impervious surface coverage.***

Impervious surfaces such as parking lots, roadways and even rooftops can be sources of pollutants that are picked up and transported during rain events. Such pollutants, which can include nutrients, heavy metals, and constituents of motor-vehicle fluids can, if not properly treated, adversely affect groundwater quality. In addition to using best

management practices to control and treat stormwater, the reduction of unnecessary impervious surface coverage can be an important way of protecting groundwater quality. (As addressed in Objective II, below, it also is an important way to protect groundwater recharge.) Recommendations for addressing this issue include the following:

1.3.1. Consider amending Zoning Ordinance § 220-133A to increase minimum lot sizes from three to five acres for portions of the APD identified as having a saturated thickness of 20 feet or greater and transmissivity greater than 1,000 feet squared per day. Also, in these portions of the APD overlaying Industrial and Commercial-I Districts, consider significantly reducing maximum impervious surface coverage from the existing lot-coverage maximum of 75%.

1.3.2. Amend applicable regulations to promote more compact development, and to reduce impervious surface coverage associated with parking lots and roads. *See* Objective II, Recommendation 1, below.

1.4 *Ensure that groundwater infiltration strategies are appropriate.*

As discussed below, it can be detrimental to groundwater quality to encourage the artificial recharge of groundwater with stormwater associated with certain types of land uses (i.e. land uses that pose high risks for contaminating stormwater). To ensure that groundwater infiltration strategies associated with land uses in the APD do not unwittingly harm groundwater quality, Zoning Ordinance § 220-135D (pertaining to drainage) should continue to require stormwater infiltration, but should be amended to provide an exception for those circumstances where, using appropriate best-management-practices, such infiltration might pose a threat to groundwater quality.

1.5 *Adopt additional provisions pertaining to hydrogeologic studies for developments within and straddling the APD boundaries.*

The Town's Zoning Ordinance allows the Planning Board, under certain enumerated conditions, and in other situations within the Board's discretion, to require hydrogeologic studies. These provisions are very important for assessing the impacts of development proposals on the Town's aquifer resources, and for better understanding the characteristics and geographical extent of the aquifers. The Town should further enhance its existing requirements relative to hydrogeologic studies in the following ways:

1.5.1. Amend Zoning Ordinance § 220-133B(1) as follows:
For development proposals ***wholly or partially*** within the Aquifer Protection District, a hydrogeologic study shall be required for the following:
(a) Subdivisions of ~~10~~ ***4*** lots or greater.

(b) Any septic system or series of septic systems designed for 2,400 gallons per day or greater contained within one lot.
(c) Water development projects that withdraw more than 20,000 gallons per day from a particular site or property.
(d) Proposals that will result in the aggregate disturbance of 50,000 square feet or more.

1.5.2. Amend Zoning Ordinance § 220-133B(3) to clarify that the Planning Board can require, at the applicant's expense, an independent hydrogeologic study, and that should the applicant so choose, it can fund an independent study by the Planning Board *in lieu* of its own initial study (i.e., to avoid the costs associated with two separate studies). Similarly, consider amending Zoning Ordinance § 133F(3), relative to conditional uses within the APD, to allow an applicant to elect to fund a single, independent study by the Planning Board.

1.5.3. Amend Zoning Ordinance §§ 220-133B to clarify that where a proposed development straddles the APD boundaries, soil borings and monitoring data must be collected from portions of the site outside of the APD boundaries as well as within the APD boundaries. It is possible, and in fact has already occurred, for proposed development sites to straddle the boundary of the Town's Aquifer Protection District. This amendment is necessary to address such development sites, to confirm that the APD boundaries incorporate all aquifer resources.

1.5.4. Amend Zoning Ordinance §220-133B to provide more guidance on the number of soil borings and monitoring wells required as part of a hydrogeologic study.

1.5.5. Amend Zoning Ordinance § 220-132 to clarify that, based on evidence and findings, including data collected from locations outside the APD, the Planning Board may adjust the boundary of the APD or reduce or expand the designation area to more correctly define the location and the extent of the aquifer on a site-specific, case-by-case basis and shall incorporate such adjustments onto the APD map.

2. EXTEND PERFORMANCE-STANDARD PROTECTIONS TO WELLHEAD PROTECTION AREAS OUTSIDE THE AQUIFER PROTECTION DISTRICT

The recommendations discussed above will enhance protection of groundwater resources within Plaistow's Aquifer Protection District (APD). However, there are a number of public wells for which the State has designated wellhead protection areas, and some of these wellhead protection areas extend beyond the boundaries of the APD. *See* Attachment 1. Plaistow should consider protecting these additional resources by

adopting a groundwater protection ordinance that extends the APD performance-standard requirements (discussed above) to all wellhead protection areas (including portions of wellhead protection areas) located outside the APD.

3. IMPROVE SAFEGUARDS TO PREVENT CONTAMINATION BY SEPTIC SYSTEMS

Plaistow already has experienced numerous failures of septic systems associated with existing commercial developments. Such failures can result in significant adverse impacts on both groundwater and surface water resources. It is believed that the addition of inappropriate substances could have contributed to past failures, and that Plaistow needs to ensure that the owners and users of existing and future septic systems need to be better informed. To address this issue, Plaistow should adopt an ordinance—applicable to both existing and future commercial uses—requiring the posting of notices in bathrooms and other appropriate locations that (1) the commercial establishment is on a septic system, (2) listing the types of substances that should not be discharged into the system, and (3) describing the adverse effects that could result from the discharge of inappropriate substances. The town also should require similar notice to be provided to individuals renting residential dwellings, and should amend Site Plan Review Ordinance § 230-10B to require such notice to purchasers of condominium units.

4. ENHANCE SAFEGUARDS REGARDING EARTH EXCAVATION

The Town's Zoning Ordinance already contains a number of safeguards to address and reduce potential impacts from excavation activities, both during and after excavation has taken place. These safeguards can be further strengthened as follows.

4.1 *Adopt additional operational standards to prevent adverse impacts to groundwater resources.*

4.1.1. Amend Zoning Ordinance § 220-73 to prohibit the fueling, maintenance and repair of vehicles and equipment within excavation sites.

4.2 *Adopt criteria and standards for reclamation of excavation sites.*

4.2.1. Adopt specific, enforceable criteria for reclamation plans submitted in advance of excavation activities.

4.2.2. Amend Zoning Ordinance § 220-74A to require that, in addition to having *completed* reclamation within a 12 month time-frame (as currently required), the owner of a excavated land shall *commence* reclamation within a certain enumerated time period (i.e., within 1 month of completion or permit expiration).

4.2.3. Amend Zoning Ordinance § 220-74A to prohibit the use or application of biosolids in excavation sites.

5. ENHANCE WATER QUALITY PROTECTIONS FOR WELLS IN PROXIMITY TO ON-SITE STUMP DUMPS

On-site stump dumps located more than 75 feet from any drinking water supply are not regulated as solid waste pursuant to New Hampshire's solid waste management statute, RSA 149-M. Stump dumps pose a threat to drinking water quality because, particularly as buried stumps decay, they create taste and odor problems. Because site clearing operations are usually complete at the time of well construction, and because site plans typically do not indicate where stumps are or will be buried, regulatory oversight can lead to the inadvertent siting of wells and stump dumps within 75-feet of one another. DES recommends that local planning boards are in a good position to address this problem.

5.1 *Require documentation of the location of on-site stump dumps.*

5.1.1. Adopt provisions in the Town's Zoning, Site Plan Review and Subdivision Ordinances requiring developers to document where on their site they will bury stumps associated with their development

5.1.2. Amend Zoning Ordinance § 220-133D(1), pertaining to disposal of waste in the Aquifer Protection District as a prohibited use, as follows: "Disposal of solid waste (as defined by New Hampshire RSA 149-M) other than brush or stumps generated on the property on which they are to be disposed, ***except that the location of any on-site stump dump shall be at least 75 feet from any existing or future well, and shall be documented on a map provided to the Planning Board, Conservation Commission, building inspector, and health officer***."

5.2 *Require water well contractors to inquire about stump burial locations before drilling new wells.*

5.2.1. Adopt an ordinance requiring water well contractors to seek and obtain information from the Town relative to the location of on-site stump dumps.

OBJECTIVE II:
PROTECT GROUNDWATER QUANTITY BY ENSURING ADEQUATE AQUIFER RECHARGE

The construction of impervious surfaces—such as parking lots, roadways and roofs—can have adverse impacts on groundwater sustainability because they interrupt the natural hydrologic cycle. Whereas undeveloped, permeable surfaces allow rainfall or snowmelt to seep into the ground and naturally replenish groundwater supplies, impervious cover often causes precipitation to be collected and discharged as stormwater runoff into rivers, streams and wetlands. In addition to reducing groundwater *quantity*, stormwater running off of impervious surfaces can pick up and transport numerous pollutants, thereby affecting water quality of rivers, streams and wetlands and, where infiltration occurs, potentially creating negative impacts on groundwater quality. To address these impacts associated with impervious surfaces, Plaistow should pursue two general strategies. As discussed below, it should ensure that (1) future development occurs in a way that minimizes impervious surface coverage, and (2) stormwater runoff is managed appropriately to allow groundwater infiltration.

1. REDUCE IMPERVIOUS SURFACE COVERAGE.

The most important way to protect groundwater recharge is to reduce the amount of land that is covered by roads, parking lots and rooftops. This can and should be accomplished on both the *town-wide level*—by managing future development in a way that reduces sprawl—and on a *site-specific level*—through the adoption of design standards.

1.1. *Reduce impervious surface coverage by promoting land use patterns that are more compact where higher densities make the most sense, and that discourage low-density sprawl.*

In recent decades, local zoning and land use planning have encouraged low-density, single-use, automobile-dependent development patterns commonly known as "sprawl." These development patterns often result in the unnecessary and harmful addition of impervious surfaces associated with more and longer roads and large parking facilities. Plaistow should closely scrutinize its existing land use regulations to identify ways to prevent future sprawl development. In doing so, it should adopt the basic strategy of identifying where future development makes most sense, where future development is least desired, and steering future development accordingly. Plaistow's plan to conduct a build-out analysis will be an important tool for engaging in this analysis. Also of critical importance will be the identification of important natural resources, including groundwater resources, wetlands, rivers and streams, as well as open space.

Plaistow's Zoning Ordinance allows for varying uses and density of development in its seven zoning districts. The Town's Commercial II (C-II) district (described as the "Town Center" of the "older Plaistow") and the adjacent Medium Density Residential (MDR) district appear to be logical areas in which to promote infill development in a more

compact manner, employing design standards to ensure the desired character of these districts is retained. On the other hand, the Low Density Residential (LDR) district, which comprises the largest district, appears ripe for low-density, automobile-oriented sprawl development which could have adverse effects on the Town's water resources (and which could be costly in terms of road infrastructure and related municipal services). To promote development that is more compact in places where higher densities make the most sense, and to discourage sprawl development and the significant impervious surface coverage associated with it, the Town's analysis of this critical issue should consider the following possible actions:

1.1.1. Encouraging more compact development in the C-II district by amending Table 220-32C to
- Allow duplexes as a permitted use.
- Allow accessory dwellings as a permitted use or at least by special exception.
- Reduce minimum lot size and frontage requirements.
- Increase maximum lot coverage.
- Increase the maximum height of buildings.

1.1.2. Encouraging more compact development in the MDR district by amending Table 220-32E to
- Allow accessory dwellings as a permitted use, or at least by special exception. Amend language in this Table, and in Article VIII of the Zoning Ordinance, to remove restrictions limiting accessory dwellings to in-law apartments in owner-occupied single-family dwellings.
- Reduce minimum lot size and frontage requirements.
- Increase maximum lot coverage.
- Allow "in-law" apartments (note: for purposes of consistency, such an amendment would also require amending Article VIII).

1.1.3. Providing for less dense development in the LDR district by amending Table 220-32F to
- Reduce density by adopting dimensional standards (including minimum lot sizes) similar to the Residential-Conservation (RC) district. Alternatively, consider re-zoning undeveloped portions of the LDR to RC.
- Allow accessory dwellings as a permitted use, or at least by special exception. Amend language in this Table, and in Article VIII, to remove restrictions limiting accessory dwellings to in-law apartments in owner-occupied single-family dwellings.

1.1.4. Determine a future vision for the Integrated Commercial-Residential (ICR) district. As currently zoned, this district has the potential to become a commercially-dominated strip similar to Route 125. In its current condition, however, there are important rural, undeveloped characteristics of this district. Plaistow should determine whether it wants to focus

development in this district, or protect the rural qualities currently existing there. The town should at least consider zoning strategies aimed at creating nodal development as opposed to strip-development, which could have adverse consequences for groundwater and other natural resources.

1.1.5. In all zoning districts, consider amending Table 220-32I to reduce minimum setbacks for front, side and rear yards, and to establish *maximum* setbacks to promote development that is more compact with less impervious surface.

1.1.6. Consider reducing the 50-foot separation requirement for dwelling units in Planned Residential Developments (PRDs) (§220-48G(3)).

1.1.7. Consider amending § 220-54D to increase maximum lot coverage for Affordable Elderly Housing Community uses in CII and/or MDR districts.

1.1.8. Consider amending or replacing Article VI of the Zoning Ordinance, pertaining to Planned Residential Development (PRD), to enhance protections for groundwater and surface water resources, and to minimize the effects of impervious surfaces associated with conventional subdivisions. Plaistow should consider re-naming this provision "Conservation Subdivisions," and more explicitly describe the purpose of promoting more compact, less sprawling subdivisions that protect natural resources. In addressing this issue, Plaistow should consider models from other communities (the towns of Gilmanton and Newmarket have ordinances that are viewed as good models), with necessary changes to address local conditions and goals. It also should consider incorporating low-impact-development standards, discussed in DES' *Managing Stormwater as a Valuable Resource* (Sept. 2001), to minimize impervious surfaces and encourage natural groundwater infiltration). The town also should consider requiring that all future subdivisions, or at least all subdivisions in excess of a certain number of lots, be designed and constructed as conservation subdivisions. The recent enactment of HB 761 clarifies that municipalities can, in fact, *require* innovative land use controls (such as "cluster" or conservation subdivisions), provided the innovative land use measure is supported by the master plan and that the necessary criteria are clear. *See* Attachment 3.

1.1.9. Consider amending the Zoning Ordinance to adopt the "village plan alternative" innovative land use control recently enacted in RSA 674:21. This new tool provides another alternative to conventional subdivisions, and is designed to promote more compact development and set aside undeveloped land. Unlike conservation subdivisions, which towns have flexibility to define at the local level, village-plan-alternative subdivisions are specifically defined in RSA 674:21. To fit the definition of a village-plan-alternative subdivision, a developer must locate the entire density

permitted by existing land use regulations on no more than 20% of the parcel, setting aside the remainder of the property under an easement allowing the undeveloped portion to be used only for recreation, agriculture, conservation or forestry. As with conservation subdivisions, Plaistow could, if it so chose, require future subdivisions to be planned and constructed as village-plan-alternative subdivisions.

1.1.10. Adopt a new ordinance to create a Transit-Oriented Development (TOD) overlay district in the vicinity of Plaistow's future rail station. Such an ordinance could be used to promote compact, mixed-use development that is supportive of, and leverages, the restoration of passenger rail service to Plaistow.

1.2. *Reduce impervious surface coverage at the site-specific level*

Conventional land use regulations often impose design standards at the site-specific or subdivision level that can result in unnecessarily large impervious-surface coverage. An important way of reducing impervious surface coverage, and thereby protecting groundwater and other aquatic resources, is to adopt a low-impact-development (LID) approach. An important part of this approach, discussed in DES' *Managing Stormwater as a Valuable Resource* (Sept. 2001), is to reduce the amount of paved surface involved in a given development. To incorporate this principle into future development, the Town of Plaistow should consider amending its land use regulations in the following ways:

1.2.1. Allow smaller parking lots. This can be accomplished by allowing on-street parking, where appropriate, to reduce off-street parking needs; by applying more flexible standards to determine the number of required parking spaces; and by reducing the minimum size of parking spaces and establishing maximum parking-space dimensions.

- Consider amending § 220-16A to reduce minimum parking-space size requirements for vehicular dealerships and to establish maximum parking-space dimensions.
- Amend § 220-67G, pertaining to parking for home occupations, to allow for on-street parking, where appropriate, to offset or reduce off-street parking needs.
- Amend Site Plan Review § 230-2B(1), as follows, to recognize that circumstances may exist where off-street parking is not necessary: "Maximum safety of traffic access and egress, sufficient parking areas to ensure off-street parking ***when it is necessary***, and applicable handicapped accommodations."
- Amend Site Plan Review § 230-12 (pertaining to off-street parking) to provide a more flexible approach to determining the amount of off-street parking required for developments, authorizing and taking into account:
    - The availability of on-street parking to reduce the number of off-street parking spaces required;

    - The ability for adjacent commercial/business uses with different peak demands to share the use of parking facilities;
    - Employer transportation demand management strategies (such as van-pools, incentives for employee car-pools, the availability of bike racks and shower facilities to encourage bicycle commuting) that reduce the number of off-street parking spaces needed for employees.
- Review the "minimum parking spaces required" in Site Plan Review § 230-12 to determine whether current required minimums should be reduced, and whether *maximums* should be adopted.

1.2.2. Allow narrow roads.

- Consider amending §220-47B to allow access roads to PRDs less than 50-feet wide.
- Consider amending street design standards in subdivision regulations, pertaining to roadways, to reduce pavement widths on minor streets and secondary streets (§ 235-32C).

1.2.3. Allow adjoining lots and land uses to share driveways. The Town's Access Management Overlay District already recognizes the benefits of shared and interconnected driveways (§220-55.2H,I). These benefits should be allowed elsewhere as well.

- To the extent it precludes shared driveways, amend § 220-42.
- Amend § 220-48 to clarify that shared driveways are allowed in PRDs.
- To the extent § 235-8, pertaining to side and rear buffer strips, precludes shared driveways, amend it to allow shared driveways

2. ADOPT STORMWATER MANAGEMENT REGULATIONS THAT ENCOURAGE APPROPRIATE GROUNDWATER INFILTRATION AND RECHARGE.

The concept of low-impact-development (LID) is an evolving tool aimed at minimizing the impacts of development on water resources. LID is premised on the concept that development should be designed and constructed in a way that replicates existing, natural hydrology to the fullest extent possible. It encourages the use of rain gardens and other natural and artificial infiltration techniques to encourage infiltration to groundwater.

Until recently, the Department of Environmental Services has discouraged the use of so-called artificial-infiltration best management practices ("BMPs") designed to collect stormwater runoff and return it into the ground for groundwater recharge. This historic reluctance to encourage artificial infiltration stemmed from the fact that such BMPs often were poorly sited, designed, constructed and maintained, leading to water quality problems. However, DES has modified this policy and now encourages artificial-

infiltration BMPs where there is sufficient local oversight to ensure proper long-term maintenance. For development proposals requiring DES "site specific" permits for the alteration of terrain pursuant to RSA 485-A:17, DES will be more likely to approve projects employing artificial-infiltration BMPs if it is confident that the BMPs will be properly sited and maintained at the local level. To foster appropriate groundwater infiltration from future development, Plaistow should consider the following.

2.1 ***Require or encourage a low-impact-development approach to future developments.***

2.1.1. Amend the town's Subdivision and Site Plan Review Ordinances to require, or at least encourage, LID designs in future developments.

2.1.2. Amend the Zoning Ordinance to require LID designs for planned residential developments (PRDs) or (if the PRD provisions are amended) for conservation subdivisions.

2.2 ***Develop a stormwater management plan that encourages appropriate artificial infiltration.***

2.2.1. To address DES concerns, address the following six issues in the development of a stormwater management plan.

- Require a site analysis to determine whether and/or where artificial infiltration is appropriate, as well as an analysis of whether and/or where *natural* infiltration can be used;
- Preclude the use of artificial-infiltration BMPs for land uses that pose risks to groundwater quality;
- Require an assessment of soil conditions and hydrology;
- Develop a set of design standards for artificial-infiltration BMPs;
- Develop a monitoring program for artificial-infiltration BMPs;
- Ensure the financial viability of an oversight and inspections program for artificial-infiltration BMPs.

It should be noted that the above elements are not *required* by DES, but if they are in place, it will provide DES with greater assurances in approving artificial-infiltration strategies as part of their site-specific permitting decisions. In developing a stormwater management plan, Plaistow should determine its desired design standard for infiltration volume. It could either require infiltration of stormwater volumes equal to pre-development conditions, or it could base its standard on a fixed depth of stormwater (i.e., 1 inch, 2 inches, etc.).

2.2.2. After developing the above elements of a stormwater management program, amend the town's Zoning, Subdivision and Site Plan Review

Ordinances to require appropriate BMPs (both natural and artificial) that maximize infiltration of stormwater.[3]

2.2.3. Amend the definition of "RUNOFF" in § 235-3 to include precipitation that runs off of impervious surfaces and is infiltrated into groundwater (i.e. in addition to precipitation "that makes its way overland toward stream channels or lakes.")

3. ENSURE ADEQUATE PROTECTION OF WETLANDS

Wetlands provide numerous important functions and values, including providing valuable wildlife habitat and flood control. Among their most critical functions and values, wetlands can play an important role in enhancing water quality. As stated in the Town of Plaistow's Master Plan, wetlands also can enhance the sustainability of groundwater resources through complex interactions with aquifers. Because of the important role wetlands can play in enhancing water quality and groundwater sustainability, Plaistow should consider the following added protections.

3.1 *Provide adequate wetlands buffers.*

To protect the numerous functions and values of wetlands, it is important to provide adequate natural buffers.[4] Such buffers should be designed to protect the water quality and other functions of wetlands, and should be enforceable and conveyed to future property owners in a manner that ensures that they will be maintained. Plaistow's current wetlands ordinance, codified as Article IV of the Zoning Ordinance, provides specific provisions relative to wetlands buffers. The wetlands buffer provisions (§ 220-20) have been described as confusing, and as having been applied in a manner that is not always sufficiently protective of wetlands. Buffer protections should be enhanced as follows.

3.1.1. Consider increasing buffer zones beyond the dimensions contained in Zoning Ordinance § 220-20.

3.1.2. Simplify language in Zoning Ordinance § 220-20. As currently worded, this section has caused confusion. It should be amended to eliminate any potential ambiguities. Subject to the recommendation above that the Town should consider increasing buffer widths, this section could be simplified by:

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[3] Subdivision Ordinance § 235-24 already states that a subdivision proposal shall not receive final approval until the Planning Board is assured that "[m]easures will be taken to minimize impermeable area and provide for adequate infiltration." This statement can be further strengthened to ensure—through the use of appropriate BMPs—that infiltration is truly maximized. *See also* Subdivision Ordinance § 235-34, which also can be strengthened.

[4] For an excellent resource discussing the importance of appropriate buffers, *see* Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Municipalities (Rev. 1997), published by the Audubon Society of NH, UNH Cooperative Extension, NH Office of State Planning, and the Natural Resource Conservation Service.

- Eliminating the current distinction between sites with and without septic systems and establishing a blanket 100-foot (or greater) buffer width in all situations; and
- Replacing references to "wetlands district" and "district" with "wetlands". (Existing reference to "wetlands district" and "district" is confusing and results in ambiguity, because nowhere else is such a district referenced or defined).

3.1.3. Amend Zoning Ordinance § 220-24 to prohibit any building activity and structures, including septic systems, waste disposal systems and roads, within wetlands and adjacent buffer zones.

3.1.4. Amend Zoning Ordinance § 220-27A (pertaining to "Special exception for nonconforming lots") to clarify that special exceptions must be sought not only for the erection of structures within *wetlands*, but also wetland *buffers*.

3.2 *Designate appropriate wetlands as prime wetlands.*

The Conservation Commission can, pursuant to RSA 482-A:15 and Part Env-Wt 701, designate wetlands of significant value "prime wetlands," affording them enhanced protections. Wetlands can be designated "prime" if they are of "substantial significance" in terms of their "size, unspoiled character, fragile condition or other relevant factor[s]." RSA 482-A:15. In determining which wetlands to designate, ten of the following fourteen wetlands functions must be considered: (1) ecological integrity; (2) wildlife habitat; (3) finfish habitat; (4) educational potential; (5) visual/aesthetic quality; (6) water based recreation; (7) flood control potential; (8) ground water use potential; (9) sediment trapping; (10) nutrient attenuation; (11) shoreline anchoring and dissipation of erosive forces; (12) urban quality of life potential; (13) historical site potential; and (14) noteworthiness. Env-Wt 701.03(a). The Conservation Commission can consider up to three additional factors of its choosing, if it provides justification for doing so. Env-Wt 701.03(b). Wetlands designated as prime shall have the presence of hydric soils, hydrophytic vegetation, and wetlands hydrology, and at least 50% of the wetland shall have hydric A soils, with the remaining consisting of hydric B soils. Env-Wt 701.04.

Prime wetlands are afforded additional protections in that DES cannot grant a wetlands permit for any activity proposed to be taken within or adjacent to a prime wetland without first notifying the select board, planning board and conservation commission. Such a permit cannot be granted unless there is clear and convincing evidence that there will not be any loss in value of wetland. RSA 482-A:11,IV.

OBJECTIVE III:
PROTECT GROUNDWATER QUANTITY BY REDUCING WATER CONSUMED FOR LAWN IRRIGATION

As suburban lots grow larger, and as more and more homes are constructed with in-ground automatic sprinkler systems, the consumption of water for lawn-irrigation purposes can have significant cumulative effects on groundwater resources. This is especially the case considering that the most intensive times of lawn watering may occur in the summer months, and during dry, hot-weather conditions when water resources are most stressed. Plaistow can address this issue by adopting regulations that enhance growing conditions on new lots—thereby reducing the amount of water needed to sustain new lawns—as well as through strategies designed to minimize water consumption associated with in-ground automatic sprinkler systems.

1. RESTRICT LAND CLEARING ACTIVITIES TO CONTROL LAWN SIZES AND ENSURE APPROPRIATE GROWING CONDITIONS

The amount of water consumed for lawn irrigation can be directly related to the size of lawn areas. As described in the Commonwealth of Massachusetts' *Guide to Lawn and Landscape Water Conservation* (Attachment 4): "By minimizing the loss of natural vegetation and establishing smaller lawns as a standard for new development, municipalities can reduce outdoor water used for lawn watering." Municipalities also can address this issue by regulating the installation and use of automatic sprinkler systems. To address consumptive water uses associated with lawn watering, Plaistow should consider the following strategies.

1.1 *Establish standards for the amount of land that can be cleared of natural vegetation.*

In addition to creating smaller lawn areas and thereby reducing the amount of water used for lawn irrigation, "minimizing soil disturbance by maintaining natural vegetation will enhance groundwater recharge, reduce sediment and stormwater runoff, and subsequent siltation of nearby streams, lakes and ponds, and maintain habitat for native wildlife." *Guide to Lawn and Landscape Water Conservation* (Attachment 4). To minimize lawn areas and retain the benefits of naturally vegetated areas, the Town should consider the following approaches.

1.1.1. Adopt regulations in the Town's Zoning Ordinance establishing a threshold of acreage that can be cleared of natural vegetation, beyond which a special permit must be obtained. The threshold triggering special review could vary based on the zoning district and the land use involved. *See Guide to Lawn and Landscape Water Conservation* (Attachment 4) and the Cape Cod Commission's "Model Land Clearing, Grading and Specimen Tree Protection Bylaw," which requires special review of projects involving land clearing of an area greater than 40,000 square feet.

1.1.2. Adopt regulations in Subdivision and Site Plan Review Ordinances governing the amount of land that can be cleared of natural vegetation. Also adopt regulations in the Subdivision Ordinance requiring that if a parcel has been cleared of vegetation within a certain number of years, portions thereof must be re-vegetated with native plant species to comply with natural-vegetation requirements. Also consider amending the Subdivision Ordinance to require that restrictions be included in individual homeowners' deeds to ensure designated natural-vegetation areas are not cleared in the future.

1.2 *Require at least 6 inches of clean, top-soil loam for areas that are cleared of natural vegetation and replaced with lawns.*

The *Guide to Lawn and Landscape Water Conservation* recommends that a minimum of 6 inches of loam be required under lawn areas, because deep soils hold moisture better (requiring less watering) and improves drought tolerance for grasses. Because topsoil is a valuable commodity, it is not unusual for it to be removed during the development process and replaced with inadequate loam. The Town can address this in the following ways.

1.2.1. Adopt site plan review and zoning regulations requiring that during the development of a site, sufficient topsoil from the site be retained and spread to a depth of at least 6 inches on all areas to be landscaped with lawn.

1.2.2. Amend § 235-8B(3)(b)[1] to require a minimum thickness of topsoil of 6 inches, rather than four, for open space landscaping, and that the topsoil be retained from the site.

2. REGULATE THE INSTALLATION AND USE OF IN-GROUND AUTOMATIC SPRINKLER SYSTEMS

In-ground automatic sprinkler systems can, individually and cumulatively, result in significant water use. Plaistow should consider the following approaches to minimizing the amount of water consumed as a result of lawn irrigation.

2.1 *Restrict the installation of new in-ground automatic sprinkler systems.*

This could be accomplished in one of the following ways.

2.1.1. Adopt an ordinance banning, or establishing a moratorium on, the installation of in-ground automatic sprinkler systems.

2.1.2. Adopt subdivision and site plan review regulations establishing maximum land areas that can be serviced by an automatic sprinkler system.

2.2 ***Regulate the operation of automatic sprinkler systems.***

2.2.1. Require in-ground irrigation systems to have rain shut-off devices, to prevent automatic watering when it is not needed.

2.2.2. Require in-ground irrigation systems to have moisture sensors, to prevent automatic watering when it is not needed.

2.2.3. Require in-ground irrigation systems to be programmable to allow watering consistent with any outdoor water-use restrictions that the Town may adopt.

ADDITIONAL SAFEGUARDS FOR PROTECTING GROUNDWATER QUANTITY AND QUALITY

1. LARGE DEVELOPMENT PROJECTS

As recommended in Plaistow's Master Plan Update, the town should require Environmental Impact Assessments for large development projects (the Master Plan Update recommends that this requirement apply to projects greater than 45,000 square feet or 200 parking spaces). Such assessments can be invaluable tools for assessing the direct, indirect and cumulative environmental consequences of large development projects. Such assessments should, among those environmental consequences, specifically address groundwater quality and quantity impacts.

2. FUEL LINES AS PART OF MANUFACTURED-HOMES CONSTRUCTION

Section 235-41C of the Town's subdivision regulations addresses fuel service and storage for manufactured housing. Fuel lines embedded in concrete construction materials can result in undetected fuel-oil leaks and contamination of soils and groundwater. This section should be amended to explicitly address this concern, and to ensure that fuel lines are not installed or fastened in a way that could lead to damage to, or corrosion of, fuel-oil lines, and/or undetected fuel-oil leaks.

3. UPDATE ALL REGULATIONS TO REFER TO THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES.

Plaistow's current regulations contain numerous references to the Division of Water Supply and Pollution Control. As a result of a statutory re-organization of the Department of Environmental Services, this Division no longer exists. All references to this Division should be replaced with "Department of Environmental Services" or "DES".