Natural Features Analysis

Adopted December 8, 1998

NATURAL FEATURES ANALYSIS

INTRODUCTION

The natural features section of the Master Plan uses the environmental criteria of topography, slopes, soils, and water resources to evaluate the Town's land area and its potential for development. Although natural features can often enhance a particular development site, they just as often pose significant barriers to development. This can be seen by examining where existing development has occurred. It is true that transportation routes are an important factor in the location of development, however, the location of roads and railroads are also determined by the natural features of the land.

This section will enable the Planning Board to identify areas of the Town that are most suitable for development and evaluate the existing limitations of the land that would impede development. Environmental limitations may include steep slopes, seasonally wet soils, wetlands, flood-plains, shallow bedrock, and underground aquifers. This section will also point out areas which deserve protection due to the environmental function of the land, for example a specific wetland area that provides flood water storage during times of heavy rain. In addition, this section will point out specific areas which the Town may wish to conserve for future community use due to their aesthetic or historic qualities. Not all open space needs to be steep slopes or wetlands. Some may be prime lands set aside for future school sites, parks, intensive farming methods or other limited low intensity land uses that add value to the overall community.

Walpole has many natural features which make the Town a very desirable place to live. Outside of its typical New England village center, the Town is still quite rural with many rolling hills, green fields, and streams. Walpole is also in close proximity to Keene and Brattleboro, Vermont, two regional economic centers. Outside of the village center, lots are often five acres or more in size. As the value of land increases, there is greater motivation to subdivide large parcels into smaller lots. **USING THIS NATURAL FEATURES SECTION WILL ASSIST THE COMMUNITY AND ITS PLANNING BOARD IN ESTABLISHING WHERE THEY WANT GROWTH TO OCCUR WHILE THEY ENDEAVOR TO PRESERVE THE NATURAL ENVIRONMENT CURRENTLY ENJOYED BY THE RESIDENTS.**

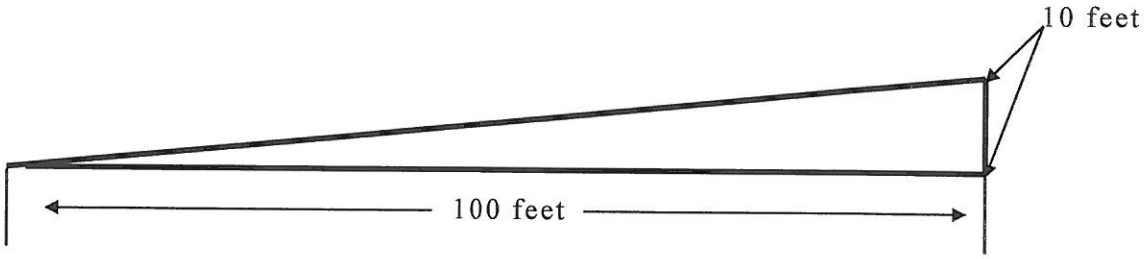
I. Topography

Walpole's eastern half has a rugged, mountainous terrain compared with the relatively flat, clear land in the west along the Connecticut River. Steep slopes are a common feature of the Town's eastern half; also, exposed bedrock can be seen in some places. The Town's western half does have some hills with steep slopes, however, as one moves toward the Connecticut River the land becomes flatter. The North Walpole area is a mirror image of the Town, with steep slopes dominating the eastern half and flat land throughout the western half. Derry Hill is Walpole's highest point of elevation at approximately 1,500 feet.

There are numerous streams which flow in an east to west direction, draining from the mountainous eastern section to the Connecticut River. Based on the soil properties of the land, there is an abundance of prime farm land along the banks of the Connecticut River. However, much of this land is vulnerable to flooding.

II. Slope

Slope is a major consideration when examining the Town in respect to future development. Slope refers to the gradient or steepness of the land. The slope of land is defined as the change in elevation (vertical distance) over horizontal distance; the more abrupt the change in elevation, the steeper the slope. Slope is measured and expressed as a percentage that represents the relationship between elevation and horizontal distance. Below is an example of an 10% slope, which means that in 100 feet of horizontal distance, the grade has risen 10 feet.



The Walpole Slope Map was prepared by enlarging the Walpole portion of a US Geological Survey topographic map (Bellows Falls quadrangle, prepared by the USGS in 1957) to a scale of one inch equals 1,000 feet. The contours of the map were then evaluated in terms of three slope categories: 0 - 8% slopes, 8 - 15% slopes, and over 15% slopes. The amount of land falling within these categories was then measured using a planimeter.

A. Development Capability

Land in the 0-8% slope category is preferred for all types of development. Gradual slopes are most favorable for building roads, and public water and sewer systems can be installed at the least cost to the community. Also, excavations for most structures can be done at a minimal cost and the erosion associated with such work can be reduced easily on site. The exceptions to this would be wetlands and floodplains because they occur primarily in the 0-5% slope range. An examination should be made as to the environmental function of these wetland areas and what risks might be inherent in their development before such lands are utilized for building sites.

As slope increases to the 8-15% category, land is less suitable for intensive development. Carefully placed residential dwellings and some farm uses (orchards and field crops) are appropriate for this terrain. As development approaches a 15% gradient, it requires more careful consideration for all types of development.

Once a slope exceeds a 15% gradient, development should be closely monitored. These areas have benefits as conservation areas for low intensity recreational uses and wildlife habitats. Also, their disturbance has the potential for serious erosion problems. Forestry practices on such slopes must be low impact, with proper erosion controls, minimal basal area cutting (definitely no clear cutting), and skid roads designed for steep slope harvesting.

When developing steep terrain, the potential for environmental damage increases as the degree of slope increases. Overly steep slopes consisting of sands and gravels left after the excavation of an area will quickly gully and erode. Erosion control barriers should be in place at the time of excavation and prompt reseeding and regrading should take place afterwards. Surface water run-off rates and erodability factors increase as the slope steepens. This will cause sedimentation of the lands downslope and clog stream channels and rivers if no erosion controls are in place. In Walpole where steep terrain and soils with low infiltration rates combine together to produce high run-off rates, soil erosion could be a major problem for future development in Walpole.

Slope is the major limiting factor for development in Walpole. Approximately 44% of the Town is covered by slopes of 15% or greater. This translates into about 10,504 acres of land. However, some of these steep areas have soil properties that are considered high in terms of development potential. Many areas along the Town's

numerous side slopes contain deep soil deposits and are well drained. Despite having favorable soil properties, these areas still have considerable erosion potential and need to be carefully evaluated during the development review process.

There are several large land areas located towards the west side of Walpole, along the banks of the Connecticut River, which are relatively flat and have good soil properties. However, many of these soils are also considered "important farmland soils" according to the Cheshire County Conservation District. **These farmland soils are quite suitable for development, however, they are more suitable for farming. As Walpole continues to grow, there will be increased pressure to develop these farmland soils for residential, commercial, and/or industrial purposes.**

The substantial amount of steep slopes in Walpole makes the issue of hillside development a critical one. Development proposals located along the Town's numerous hillsides should be evaluated in terms of potential soil erosion, septic system placement, water well placement, roadway and driveway construction, and surface water run-off potential. Soil properties should be considered in conjunction with slope gradients when evaluating a site's erosion potential.

III. Soils

Soil information by type is illustrated on the Walpole Soils Map, which was prepared by the Southwest Region Planning Commission in 1989, by assembling and matching individual soil survey sheets within the boundaries of the Walpole Base Map. Soils information for Walpole came from the following sources:

* Soil descriptions and mapping:

  Soil Survey of Cheshire County, New Hampshire, published by the US Department of Agriculture, Natural Resources Conservation Service (formerly, and published under the name of Soil Conservation Service), June 1989.

* Soil development capability:

  Soil Potential Ratings for Development; Cheshire County, NH, prepared by the Cheshire County Conservation District in August of 1984.

Despite the Town's numerous steep sloping areas, approximately half of Walpole's land area contains soil properties which are suitable for development. This is significant to note in light of the fact that almost half of the Town's land area contains prohibitive slope gradients. Many of these sloping areas contain deep, well drained soil deposits with bedrock well below the surface; thus the soil is rated high in terms of development potential. However, slope is still the limiting factor. Although the soil properties are suitable for development, the potential for erosion and increased surface water run-off rates are inherent factors in the development of steep sloping areas. Therefore, erosion control and stormwater management plans are highly recommended for any development within areas containing slope gradients of 15% or greater.

The Town's largest patch of unsuitable soils begins along the west bank of the Cold River and extends north, covering Mount Kilburn, Fall Mountain, and the majority of North Walpole. The restrictive features here are slope and bedrock. Along the banks of the Connecticut River there are several large areas of productive farmland soils.

Many of these farmland soils are quite suitable for other types of development. However, the majority of farmland soils which directly abut the Connecticut River are subject to flooding, thus making them unsuitable for development. Unsuitable soil properties can also be found on Hitchcock Mountain, Derry Hill, Kingsbury Hill, and along portions of the Cold River, Great Brook and Houghton Brook. The restrictive features in the mountainous areas include slope and bedrock, while the restrictive features along the riverbanks include wetlands and floodplains.

A. Steep Soils

Walpole contains several soil groups associated with steep slopes. These soils are found on the sides of hills, along ridgetops and as rocky outcrops void of soil cover. They are described below.

Symbol	*Soil Type*	*Characteristics*
26E	Windsor	loamy fine sand, 15 to 50% slopes
60D	Tunbridge-Berkshire	stony fine sandy loams, 15 to 25% slopes
61D	Tunbridge-Lyman	rock outcrop, 15 to 25% slopes
72D	Berkshire	fine sandy loam, 15 to 25% slopes
161E	Lyman-Tunbridge	rock outcrop, 25 to 50% slopes
230E	Poocham	very fine sandy loam, 15 to 50% slopes
330D	Bernardston	silt loam, 15 to 25% slopes
331D	Bernardston	stony silt loam, 15 to 25% slopes
331E	Bernardston	stony silt loam, 25 to 50% slopes
360D	Cardigan-Kearsarge	silt loams, 15 to 25% slopes
361D	Cardigan-Kearsarge	rock outcrop, 15 to 25% slopes
362E	Kearsarge-Cardigan	rock outcrop, 25 to 50% slopes
366D	Dutchess	silt loam, 15 to 25% slopes
367D	Dutchess	stony silt loam, 15 to 25% slopes
367E	Dutchess	stony silt loam, 25 to 50% slopes
510E	Hoosic	gravelly fine sandy loam, 15 to 25% slopes

When looking at the publication, Soil Potential Ratings for Development; Cheshire County (prepared by the Cheshire County Conservation District in 1984), one will notice that the soil symbols are followed by the letters B, C, D, or E. These letters represent the percentage of slope that is associated with a particular soil type. Below are the expressions of slope used in this publication plus their corresponding development capability.

	SLOPE	*DEVELOPMENT CAPABILITY*
	0-5%	higher density
B	5-8%	higher density
C	8-15%	less intensive
D	15-25%	limited capability
E	over 25%	prohibitive

Preparing the Walpole Slope Map involved combining several of the previously mentioned slope categories. This is especially true in the case of slope categories D & E (15-25% slopes and over 25% slopes respectively). It is important that the topographic and slope maps be used in conjunction with the soils map, so the letter symbols on the soils map and the actual topographic lines can be compared. An on-site analysis should take place when the topographic maps and the associated soil symbols are in question.

B. Floodplain Soils

According to the Cheshire County Soil Survey, Walpole does not contain a large amount of floodplain soils. Only 944 acres (or slightly less than 4% of the Town's total land mass) can be described as having floodplain soil characteristics. These areas are scattered throughout town, however, there are several large patches of floodplain soils along the banks of Blanchard Brook, Great Brook, the Cold River, and the Connecticut River. Floodplain soils in Walpole include:

Symbol	*Soil Type*	*Characteristics*
2	Suncook	loamy fine sand
4	Pootatuck	fine sandy loam
5	Rippowam	fine sandy loam
6	Saco	mucky silt loam
9	Winooski	silt loam
107	Rippowam-Saco	sandy silt loam
108	Hadley	silt loam
109	Limerick	silt loam
401	Occum	fine sandy loam

The Town of Walpole participates in the National Flood Insurance Program sponsored by the Federal Emergency Management Agency (FEMA). The extent of Walpole's floodplains were mapped by FEMA in 1981. The FEMA maps were combined onto one map by Commission personnel in 1989, and the acres of floodplains were measured using a planimeter. The FEMA maps show a significantly larger amount of floodprone areas than the County Soil Survey, although differences in methodology must be taken into account, as well as an expected margin of error from using photocopied maps. The FEMA maps show 1,440 acres of 100-year flood areas and 340 acres of 500-year flood areas. According to FEMA, 100-year flood areas have a 1 percent chance of being flooded in any given year, and 500-year flood areas have a 0.2% chance of being flooded in any given year.

C. Wetland Soils

The Natural Resources Conservation Service describes wetland soils as those soils which are poorly drained or very poorly drained (including muck and peat). Walpole has very few wetland soil areas. Only 1,226 acres (or 5.1% of the Town's total land area) can be described as having wetland soil characteristics. This wetland acreage total can be broken down into 955 acres of poorly drained soils and 271 acres of very poorly drained soils.

The Wetlands Map shows several small patches of wetland soils scattered throughout the Town, with concentrations along the banks of Houghton Brook, Great Brook, Blanchard Brook, and the Cold River. Wetland soils in Walpole include floodplain soil symbols 5, 6, 107 and 109 which are described on the previous page. Other wetland soils in Walpole include:

Symbol	*Soil Type*	*Characteristics*
5	Rippowam	fine sandy loam
6	Saco	mucky silt loam
107	Rippowam-Saco	sandy silt loam
109	Limerick	silt loam
197	Borohemists	ponded
214	Naumburg	loamy fine sand
295	Greenwood	mucky peat
340B	Stissing	silt loam
341B	Stissing	stony silt loam
347B	Lyme	stony fine sandy loam
395	Chocorua	mucky peat
414	Moosilauke	fine sandy loam
495	Ossipee	mucky peat
533	Raynham	silt loam

IV. Soil Development Potential

A Soil Potential for Development Map was created, using the soils information described above. According to this map, Walpole has a number of suitable soil areas scattered throughout Town, with the exception of the Fall Mountain/Mount Kilburn area in North Walpole. Many of the suitable soil areas occur on hill-sides as deep deposits of quality soil. Hillside development does create the potential for erosion, however, this can be mitigated if proper erosion controls are in place. As mentioned previously, the banks of the Connecticut River are covered by prime farmland soils. However, many of these farmland soils (the ones outside of the floodplain) are rated quite high in terms of development potential. Thus, although farming would be the ideal use of these soils, they are also quite suitable for other types of development. According to the Cheshire County Conservation District, the soils in Walpole rated high in terms of development potential include:

Symbol	*Soil Type*	*Characteristics*
24A	Agawam	very fine sandy loam, 0-3% slopes,important farmland soil
24B	Agawam	very fine sandy loam, 3-8% slopes, important farmland soil
24C	Agawam	very fine sandy loam, 8-15% slopes
26A	Windsor	loamy fine sand, 0-3% slopes
26B	Windsor	loamy fine sand, 3-8% slopes
26C	Windsor	loamy fine sand, 8-15% slopes
30A	Unadilla	very fine sandy loam,0-3% slopes, important farmland soil
30B	Unadilla	very fine sandy loam, 3-8% slopes, important farmland soil
72D	Berkshire	fine sandy loam, 15-25% slopes
331C	Bernardston	stony silt loam, 8-5% slopes
336B	Pittstown	stony silt loam, 3-8% slopes
366C	Dutchess	silt loam, 8-15% slopes, important farmland soil
366D	Dutchess	silt loam, 15-25% slopes
367C	Dutchess	stony silt loam, 8-15% slopes
367D	Dutchess	stony silt loam, 15-25% slopes

Some of the soils in this category are unique in terms of development potential. Many are prime agricultural soils that could also be utilized for residential, commercial, or industrial development. Although there may be specific costs associated with developing a certain soil in this category, the soil limitations can be mitigated by designing structures and systems to suit the site. (Although many of the above soils occur on land that is not particularly level, the restriction posed by excessive slope can be minimized through the use of erosion control techniques.

There are three rating categories developed by the Natural Resource Conservation Service that are combined to form an overall development potential rating:

Septic systems with absorption fields	(40%)
Streets and roads	(30%)
Dwellings with basements	(30%)
Overall rating	**100%**

The Natural Resource Conservation Service considers the siting of on-site septic systems to be the most important development consideration; thus this category is given more weight in the rating system. NRCS classifies soils into five categories (very low, low, medium, high, and very high) based on development potential. However, for the purposes of this report and the accompanying Soil Potential for Development Map, the five categories have been combined to form three categories (low, medium, and high). Below is a more detailed description of each category.

Combined Potential	*Potential*	*Characteristics*
HIGH	Very High	Site conditions and the properties of the soils are favorable for development. Installation costs for water and sewer systems are low and maintenance costs for roads and utilities would be low as well. Foundation costs are also low.
	High	Development costs are slightly higher than for soils in the above class.
MEDIUM	Medium	Development costs at this level become significant. Overcoming soil limitations here may include specially designed septic systems, terracing to prevent soil erosion, or coping with seasonally high water tables or bedrock close to the surface when excavating or building.
LOW	Low	Development costs in these soils are very high and there may be more soil limitations to consider than with the other classes.
	Very Low	Severe soil limitations pose very high to almost prohibitive development costs.

Development limitations in Walpole are primarily due to steep slopes and thin soil cover. Floodplains along the Connecticut River are also a restriction, but to a lesser extent. Restrictive soil properties are scattered throughout the Town, however, large concentrations of restrictive soils are found in North Walpole, the Fall Mountain/Mount Kilburn area, the Chenney Hill area, Drew Mountain, Derry Hill, Watkins Hill, and along the banks of the Cold River, Great Brook, Houghton Brook, Blanchard Brook, and the Connecticut River.

Farmland soils may exist in a formation that is too small, inaccessible, or too big for today's small crop farms. Some of these soils may be suitable for only specific crops. The LESA (Agricultural Lands Evaluation and Site Assessment) manual should be consulted when a choice needs to be made regarding the use of one particular farmland over another, depending on whether the use is for farming or development. The LESA system was designed by the USDA, Soil Conservation Service. The LESA system is used by the Cheshire County Conservation District when preparing environmental impact statements for federal, state, or local agencies.

V. Water Resources

Walpole has a land area of approximately 37.3 square miles, or 23,872 acres. This can be broken down into 36 square miles (or 23,040 acres) of land and 1.3 square miles (or 832 acres) of surface water. Walpole does not have very many sizable waterbodies, however, several significant watercourses flow through Town. In addition, there are several large aquifers located along the banks of the Connecticut River. A detailed description of the Town's watersheds, waterbodies, watercourses, and aquifers is presented below.

A. Watersheds

The watershed is the principle focus in describing a surface water system. A watershed is the land area made up of a series of connecting higher ridges that drain surface water to the lowest point, which is where a stream or a river flows out of the watershed.

The land area that makes up Walpole is comprised of portions of three major watersheds: the Lower Connecticut River Watershed, the Cold River Watershed, and the Ashuelot River Watershed. All three watersheds drain into the Connecticut River Basin. The location and extent of these watersheds can be seen on the accompanying Surface Water Map. The map also shows all perennial watercourses and waterbodies within Town boundaries.

The majority of Walpole's land area (80%) falls within the Lower Connecticut River Watershed. The only areas of Town which do not fall within this watershed are: the North Walpole and Drewsville area, which falls within the Cold River Watershed; and a portion of land in the Town's southeast corner near Carpenter Hill, which falls within the Ashuelot River Watershed.

The steep sloping area of Walpole's eastern half forms a drainage pattern where surface water flows off the hills in a westerly direction, eventually flowing into the Connecticut River. The only exception to this is Merriam Brook, which is located in the Town's southeast corner and flows in an easterly direction into the Ashuelot River.

B. Watercourses

All told, there are 27 watercourses in Walpole, the most significant being the Connecticut River and the Cold River. The Cold River enters Walpole in two locations: the first spot is in Drewsville where the river darts into town and then back out into Langdon; it flows back into Walpole just north of the Whitcomb gravel operation, eventually emptying into the Connecticut River. This section of the Cold River is, in effect, the dividing line between Walpole and North Walpole.

Other significant watercourses include Houghton Brook in the southern portion of Town; Great Brook, which enters Walpole just north of Barnett Hill and flows in a southwesterly direction through Town; Mad Brook, which is in close proximity to the village area; and Blanchard Brook, which begins in two places in the Town's northern portion before it converges just south of the Walpole Valley Road. All of the above mentioned watercourses eventually empty into the Connecticut River.

C. Waterbodies

All told, there are 31 waterbodies scattered throughout Town. Walpole does not have any significant waterbodies, all are very small with the majority falling under five acres. The largest waterbody is Mill Pond, approximately 10 acres in size. With the exception of the man-made waterbodies near the airport, all of Walpole's ponds are connected to the streams and rivers which form the Town's drainage pattern. Walpole's waterbodies are not large enough to support the type of seasonal residential development associated with larger waterbodies across the State, nor are they significantly utilized for recreation.

D. Aquifers

Aquifers are a concentration of subsurface water, occurring in saturated soils and geological formations. Water is supplied through precipitation and surface water discharge. Water infiltrates the ground through an aerated zone where impurities are filtered out. The water then moves to a saturated zone where the pore spaces between soil particles are filled by the water, thus creating a saturated zone, called aquifers. It is very important that the earth's surface be able to transmit water so that a certain percentage can be stored underground as "groundwater". If excessive compaction or extensive covering of the earth's surface occurs, the amount of water which can reach the saturated zone and become groundwater is reduced.

Aquifers (concentrations of groundwater) are found where saturated layers are permeable, and the storage and transmission of water can take place. Aquifers having medium to high potential to yield groundwater occur in Southwest New Hampshire as alluvial deposits of sand and gravel (unconsolidated deposits) or in bedrock fractures (consolidated deposits).

The unconsolidated deposits, also called stratified drift deposits, contain sorted layers of gravel, sand, silt and clay. These materials have abundant pore space to store water, in fact, this pore space may amount to more than 30 percent of the deposit's total volume. Consequently, these stratified deposits of sand and gravel have become good sources of medium to high volume aquifers. This type of aquifer is found primarily along valley bottoms.

The consolidated deposits, or bedrock fractures, are a more productive water source when covered by a layer of sand and gravel. This allows recharge to occur directly from above. Bedrock fractures are usually adequate for domestic wells. In contrast, a till aquifer is usually low yielding and can have a short well life. This is due to a mixture of clay, silt, gravel and boulders which tends to compact due to the different soil particle sizes. The transmission and storage of water is greatly decreased in this type of aquifer.

Stratified drift aquifers can be either confined and unconfined. Confined aquifers have a layer of impermeable material, such as clay, over them. Unconfined aquifers are covered by a layer of permeable material so that recharge occurs directly from above. The water table (the top of the saturated zone) fluctuates depending on the volume of water stored within this zone. The confined system is under pressure due to the surface layer of clay and is resupplied where this layer is interrupted or terminates.

The US Geological Survey has recently completed aquifer delineation maps for the entire state of New Hampshire. The Walpole Aquifer Map was prepared from the USGS study, "Saturated Thickness, Transmissivity and Materials of Stratified-Drift Aquifers in the Lower Connecticut River Basin, Southwestern New Hampshire." The map is essentially a surficial geology map, showing the distribution of unconsolidated (stratified drift deposits) geologic material on the land surface. There do exist bedrock aquifers, but these were not mapped as part of this study.

The earlier information being replaced by this USGS study identified aquifers as having high, medium or low potential yields; this study identifies the boundaries of the sand and gravel (stratified drift) aquifers, and measures the rate of transmissivity - that is, the speed with which water passes through the materials - in increments of 1,000 feet squared per day; the map illustrates areas of less than 1,000 feet squared per day, 1 - 2,000 feet, 2 - 3,000 feet, and 3 - 4,000 feet, and over 4,000 feet squared per day. Transmissivity of less than 1,000 is considered suitable for single family homes, but not for public or community systems. The map also illustrates the depth of the aquifer, which relates to the potential for recharge. Since recharge is a function of saturated thickness and transmissivity, both factors need to be taken into account.

The map indicates that the primary aquifer area in Walpole follows the Cold River and the Connecticut River, being bounded in part by Blanchard Brook. There appear to be only two small areas with a transmissivity of greater than 4,000 feet squared per day: (1) in North Walpole between the railroad bed and the River; and (2) at the bend in the Connecticut west of the intersection of Route 12 and Upper Walpole Road. Both of these locations also contain the only areas identified as having transmissivities of 2 - 3,000 feet and 3 - 4,000 feet; these are quite small, however. The remainder of the town is underlain by till or bedrock, for which, as mentioned above, transmissivity has not been determined.

VI. Conservation and Preservation Techniques

A conservation and preservation analysis is the culmination of the natural features section of the Town's Master Plan. By analyzing and evaluating the Town's existing physical features such as topography (slopes), soil conditions, floodplains, and water resources, it is possible to identify areas within Walpole that have excellent development potential for residential and non-residential uses.

Conversely, it is also possible to identify environmentally sensitive areas within Walpole that should not be subject to intensive development pressure or activity. In fact, there are some areas that should be protected from almost all types of development activity because of unique or exceptional environmental considerations. When such areas are identified, it is desirable to protect them from intensive and/or extensive development activity through the application of various conservation and preservation techniques and land use management practices, such as the use of detailed performance standards and protective buffers and setbacks.

One important area of concern when looking at conservation and preservation has to do with how to manage development within critical resource areas. For the Town of Walpole, critical resource areas are primarily those that contain steep slopes, floodplains, and shoreland. Of the three, steep slopes are the Town's most significant development constraint. Under Walpole's current zoning arrangement, it is becoming increasingly difficult to find land in the outlying areas of Walpole that can accommodate a functioning septic system, a water well, and a building all within the space of an acre. When hilly areas of Town become developed, erosion problems and excessive surface water run-off can become more frequent unless the Town institutes protective measures. The following pages set forth the kinds of goals and objectives suggested by the Planning Board to address these two important areas, and further conservation and preservation techniques and strategies.

A. Steep Slopes

The discussion on slopes earlier in this chapter indicated that approximately 44% of Walpole's land area consists of slopes with a 15% gradient or greater. In an effort to refine this information, the Planning Board also examined slopes of greater than 25%, since it is at this degree of steepness that the most severe problems are likely to occur with development. This area is rather small by comparison, and is situated in parts of Town that are, for the most part, not accessible by any road. Therefore, the Planning Board does not see the need for a steep slope overlay protection district per se, but would rather continue to review any applicable proposals based on existing regulations.

B. Floodplain Development

Walpole intends to continue its participation in the National Flood Insurance Program administered by the Federal Emergency Management Agency. In the March 1990 Town Meeting, Walpole revised its floodplain development ordinance to conform with all federal requirements. For development occurring within the Town's floodplains, the Planning Board and the Selectmen will continue to enforce the strict construction standards outlined in the ordinance.

C. Shoreline Development

In 1991 the NH Legislature enacted the Comprehensive Shoreland Protection Act, which affects all lands within 250 feet of certain public waters. The intent of the law, relative to this master plan, is to: further the maintenance of safe and healthful conditions; provide for the wise utilization of water and related land resources;

prevent and control water pollution; conserve shoreline cover and points of access to inland waters; preserve the state's lakes in their natural habitat; promote wildlife habitat, scenic beauty, and scientific study; protect public use of waters, including recreation; conserve natural beauty and open spaces; and anticipate and respond to the impacts of development in shoreland areas.

D. Connecticut River Management and Protection

In 1992 the NH Legislature designated the Connecticut River into the New Hampshire Rivers Management and Protection Program. Through the Connecticut River Joint Commissions, five subcommittees were established along the River to ensure local leadership in implementing the Act; the Town of Walpole was included in the Wantastiquet Area Subcommittee. Toward this end, the Joint Commissions and these subcommittees developed a Corridor and Management Plan for the river in May of 1997. The Plan contains many recommendations for river management and protection, all of which are advisory, as is the Joint Commissions. The Plan describes a number of significant features of the river, identifies problems and potential challenges, and proposes objectives to meet the overall goal of river protection. A copy of this Plan has been forwarded to the Planning Board and Board of Selectmen in every riverfront town. The NH Legislature is working to authorize each riverfront town to adopt a locally-designed program for protecting the river and the shoreline. The Plan, as it stands, may now be adopted by local planning boards as an adjunct to the master plan, and may include methods of implementing any of the appropriate recommendations.

E. Connecticut River Scenic Byway

Another endeavor taking place along the River is the Tri-State Connecticut River Scenic Byway Program, a joint effort of New Hampshire, Vermont and Massachusetts. The purpose of this program is to identify a scenic corridor along the Connecticut River and then develop a Corridor Management Plan that would be geared, to large extent, toward promoting tourism in the Valley. While the goals of this program are not exclusively environmentally driven, the value of a healthy natural environment is tantamount to any successful effort to develop and market a Scenic Byway identity. As of this writing, the Management Plan is being drafted, and is scheduled to be presented to the riverfront towns in the Spring of 1998. As with the Management Plan for the river, any town that chose to do so could adopt the Plan and choose to implement any of the strategies that will be offered relative to the promotion of tourism - which will include strategies to protect the natural environment. This plan, when complete, will also be made available to the Town Planning Board and Board of Selectmen.

F. North Cheshire Branch Hiking Trail

A multi-use recreational trail has been developed along Walpole's portion of the abandoned railroad right of way, which was once the North Cheshire Branch of the B & M Railroad. This branch was abandoned by B & M in 1972, and purchased by the New Hampshire Department of Transportation. The DOT used federal funds for the purchase of the right-of-way, for the purpose of preserving the land for future transportation uses. Since 1995, volunteer efforts have resulted in the construction of bridges and upgrading the trailbed. The trail is managed by the Trails Bureau of the the NH Department of Resources and Economic Development, which has appointed the Friends of Pisgah as the regional coordinator for planning and management.

G. Scenic Road System

The establishment of a scenic road system would help preserve the rural character of several of the Town's Class V roads. As noted in the Transportation Section of this document, Walpole has several Class V gravel roads that do not meet the minimum width standards established by the New Hampshire Department of Transportation (NHDOT) for low volume, lightly traveled roads. Authorized by RSA 231: 157 & 158, towns in New Hampshire may vote to designate any of their local roads as Scenic. The effect of this designation is to require a public hearing before the Planning Board before any repair, maintenance, reconstruction or paving work is done within the right-of-way by either the Town itself or any public utility. This designation does not affect the rights of any landowner to do work on his/her own property. The law allows Planning Boards to adopt regulations specific to Scenic Roads. In Walpole, to date only one road - Farnum Road, has been designated as Scenic at Town Meeting.

H. Protected Lands

The accompanying Conservation and Preservation Map shows the location of several tracts of protected land in Walpole. A description of these lands is presented in the table on the following pages. The map also shows several tracts of land which are recommended for protection. Preserving these tracts from future development can be achieved through a number of methods, including:

1. ***Fee simple purchase*** - which simply means acquiring the property through negotiated purchase.

2. ***Purchase of development rights*** - under this approach, the owner gets to keep and use his land for various permitted uses that are consistent or compatible with conservation and preservation practices but he cannot develop the land for more intensive development activities.

In addition, other land acquisition programs can be pursued through non-profit groups such as the Trust for New Hampshire Lands, the Society for the Protection of New Hampshire Forests, the New Hampshire Audubon Society, and the Monadnock Conservancy.

CONCLUSION

The Natural Features section provides sufficient information for the Town to develop and maintain an on-going conservation and preservation plan. The information presented in this section can be used to:

1. Develop various environmental overlay zoning districts, which can prevent or minimize development activity in environmentally sensitive areas.

2. Help the Planning Board and developers make better and more informed decisions relative to how land can be best used to accommodate various development proposals and projects.

3. Assist the Conservation Commission and Planning Board in:

   (1) monitoring development activity;
   (2) monitoring the environmental integrity of the Town's critical resource areas;
   (3) continuing to identify natural and man-made features that should be protected;
   (4) developing an inventory of potential lands that could be preserved through various conservation and preservation techniques fostered and promoted by non-profit agencies listed previously.

4. Explore the feasibility of adopting environmental overlay districts to protect such natural features as wetlands and aquifers.

GOALS AND OBJECTIVES

GENERAL GOAL:

To protect and preserve the Town's critical resource areas in an effort to maintain a balance between the Town's existing and future development needs and its natural environment.

SPECIFIC OBJECTIVES:

1. As part of the update of the Land Use Plan, all development activity since 1986 within the floodplain areas will be examined.

2. The Planning Board will continue to rely on the submission of contour and erosion control information in its review of development applications.

3. The Planning Board will pursue the adoption of Driveway Regulations, in order to ensure that the construction of all driveways in Town, but in particular those on slopes of over 25%, will address issues of erosion and sediment control.

4. The Planning Board recommends that, at the building permit stage, when steep slopes are involved, the Conservation Commission should review the plans to ensure that erosion and sediment control are adequately addressed.

5. The Planning Board will pursue an amendment to the Subdivision Regulations that will require the identification of a safe driveway access for each newly-created lot.

6. The Planning Board will review all development applications within the critical areas identified in this section for potential environmental impacts, and recommend mitigation where appropriate.

7. Despite the absence of Scenic Road designations and accompanying regulations, the Planning Board recommends that necessary safety and widening and/or reconstruction projects on Town roads be accomplished in such a manner that the rural character of these roads is not compromised.

GENERAL GOAL:

To enrich the lives of Town residents by striving to improve the aesthetic quality and visual impact of the man-made environment as well as preserving and enhancing the attractive visual features of the natural environment.

SPECIFIC OBJECTIVES:

1. Protect the scenic elements of the Town's natural environment such as steep slopes, hilltops, waterbodies, streams and rivers, particularly the areas adjacent to Walpole's portion of the Connecticut River and the Cold River.

2. Encourage the underground placement of utilities when and where practical; and when underground placement is not practical, utilize design and landscaping techniques to blend such facilities with the natural environment to minimize their obtrusiveness. In the case of wireless communications facilities, all reasonable efforts should be made to minimize the visual effect of towers and any appurtenances.

3. Encourage the use of aesthetically pleasing landscaping practices to enhance the visual quality of the man-made environment. In appropriate cases, the Planning Board may request landscaping plans to be submitted as part of development applications.

4. Encourage aesthetics and attractive designs of signs in terms of number, type, size and location.

PROTECTED LANDS WITHIN THE TOWN OF WALPOLE

I.D. #	Description	Approx. Acreage	Tax Map Location	Special Features
1.	Mason Forest (Gift-1951-Fanny Mason). Owner: Town of Walpole.	237	M7-L5 M7-L6	Forest trails,highway rest areas, and wildlife habitat.
2.	Hooper Forest (Bequest-1926-George L. Hooper). Owner: Town of Walpole.	130	M11-L3	Forest recreation and wildlife,lean-to, camp site, and ski trails.
3.	Water Company Town Forest Owner: Town of Walpole	134	M11-L2	Woodland and wildlife area.
4.	Hooper Farm Woodland (Bequest-1926-George L. Hooper). Owner: Town of Walpole.	109	M8-L61 M8-L62 M8-L71	Woodland around golf course, garden lots, and beaver pond.
5.	Mill Pond Nature Sanctuary (Gift-1977, R.N. Johnson; Purchase-1977, Lottie Kilburn; Gift-1979-Hubbard Farms; Purchase-1989-Robert Galloway). Owner: Town of Walpole.	86	M10-L5 M12-L60	Nature trails and Wildlife habitat.
6.	Reservoir Town Forest Owner: Town of Walpole	54	M10-L32	Forest area, fishing and wildlife.
7.	Trombley Town Forest (Tax sale-1947). Owner: Town of Walpole.	24	M6-L26	High elevation, splendid view of countryside.
8.	The Pinnacle Town Forest (Tax sale). Owner: Town of Walpole.	23	M9-L22	Rocky peak with great view, trail through woods.

I.D. #	Description	Approx. Acreage	Tax Map Location	Special Features
9.	Merriam Town Forest (Gift-Memorial to Merriam Family) Owner: Town of Walpole.	12	M3-L48	Lovely stream and managed forest.
10.	Knapp Cranberry Meadow (Memorial Gift-Louisa and Fredrick Knapp). Owner: Town of Walpole.	10	M8-L71	Beaver pond.
11.	Academy Ravine, Bellow-Knapp Trail (Gift of Bellows Bellows and Knapp families-1928, memory of Henry Bellows and Fredrick Knapp; Gift-Mr. and Mrs. Alfred Bertin and Mr. and Mrs. Clair Rogers; Gift-Mr. and Mrs. C. Chickering). Owner: Town of Walpole.	12	M10-L47	Nature trail, May Alcott Falls. Great variety of shrubs, plants, and other vegetation.
12.	Conservation easement granted to Town by Beatrice Graves.	69	M7-L26	Agricultural, forestry and conservation use only. No commercial development.
13.	Conservation easement granted by Wright, Aldrich, and Hudson.	35	M4-L50-1	Agricultural, forestry, conservation uses only. No commercial development.
14.	"High Blue" area. Owner: Society for the Protection of NH Forests.	164	M6-L27 M6-L28	Open fields and woodlands. Great views of Green Mt., Mt. Monadnock and Connecticut Valley.
15.	Jacobs/Faulkner lot. Conservation easement granted to the Society for the Protection of NH Forests.	49	M3-L17	Open fields, beautiful views.

I.D. #	Description	Approx. Acreage	Tax Map Location	Special Features
16.	Dunshee Island (Great Island) Owner: NH Fish and Game Department	7	M7-L14	Nature study area
17.	River Front-Gift from Hubbard Farms. Owner: NH Fish and Game Department.	31	M10-L4	Frontage along the Connecticut River. Farmland and wildlife area.
18.	Conservation easement granted by Hubbard Farms to the NH Fish and Game Department.	8	M10-L4-1	Farmland and wildlife area.
19.	Agricultural preservation restriction given to the State of NH by by David A. Barrett	181.5 3.75 8.0 9.9	M4-L3-2 M4-L1-2 M4-L1-3 M4-L1-4	Agricultural use only. No Commercial development.

TOTAL ACREAGE OF PROTECTED LANDS IN WALPOLE: 1,397.15 acres.

LANDS RECOMMENDED FOR PROTECTION

1. The Sheep Hill Area - Wildlife habitat and nature trails.

2. Fay Falls - A natural falls area along Houghton Brook.

3. The Derry Hill Area - Wildlife habitat and nature trails.

4. Walpole Town Well - This is the land area around the Town's well located off of Watkins Hill Road, along Great Brook.

5. Great Brook Watershed Protection Corridor - This includes land along either side of Great Brook, beginning near Ramsey Hill, and ending at the Town's well located off of Watkins Hill.

6. The Eaton Hill Area - Wildlife habitat and nature trails.

7. The Mad Brook Watershed Protection Corridor - This includes land along either side of Mad Brook, beginning near the end of Reservoir Road, and ending where the Brook meets the downtown area.

8. The Eaton Hills West Area - Wildlife habitat and nature trails.

9. The Cheney Hill Area - Wildlife habitat and nature area.

10. The Blanchard Brook Watershed Protection Corridor - This includes land along either side of Blanchard Brook, beginning at the base of Hitchcock Mountain, and ending at the Blanchard Brook Dam and Mill Pond diversion canal. Special features to protect within this corridor include the Blanchard Brook Dam and Blanchard's Falls.