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Town of Walpole  
Aquifer Protection Study  
July 1985

Prepared For:  
Town of Walpole

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REFERENCE



## CONTENTS

1.0	INTRODUCTION	1
2.0	METHOD	1
3.0	AQUIFER DELINEATION	2
3.1	Surficial Geology	2
3.2.0	Regional Hydrogeologic Setting	4
3.2.1	Saturated Thickness	5
3.2.2	Recharge	6
3.2.2	Safe Yield	7
3.2.4	Groundwater-Surface Water Interaction	7
3.3.0	Hydrogeologic Description of Aquifer Areas	8
3.3.1	Groundwater Movement	9
4.0	LAND USE SURVEY	10
4.1	Restrictive Land Uses	10
4.1.1	Hazardous Waste	10
4.1.2	Septic Systems	11
4.2	Aquifer Protection and Land Usage	11
4.2.1	Open Space	11
4.2.2	Residential	12
4.2.3	Commercial/Industrial	12
4.2.4	Highways	13
4.2.5	Right-of-Ways	14
4.3.	Town-Wide Aquifer Protection Legislation	15
5.0	TEST DRILLING PROGRAM	15
5.1.	Possible Aquifer Areas Which Were Not Drilled	16
6.0	GROUNDWATER FLOW MODEL	18
7.0	Selected References	20



<u>Test Well No.</u>	<u>Depth (in feet)</u>	<u>Description</u>	<u>Water Table</u>	<u>Pumping Rate</u>
19	0-19 19-25 25-35 35	c sand silt m/c sand refusal	7 feet 1"	23 gpm
20	0-22 22	silt/pebbles refusal	well not pumped	-----
21	0-3 3	silt/pebbles refusal	well not pumped	-----
22	0-15 15-39 39	f/sand m/sand refusal	6"	45gpm
23	0-15 15-37 37	clay/silt m sand/gravel refusal	well not pumped	-----
24	0-11 11-20 20-41 41	f/c sand silt/vc sand med sand/gravel refusal	1 foot 8"	57 gpm
25	0-10 10-13 13-20 20-27 27-41 41	peat clay/m sand m sand m/c sand m sand/gravel refusal	4"	7 gpm
26	0-3 3-7 7-21 21	peat silt/f sand f/c sand refusal	well not pumped	-----

## APPENDICES

1. Town-Wide Aquifer Protection Legislation
2. Test Well Logs

## LIST OF MAPS

1. Surficial Geology
2. Water Table Topography
3. Groundwater Supply Favorability
4. Land Use
5. Water Resource Protection District

## 1.0 INTRODUCTION

IEP, Inc., was retained by the Town of Walpole in January of 1985 to undertake a hydrogeologic assessment of the Town, which would supplement the School Meadow Brook Aquifer study completed by IEP in 1983. The purpose of this study was two-fold: (1) to define and protect the Mine Brook Aquifer, presently utilized by the Town, and (2) to define and protect any other viable water resource for future drinking water supply. The investigation was to identify, through the use of geologic maps, hydrogeologic analysis and exploration drilling, the location and physical characteristics of these aquifers. A land use survey of areas critical to protection of the aquifers was performed.

The intent of the report is to: (1) identify potential sites for municipal well location, (2) provide the town with a prioritized list of immediate recommendations for aquifer protection and (3) serve as the required basis for funding of land purchase under the DEQE Chapter 286 Aquifer Land Aquisition Program.

## 2.0 METHOD

This study was divided into three phases. Phase 1 entailed the delineation of the town's aquifers and the determination of their physical characteristics. A map of the surficial geology of the Town was generated using available USGS surficial maps, the surficial map produced by IEP for the School Meadow Brook study, and supplemental field mapping by IEP geologists. Available subsurface data was gathered from test boring and production well logs, seismic surveys, highway borings, and local well drillers. These data sources are listed in the references. This data was supplemented with the results of extensive test drilling, conducted under the supervision of IEP personnel by the R.E. Chapman Co., at points identified after the data compilation as being likely to have favorable hydrogeologic properties. All of this data was incorporated into a groundwater favorability map, which defines watershed divides and depicts the saturated thickness of the aquifers. The hydraulic properties of the Mine Brook aquifer was determined using test well pumping data and long term pumping records. Numerical computer pumping was used to simulate the effects of well pumpage under varying conditions.

Phase 2 consisted of the preparation of a Land Use Survey. This phase involved a review of the Town's zoning bylaws, followed by identification of existing industrial and other potentially hazardous land uses within the primary and secondary recharge areas for the Town's aquifers.

In Phase 3, sites with potential for development as municipal water supplies were identified. Recommendations for the monitoring and protection of groundwater quality at these sites were formulated. A map showing significant groundwater areas, including areas which contribute groundwater

to the existing Mine Brook wells or would contribute groundwater to the proposed well sites, as well as land parcels recommended for purchase under the Chapter 286 program, was prepared.

### 3.0 AQUIFER DELINEATION

This phase involved (1) mapping and evaluation of the surficial geology of the watershed, (2) describing the regional hydrogeologic setting, and (3) preparing a groundwater favorability map showing the aquifer's saturated thickness and potential high-yield well areas.

#### 3.1 Surficial Geology

The purpose of the surficial geologic investigation was to determine the mode of deposition of the unconsolidated sediments which overlie bedrock. The understanding of the glacial geologic processes responsible for the deposition of these sediments allows the geologist to predict the physical properties of these deposits in areas or at depths where direct examination is not feasible. Knowledge of these physical properties (e.g. grain size, sorting, compaction) is essential to the understanding of the hydraulic properties of the groundwater aquifer. Predictions generated from the surficial geologic investigation, coupled with existing test well records, can be used to locate those areas in the aquifer which are most favorable for development - areas with roughly 40 feet or more of saturated, coarse-grained sand and gravel.

Glacial processes in Walpole had 2 major effects: (1) the pre-existing bedrock topography was scoured and eroded, and (2) the bedrock surface was covered by varying thicknesses of unconsolidated deposits. Although New England was glaciated numerous times during the Pleistocene Epoch, only deposits of the last glaciation, the Late Wisconsin, are recognized in Walpole. This glaciation began about 26,000 years ago and ended about 13,000 years ago.

The movement of the glacial ice scoured and eroded the land surface, removing material and incorporating it into the ice. During glacial advance, the abrasive action of the ice and its included material scoured and deepened the bedrock valley underlying Mine Brook, which was later filled in with sediments as the ice retreated.

There are two broad classes of glacial deposits: till and stratified drift. Till, often called hardpan, is deposited directly by the glacial ice, with little or no interaction with meltwater. Till is comprised of all the material incorporated into the glacier as it advanced, and hence is an unsorted to poorly sorted mixture of sand, gravel and boulders, with some silt and clay. Till plastered on the surface of the bedrock by the moving ice is called lodgement till, while till deposited directly as the ice wastes (melts) is called ablation till. Till deposits immediately overlie

bedrock and are generally less than 20 feet in thickness, although they may be up to 200 feet thick in elongate till hills known as drumlins. Glacial till is generally very dense and does not readily transmit groundwater. Because of its low permeability and infiltration rates, till units have little importance as groundwater aquifers or recharge areas. Well yields from till are generally less than 10 gallons per minute (gpm), which is too low for a municipal well.

Stratified drift deposits are comprised of material, originally caught up in the ice during its journey south, that was freed from the glacier and transported by meltwater streams. The streams' energy served to sort the material by grain size - in faster flowing streams, coarse materials were deposited, while finer materials were carried downstream. These finer materials were eventually deposited when the stream lost its energy, either by slowing down or flowing into glacial lakes. Because the finer-grained material has been winnowed from them by meltwater, the coarser stratified drift materials are relatively permeable, making them more desirable groundwater aquifers and more effective aquifer recharge areas. Stratified drift is usually underlain by till.

Deglaciation begins when the climate warms enough to cause the rate of melting at the ice front to exceed the rate of ice production in glacial source regions. As the glacial ice front retreated from south to north through Walpole during deglaciation, a margin of stagnant ice developed beyond the active ice front. During this time, large amounts of sediment-laden water flowed on, in, under, along, and out of the ice front. In the stagnant ice zone, depressions and cracks developed and were enlarged due to melting. These holes were filled with stream-sorted sands and gravels. Other sand and gravel deposits were laid down by streams flowing along the ice margin, out the ice front, etc. These ice-contact stratified drift deposits, which were left as free standing piles of sand and gravel when ice melting was complete, are collectively called kame deposits or kames. Subglacial stream channels were gradually filled with coarse materials, leaving (after the ice melted) sinuous ridges known as eskers. Well-sorted deltaic deposits were formed when meltwater streams flowed into temporary lakes, which were often formed by ice or till dams in valleys. Finer sand, silt and clay was deposited on the bottoms of these lakes. Residual ice blocks were surrounded by sediments deposited by meltwater flowing around them. These blocks eventually melted away, leaving depressions known as kettle holes.

The kame and esker deposits are the coarsest and most permeable surficial deposits in the Town, and are therefore the most favorable for groundwater resource development.

The present day topography created by these processes consists of kame terraces draped against the till/bedrock upland hill, with kames and eskers leading down from them to the valleys. Depositional sequences were

determined by examining the range, elevation and texture of these deposits. Their designation and range of elevations is as follows:

Qfc <sub>1</sub>	240 - 290
Qfc <sub>2</sub>	210 - 250
Qflc <sub>3</sub>	140 - 230
Qflc <sub>4</sub>	101 - 230
Qfc <sub>u</sub>	120 - 210

Each sequence is labelled with a set of symbols which define the sedimentary environment or environments in which it formed as well as its age relative to other similar sequences in the Walpole area. The symbol "Q" identifies the Quaternary period. The symbols "f", "l", "c", "n" and "u" stand for fluvial (stream), lacustrine (lake), ice-contact, non-ice contact and undifferentiated environments, respectively. Thus, the symbol Qflc<sub>2</sub> defines a morphological sequence of Quaternary age, formed in a fluvio-lacustrine environment in contact with the glacial ice, which was the second such sequence to form in this area. These symbols have been used on the Surficial Geology Map (fig. 1).

The sequence defined as Qfc<sub>1</sub> includes a discontinuous ridge which is an esker and a relatively planar surface which is a kame terrace. Qfc<sub>2</sub> contains similar deposits as well as several kettle holes. Qflc<sub>3</sub> also contains deposits similar to those in Qfc<sub>1</sub>; however, on a regional scale the dominant feature is a large expanse of relatively flat topography, underlain primarily by fine-grained sediments deposited in a temporary lake which contained waters trapped by bedrock highs to the south and an ice dam to the northeast. Topography in the Qflc<sub>4</sub> sequence is the most varied. The most important feature of this sequence, in terms of water supply, is the "head of outwash" in Mine Brook's valley, which is an area of irregular topography formed near the margin of the melting ice. Meltwater flowing from the ice carried away most of the fine material, leaving permeable deposits of sand and gravel. This sequence also contains eskers, kame terraces, and other types of deposits.

The existing municipal wells are located in Qflc<sub>3</sub> and Qflc<sub>4</sub> in the School Meadow Brook Aquifer and in Qflc<sub>3</sub> in the Mine Brook Aquifer. These same units serve as the major source of groundwater recharge to the wells.

### 3.2 Regional Hydrogeologic Setting

The Town currently exploits two aquifers: the School Meadow Brook Aquifer and the Mine Brook Aquifer. A hydrogeologic study of the School Meadow Brook aquifer was completed by IEP in 1983. This study was confined to other areas of stratified drift in the town, because the permeabilities of till units are too low for them to serve as municipal water supplies. Areas of stratified drift in the Town (which are delineated on the Surficial Geology Map) include School Meadow and Mine Brook valleys, most of the

Neponset valley including the Cedar Swamp area and the Bird Pond area, Traprock Brook valley, and the west side of Willett Pond.

### 3.2.1. Saturated Thickness

In order to serve as a water supply, a unit must not only be sufficiently permeable to transmit water to a well but must also have a sufficient thickness of water-saturated material to transmit large volumes of water to that well. (Permeability is measured in gallons per day per square foot. The permeability times the saturated thickness of the aquifer is the transmissivity, measured in gallons per day per foot. The transmissivity measures the ability of the entire thickness of the aquifer to transmit water to a well). A map of the saturated thickness of the Town's stratified drift deposits was prepared in the following manner: Available subsurface data was compiled. Primary data sources were the 1959 Fay, Spofford and Thorndike study, the 1966 Geraghty and Miller study, the 1973 USGS Hydrologic Report, roadway borings drilled during the design of I-95, and logs gathered from local well drillers. The saturated thickness of stratified sand and gravel was determined for these data points. A contour diagram of the saturated thickness of the town's aquifers was constructed using this data and information from the water table topography map (fig. 2). Because till deposits are too poorly permeable to yield significant quantities of water, till deposits are not considered part of the aquifer. Hence the "0" contour line on this figure has been defined as the surface expression of the geologic contact between till and stratified drift deposits. Test wells were installed under the supervision of IEP personnel in areas where the data base was not sufficient to properly construct the map. These additional data points were used to "fine-tune" the contours, which were then incorporated into fig. 3, the Groundwater Favorability Map. This map can be considered as a "location map" for the groundwater aquifers in the town.

Supplemental drilling was not conducted in areas, including the Bird Pond area and part of the Traprock Brook area, which could not be used for water supply by the Town due to regulations regarding proximity of specific land uses to water supplies. (This topic is discussed in section 4, the Land Use Survey).

Only aquifer deposits with roughly 40 feet or more of saturated stratified sand and gravel are recommended for further investigation for use as municipal water supplies. As is evident from fig. 3, both Mine Brook and School Meadow Brook valleys have sufficient saturated thicknesses to be considered aquifers. A small area in the Neponset valley near its confluence with School Meadow Brook also has the requisite thickness, although the rest of the valley, including the Cedar Swamp area, does not. It should be noted that there are few data points along the Neponset in the eastern side of the Town, so the saturated thickness values should be regarded as tentative in this area. No wells can be situated in this area

because of land use constraints. Because there is a potential well site in the western part of the Neponset valley in the Town, the stratified drift deposits in the valley should be regarded as the Neponset Aquifer. The area around Willett Pond has relatively thin saturated thicknesses and should not be regarded as a municipal aquifer. Although Traphole Brook has relatively thick deposits of stratified drift, the water table is fairly deep (approximately 20 feet) in much of this area, so the saturated thickness of sand and gravel is thin.

### 3.2.2. Recharge

Precipitation falling on these watersheds can be lost through direct evaporation or transpiration by plants (evapotranspiration), can percolate downward to the groundwater table, or can leave the watershed through surface flow. The amount percolating to the water table (recharge) depends on the infiltration capacity of the soils. Glacial till has a low infiltration capacity, so most of the precipitation runs off. Stratified sands and gravels have higher infiltration rates, allowing a greater percentage of the precipitation to recharge the aquifer. For this reason, stratified sands and gravels usually comprise the primary recharge areas for municipal wells located in glacial aquifers, and are the areas most important to groundwater protection.

The recharge areas for each of the aquifers in the Town has been taken to be the watersheds of the principal streams flowing through the aquifers (e.g., the recharge area of the Mine Brook Aquifer is the Mine Brook Watershed). Watershed divides are indicated on fig. 3. The recharge areas can be subdivided into primary and secondary recharge areas. The primary recharge areas include all of the exposed stratified drift deposits in the watersheds. As discussed above, most of the flow passing through the aquifer, which would supply any wells, is confined to these deposits. The secondary recharge area is considered to be that part of the watershed outside of the sand and gravel zone, including till and bedrock areas. The permeability and capacity for water storage of till is low, and the generally steeper slopes of till and bedrock areas foster greater runoff. This zone contributes ground and surface water to any wells within the watershed, but at a much slower rate than does the primary recharge area. Land usage within this zone must also be examined in order to protect the Town's water resources.

### 3.2.3. Safe Yield

In addition to discharge into surface water bodies and losses to evapotranspiration, groundwater may be discharged from the aquifer by well pumpage. It is essential, in order to maintain the water supply, that total groundwater discharge does not exceed the recharge to the aquifer. When discharge exceeds recharge, the water table lowers, resulting in a diminution of the water supply. The amount of water which can be pumped

from the aquifer without depleting it is termed the safe yield. The Massachusetts Dept. of Environmental Quality Engineering (DEQE) has estimated the safe yield of the Mine Brook Aquifer to be 4.0 million gallons per day (mgd), with yields of 6 mgd permissible for short periods of time. The yield of the Mine Brook Aquifer has been evenly apportioned between Medfield and Walpole, leaving Walpole with the right to take 3.0 mgd from this aquifer. The safe yield of the Neponset River Aquifer has not been calculated; however, the large size of the recharge area for this aquifer, coupled with the relative paucity of desirable well sites in it, render it unlikely that the safe yield will even be approached by municipal well development. The safe yields of other areas of stratified drift in the Town, where no well sites are recommended, were not calculated.

#### 3.2.4. Groundwater-Surface Water Interaction

Surface water and groundwater systems are directly interrelated and must be thought of as one complex hydrologic system. The existing municipal well sites in Walpole, and the sites recommended in this study, are all near surface water bodies. Groundwater quality can be severely affected by polluted surface waters, particularly near pumping wells, where a phenomenon known as induced infiltration can occur. During pumping, the water table surrounding the well is lowered (the "cone of depression"), causing the surface waters to be drawn downward and into the well along with groundwater. The rate of such recharge is controlled by the permeability of the sediments underlying the surface water body.

The present and proposed Mine Brook well sites are near wetland areas. Wetlands are important to the groundwater supply for two reasons. First, the wetlands and associated surface waters serve as a source of recharge by induced infiltration to the wells. Because the thick organic deposits that usually underlie wetlands have low vertical permeabilities, this induced recharge occurs slowly. This slow leakage of the organic soils serves to store surface waters, making them available to the wells by induced infiltration during the drier months. Secondly, wetlands are effective, through a variety of physical, chemical and biological mechanisms, in attenuating or eliminating many pollutants which might otherwise be drawn into the wells. This "living filter" provided by wetlands systems serves to reduce the potential for contamination created by induced infiltration of surface waters.

#### 3.3. Hydrogeologic Description of Aquifer Areas

Mine Brook flows from Jewell's Pond in Medfield in a south-southeasterly direction for approximately 3.4 miles, while dropping about 35 feet in elevation, before emptying into the Neponset River. The inflow to Jewell's Pond is Mill Brook, which is named Tubwreck Brook in its more northern reaches and flows in a southerly direction for approximately 3.2 miles, dropping about 80 feet in elevation, before emptying into Jewell's Pond.

Areas which drain into Tubwreck, Mill, and Mine Brooks are all part of the Mine Brook Watershed. Roughly half of this watershed is located in Walpole. This portion of the watershed is delineated on fig. 3. Most of the rest of the watershed is in Medfield, and the remainder in Dover. Several small, unnamed tributaries flow into Mine Brook. Mine Brook is the sole surface water outflow from the watershed. Average monthly discharge for Mine Brook in the period June 1967 - June 1968 was measured at 12 cubic feet/second, with a high of 44 cubic feet/second in March and a low of 3 cubic feet/second in September (U.S.G.S., 1973).

The Neponset River flows from the Neponset Reservoir in Foxborough northwards towards Walpole, where it veers to the northeast before flowing through Norwood. School Meadow Brook flows into the Neponset approximately 3.9 miles north of the Reservoir. Mine Brook empties into the Neponset about 0.5 miles further north. The Neponset drops approximately 85 feet in elevation between the Neponset Reservoir and School Meadow Brook, and another 80 feet between School Meadow Brook and Bird Pond in the eastern part of Walpole. The Neponset has many tributaries and a large watershed, of which the Mine Brook and School Meadow watersheds are a part. The Neponset watershed in this study will be considered to be those lands which drain directly into the Neponset, and not into any of its more major tributaries. The most important part of this watershed in Walpole is the Cedar Swamp area. Average monthly flow in the Neponset River was measured at 62 cubic feet/second in the period June 1967 - June 1968, with a peak monthly discharge of 212 cubic feet/second in March and a low of 20 cubic feet/second in September (U.S.G.S., 1973).

This area receives recharge from the Neponset Aquifer and the School Meadow Brook Aquifer. The Town does not wish to exploit the School Meadow Brook Aquifer any further. Pumpage from a well placed in this area would exploit, to some degree, the School Meadow Brook Aquifer, but much of the pumpage would derive from the Neponset Aquifer.

### 3.3.1. Groundwater Movement

Groundwater in Walpole flows from areas of high elevation (recharge areas) to areas of low elevation (discharge areas). Surface water bodies in low-lying areas may be formed by ground water discharge resulting from the intersection of the water table with the land surface. This relationship is illustrated in fig. 2, which is a contour map of the water table's topography. The contours are based upon elevations of ponds, streams and wetlands, as well as groundwater level measurements in wells. The velocity of groundwater flow can be calculated from Darcy's Law

$$V = K S$$

where V = velocity in feet/day  
K = permeability in gallons/day/sq. foot  
S = water table gradient, ft/ft

The water table gradient in Mine Brook valley from Jewell's Pond to the Neponset River is about 35 feet/16,000 feet (= 3.4 miles), or 0.0022. Permeabilities were determined in Mine Brook valley during pump tests performed by Geraghty and Miller as part of a previous study (Geraghty and Miller, 1966). They found values of about 1000 and 500 gallons/day/square foot near the present Mine Brook #1 and #4 wells. From these values, a rather conservative estimate of the average permeability of the stratified drift in the valley is considered to be 400 gallons/day/square foot. Using this value, the velocity of groundwater moving down the valley would be

$$V = 0.00195 (500) = 0.88 \text{ feet per day}$$

Using a more liberal estimate of the average permeability for the stratified drift in the valley of 800 gallons/day/square foot, the groundwater velocity would be

$$V = 0.0022 (800) = 1.77 \text{ feet per day.}$$

The velocity of groundwater flowing through stratified drift down the sides of the valley, where the water table gradient is steeper, should be higher. Due to the low permeability (typically 100 gallons/day/square foot or less) of till, groundwater velocity is slow in till units.

The gradient of the water table in the Neponset River valley between the Neponset Reservoir and School Meadow Brook is about 85 feet/16,500 feet or 0.0052. Permeability values have not been determined for sediments in the Neponset valley; however, using the same permeability estimates of 400 and 800 gallons/day/square foot the groundwater velocity of water in the valley would be 2.08 or 4.16 feet/day.

#### 4.0 LAND USE SURVEY

The purpose of the land use survey is two-fold. First, the placement of municipal wells within specified distances of certain land usages is prohibited by the DEQE. A well may not be within 400 feet of a septic system and may not be within 1/2 mile of a "hazardous waste storage area", according to the DEQE "Guidelines for Public Water Supplies." Hazardous waste storage areas are interpreted by the DEQE to include any Resource Conservation and Recovery Act (RCRA)-listed facilities, which are facilities that have applied for permits to produce, store, ship and/or dispose of hazardous wastes. Thus, like the surficial geologic and saturated thickness mapping, the results of the land use survey can be used to reduce the number of areas requiring further exploration. The second purpose of the land use survey is to identify threats to the viability of any presently used or recommended well sites. This requires examination of land usage within the recharge areas to these sites.

#### 4.1 Restrictive Land Uses

##### 4.1.1 Hazardous Waste

The following sites are listed as RCRA sites by the Woburn office of the DEQE. The acronym "SQG" signifies "small quantity generator."

Bird Inc., East St.  
Bird Machine Co., Inc., Neponset St.  
Bird-Johnson Co., 7 Renmar Industrial Park, SQG  
Bird-Johnson Co., 110 Norfolk St.  
Central Auto Body, 10 West St., SQG  
Centre Cleaners, 629 Main St., SQG  
Corning Medical and Scientific, 333 Coney St.  
Denis Auto Body, 1171 Main St.  
Fish Chemical and Equipment Co., 18 Industrial Rd.  
Glove Cleaners Inc., 278 Union St., SQG  
Hollingsworth and Vose Co., 112 Washington St.  
J & A Cleaners, 917 Main St, SQG  
J & M Cabinet, Main St, SQG

The approximate locations of these industries have been plotted on fig. 4, the Land Use Map. Circles of 1/2 mile radius around these sites have been included on the map to show areas in which municipal wells may not be located.

The DEQE list also includes three companies which have recently moved out of the Town. These companies, which are incorrectly listed and no longer of concern, are::

Ellkim Corp., 2064 Providence Highway, SQG  
Fales Machine Co., 1034 East St.  
Holliston Mills, 2000 Main St.

The DEQE will also not allow municipal wells to be constructed within one half mile of active or abandoned sanitary landfills. The DEQE maps indicate that there is a landfill just behind the Johnson Middle School on Robbins Road. According to the Town Engineer, this was a "stump dump" used as a dump for stumps and brush, and was not used as a sanitary landfill. The presently operative Mine Brook #1 well is located upgradient within one half mile of this dump, and water quality problems have not been detected there.

#### 4.1.2. Septic Systems.

Municipal wells cannot be located within 400 feet of a septic system. Although individual private septic systems were not located by IEP, it is presumed that houses located on streets not serviced by sewer mains must have septic systems, and that wells therefore cannot be located within at least 400 feet of houses on these streets. This constraint effectively rules out as municipal well sites the area around Willett Pond and the area just east of Moose Hill Road near Traphole Brook.

#### 4.2. Aquifer Protection and Land Usage.

The Town's water supplies could be possibly ruined by any of a number of causes, ranging from septic overloading to highway accidents involving tanker trucks carrying toxic chemicals. The purpose of this section is to consider the potential for generation of contamination by the various usages of lands which recharge the Town's aquifers. Considerations discussed in the preceding sections (surficial geology, saturated thickness, and regulatory prohibition) have reduced to two the aquifer areas available for exploitation: Mine Brook valley and the Neponset River valley near its junction with School Meadow Brook. This discussion will therefore be limited to the watersheds of these two streams.

Land usage in Walpole falls into four major categories: open space, residential, commercial/industrial and highway/railway. These uses have different potential impacts upon the aquifers.

##### 4.2.1. Open Space

Much of the land within Walpole in the Neponset Aquifer upstream of the recommended area and in the Mine Brook Aquifer is Open Space. This land includes Cedar Swamp and other land in the Neponset watershed. The Mine Brook watershed contains smaller but still significant areas of swampland as well as wooded, undeveloped areas. Open space is an asset to aquifer protection because it provides few pollution sources and undiminished capacity for recharge and for attenuation of contaminants which may be

entering the watershed from another area. The attenuation capacity of the wetlands areas is especially important, as discussed in the "Regional Hydrogeologic Setting" section.

#### 4.2.2. Residential

Residential single family homes and developments generally have a limited effect on the aquifer. Their most significant impact is septic leachate, although other contaminants such as lawn fertilizers and animal wastes are produced by this usage. All of the land near or upgradient of the existing or proposed well sites in Mine Brook is zoned for rural or residential usage. Although many of the streets in the Mine Brook Aquifer are not sewered, the areas upgradient or surrounding the existing wells and proposed well sites are rather sparsely populated. The limited septic load produced by such a population density should ensure that any septic leachate produced in these areas will be attenuated or diluted in the subsurface environment. Medfield also utilizes Mine Brook as a municipal water supply and considers the Mine Brook watershed, including Mill Brook, to be a watershed protection district. This district contains only residential estate or residential town zoning, which require lot sizes of 40,000 and 80,000 square feet, respectively. Many of these houses have their own septic systems; however, because of the relatively large lot sizes, septic contamination is not anticipated. The parts of the Neponset Aquifer which are zoned for residential usage are found, for the most part, around the perimeters of the Aquifer within the Town. The proposed well site in this aquifer is located in land zoned residential A but is very close to industrially zoned land.

#### 4.2.3. Commercial and Industrial

The percentage of the land used for Commercial and Industrial purposes varies widely between the two watersheds. All of the land upgradient or near the existing and proposed well sites in Mine Brook and most of the land in the southern (downgradient) part of the watershed is zoned for residential usage. The only non-residential portions of the watershed within the Town are one area zoned for limited manufacturing and one zoned for industry. This industrial zone includes the Bird-Johnson sites on Norfolk St. and Renmar Ave., which generate waste solvents. The Bird Co. also deposits asphalt-containing products in a landfill on Norfolk St. These are RCRA-listed sites, but are downgradient of and greater than 1/2 mile from the well sites.

Much of the Neponset Aquifer is zoned industrial. However, much of this industrial land is in Cedar Swamp and is undeveloped. RCRA-listed hazardous waste generators located within the watershed upgradient of proposed well site include Bird Machine Company, located on Neponset Ave., Fish Chemical and Equipment, located on Industrial Rd., and J & M Cabinet Shop, located on Main St. in the southwestern corner of town. All of these sites are over 1/2 mile from the proposed well site. Interviews conducted by IEP personnel

with representatives of these companies regarding their use, storage or generation of hazardous materials revealed the following:

Bird Machine stores 5000 gallons of #6 oil for use as heating oil on the site and also stores cutting oils for machinery on the site. The Fish Chemical facility packages chemicals in drums and generates approximately 20 to 30 drums of hazardous wastes per year by flushing the lines used in the packing process. J & M Cabinet uses lacquer thinner and spray paints, and stores thinner on the site. They generate "negligible" amounts of hazardous waste.

The Kendall Co. is also a RCRA listed generator in the watershed, but is located just over one half mile downgradient of the proposed well site. Two non-listed but potential sources of hazardous materials in the Neponset watershed are Goldies Scrap Metal and Zion Auto Enterprises, located on Main St. near Winter St. Junkyards often are sources of waste oil and other organic pollutants such as degreasers. Both of these sites are located over a mile from the proposed well site in the Neponset Aquifer.

Gas stations are a commercial usage which can have detrimental effects on groundwater quality. Underground gas storage tanks may rust if made of steel or crack if made of fiberglass, resulting in the release of gasoline to the groundwater. The Maider Texaco station is located in the small, northernmost portion of the Mine Brook watershed that extends into the Town of Dover. A release of gasoline from this station in 1981 resulted in the contamination of several private drinking water wells. A study of this release was performed by Haley and Aldrich, who concluded that the contaminated groundwater would discharge into Mine Brook, where dilution and evaporation of the volatile components of the gasoline would dissipate the contamination, resulting in "no significant potential for contamination of Medfield or Walpole municipal wells in the Mine Brook valley." Gas stations were not located by IEP during this study; however, it would be worthwhile to require that any gas stations located in the Aquifers have groundwater monitoring wells installed if they are located in areas which recharge wells.

4.2.4. The de-icing salts (usually sodium chloride and occasionally calcium chloride) applied to Highways can have deleterious effects on groundwater quality. Sodium levels in the Town's wells in the School Meadow Brook wells have increased to potentially health-threatening levels due to the infiltration of road salt applied to surrounding highways and carried into recharge areas by runoff. Mine Brook flows through a less-developed area and should therefore be less susceptible than School Meadow Brook to contamination by road salts. Major roads such as Rt. 1A and Main St. run through the Neponset Aquifer, so the potential for contamination in this area is greater. Highways can also contribute such substances as lead (from emissions), rubber, and asbestos (from brakes) to the watershed.

Highway or railroad accidents involving transporters of hazardous materials can also pose a significant threat to groundwater quality.

4.2.5. Both railroad and power line Right-of Ways are sprayed with herbicides in the Town of Walpole. This spraying is done to reduce ground cover and provide easy access for maintenance work. Herbicides may enter the groundwater and move with it unless they are broken down by microbial or chemical processes or are adsorbed onto soil particles. These two processes (degradation and adsorption) affect different herbicides at different rates.

CONRAIL hires the Railroad Weed Control Co. to spray its right-of-ways. According to Mr. John Roy of CONRAIL, a solution consisting of two pounds of "Karmex", two pounds of "Atratal", two quarts of "Roundup" and a carrying agent are sprayed at a rate of 40 gallons per acre. Karmex is a trade name for the compound Diuron, a urea-based herbicide manufactured by DuPont since 1954.

According to a report prepared for the Commonwealth of Massachusetts by Harrison Biotech, Inc., Karmex (a trade name for diuron) is considered to be a low-mobility (poorly soluble and easily adsorbed) herbicide when applied near the surface of the soil and is only mildly persistent. Diuron does not appear to be carcinogenic, mutagenic, or bioaccumulative, and appears to be toxic only in high doses (e.g. >250 parts per million). It is toxic to phytoplankton and may inhibit microbial activity in soil.

Atratal is a trade name for atrazine, which is described as persistent and moderately mobile. Available evidence indicates that atrazine is probably not mutagenic or carcinogenic, not toxic in low doses when ingested by mammals or birds, not subject to significant bioaccumulation, and not embryotoxic in low doses. It does appear to be toxic to some fish species and to bottom fauna (e.g. mayflies, leeches, gastropods). It causes a decrease in the photosynthetic activity of aquatic algae and in zooplankton reproductive rates at relatively low levels (20 parts per billion) (Harrison Biotech, 1985). Because Atrazine is somewhat mobile and persistent, and because a CONRAIL line runs down the center of the Mine Brook Aquifer, it may eventually be detected in the Town's drinking water. The Town may therefore wish to request that its use be discontinued.

Roundup is a trade name for glyphosphate, a broad spectrum herbicide manufactured by Monsanto which has a very low toxicity to animals and does not bioaccumulate. It is easily adsorbed onto soil particles and is easily degraded in the natural environment (Harrison Biotech, 1985). The surfactant used in Roundup is toxic to lower aquatic organisms.

The adsorption capability of soils varies with the composition of the soil. The adsorption capacity of sands and gravels, which are common aquifer materials, is much lower than that of finer grained deposits. Organic deposits, such as are found in wetlands, have high absorption capacities,

and thus the wetlands found in the Mine Brook and Neponset Valleys may serve to protect the water supplies from contamination by herbicides.

The Edison Electric Co. has a right-of-way in a north-south direction in the Medfield portion of the Mine Brook Aquifer and a right-of-way through the Neponset Aquifer. Bob Little, who supervises spraying for Edison Electric, was interviewed regarding spraying practices. He stated that Edison has three spraying programs: the Selected Folia program, the Selective Basal Thin Line program, and a treetop or tree stump spraying program. In the Selected Folia program, a 1:1000 solution of Krenite is used at a rate of one gallon or less per acre. Although highly soluble, Krenite is only moderately mobile due to its strong tendency to adsorb onto soil particles. The persistence of Krenite in water is strongly dependent on pH. It is persistent at pH's above 7 and easily degraded at pH's of 5 and below. It does not appear to be strongly toxic mutagenic, or bioaccumulative. In the Selective Basal Thin Line program, Garlon, or triclopyr, is diluted by 50% with a carrier, usually fuel or diesel oil, and sprayed on the base of target species with a calibrated nozzle. Very little data is available about this herbicide. It appears to have low toxicity and not be carcinogenic or mutagenic. Available data suggest that it is very mobile and relatively persistent. Tordon-RTU, composed of picloram and 2,4 D, is sprayed on trees or stumps to prevent new growth. Picloram has a low toxicity but is relatively mobile and persistent. 2,4 D is moderately persistent (half-life of several months), has variable mobility depending on conditions, and is toxic to some fish but does not bioaccumulate (Harrison Biotech, 1985). The mode of application of triclopyr and Tordon-RTU suggest that only limited amounts are applied within the aquifer.

4.3. IEP has prepared for Walpole a Town-Wide Aquifer Protection Legislation package, which is included as Appendix A.

As part of the Commonwealth of Massachusetts Generic Environmental Impact Report on the Control of Vegetation on Utility and Railroad Rights-of-Way, the MEPA Herbicide Task Force recommended that the State define areas of special sensitivity to herbicide applications and restrict such applications in such areas. These areas included zones of contribution to public water supplies, which are delineated on fig. 5, private wells and water supplies, open water (lakes and streams), and, among others, wetlands. The Mine Brook valley fits into several of these "sensitive" areas, and the Town may wish to restrict or prohibit the application of herbicides in it.

5.0. TEST WELL DRILLING

An exploratory test well drilling program was begun after completion of field surveys and the analysis of available hydrogeologic data. The purpose of this program was to locate areas with roughly 40 feet or more of stratified sands and gravels that were sufficiently permeable to serve as municipal water supplies. Much of the drilling time was spent attempting to

delineate the more poorly documented aquifer areas, such as the Cedar Swamp area. Because the Town does not wish to exploit the School Meadow Brook Aquifer, drilling was not performed in that area. Drilling was conducted using the drive and wash method by drillers from the R.E. Chapman Co. under the field supervision of IEP personnel. In this method, 2-1/2" steel casing is driven into the subsurface by repeated blows with a 600 lb. hammer. The materials in the casing are then washed out of the well by inserting wash pipes, which have water pumped through them, down the interior of the casing. Samples are taken by collecting the wash water in a bucket, which yields a fairly representative sample of the sediments in the length of the 7 foot length of casing being washed, although some of the finer material is washed away. If the materials were coarse enough to indicate that adequate pumpage might be obtained from the well, a screen was inserted down the well and trial pumping begun. If the rate of pumpage was high, an observation well was drilled adjacent to the pumping well to measure the "drawdown", or drop in the water table caused by the pumpage. The specific capacity of the well, in gallons per minute per foot of drawdown, could then be calculated. The safe yield of the well in gallons per minute (gpm) is estimated by multiplying the specific capacity by one half the saturated thickness of sand and gravel at the well, which is considered to be the available drawdown.

A total of 27 test wells were drilled. Logs for these wells are included in Appendix B, and their locations are indicated on fig. 3. Pipe was left only in those wells which were considered to be of possible future use to the Town. Several wells had yields high enough to be considered for municipal use. These include well 3, well 18, and well 24. Well 3, located northwest of the West Junior High, had the highest yield of any well drilled in the study. Well 18 is located on the south side of the Neponset River near its confluence with School Meadow Brook, and well 24 is located on the northern side of Mine Brook near the Medfield border. Pertinent data for these wells are summarized in the following table:

Well #	Saturated Thickness	Pumping Rate	Drawdown	Specific Capacity	Safe Yield
3	44 feet	60 gpm	1.6'	37.5 gpm/ft.	825 gpm
18	42 feet	38 gpm	1.3'	29.8 gpm/ft.	625 gpm
24	38 feet	60 gpm	4.0'	15.0 gpm/ft.	270 gpm

The safe yields of 825, 625, and 270 gallons per minute can be expressed as approximately 1.2, 0.9, and 0.4 million gallons per day.

#### 5.1. Possible Aquifer Areas Which Were Not Drilled

Officials of the Town had suggested that several areas in the Town be examined in this study as part of the search for water supplies outside of

Mine Brook, including the areas around Willett Pond, Bird and Son Pond, and the Traphole Brook valley. No exploratory drilling was conducted in the Willett and Bird Pond areas, and only one hole drilled in Traphole Brook valley, for the following reasons:

5.1. Willett Pond. The surficial deposits on the eastern side of Willett Pond are composed of glacial till. There is a strip of stratified drift deposits, ranging from less than 200 to greater than 600 feet in width, on the western side of the pond. This strip is bordered to the west by till. Information gathered during the data compilation phase of this report indicates that these stratified deposits have a maximum thickness of only about 20 feet, which is too thin for a municipal well. In addition, water supplies must be located at least 400 feet from the nearest septic system. The streets in this area are unsewered, and the area is densely settled. Although individual septic systems were not located, it can be assumed that adequate setbacks would be difficult or impossible to attain throughout most of this area, regardless of its geology.

5.2. Bird and Son Pond. The Massachusetts Dept. of Environmental Quality Engineering (DEQE) requires that no municipal water supply be located within one half mile of a site on which hazardous waste storage occurs. The Bird and Son plant, located at the western end of the pond, has a RCRA permit for such storage. The DEQE would therefore not allow municipal well development to occur within a half mile of the plant, ruling out further exploration in the Bird and Son Pond area.

5.3. Traphole Brook. A large part of the Traphole Brook valley is excluded from use for municipal wells due to proximity to the Corning facility on Coney St. This is a RCRA listed facility and hence the surrounding lands are subject to the same one half mile prohibition as the lands surrounding Bird Pond. Moose Hill Rd., on the western side of the valley, is not sewerred. It would be difficult to get the required setback from septic systems to place wells on this side of the valley. Seismic profiles taken across the valley just south of the Walpole line in Sharon indicate that depth to bedrock is approximately 40 feet in that area. However, well logs from just north of the border in Walpole indicate that the water table is at about 20 feet, leaving only 20 feet or less (depending on till thickness below the stratified drift) of stratified drift. This suggests that even if land use obstacles could be overcome, there is insufficient thickness to support a municipal well. Data points were lacking in the northern end of the valley, so one test well (TW-19) was installed at that end of the valley just outside the 1/2 mile radius from the Corning plant in order to characterize the aquifer just in case the land use obstacles could be overcome. This well reached refusal at 35 feet. Much of the material was relatively fine-grained, and the saturated thickness was only 27 feet. The well pumped at 23 gpm, which is too low for municipal wells.

## Groundwater Flow Model

A Fortran 66 computer program has been written for an Apple II computer to solve the time dependent, two-dimensional partial differential equation governing non-steady state flow in an artesian isotropic aquifer:

Equation 1

where,

- T = aquifer transmissivity (gal/day/ft)
- h = hydraulic head (ft)
- t = time (days)
- S = aquifer storage coefficient
- Q = net groundwater recharge or withdrawal (gal/day)

The model presented here is a version of the Prickett-Lonnquist Aquifer Simulation Model (PLASM) published as Bulletin 55, Illinois State Water Survey, 1971. In this model, equation 1 is valid for a continuous system, or for a network of grid points in that system. Each parameter (static water elevation, saturated thickness, permeability and storage coefficient) is initially defined for each grid point and a finite difference approximation to equation 1 is written and solved. The equation is solved using a numerical technique called the modified alternating implicit method (Remson, et al, 1979, Rushton, et al, 1979). Because of the iterative nature of the solution the program cycles to self-consistency below a defined error limit. Once the error limit is met, the program calculates and prints the hydraulic head. The time step is then advanced and the iterative procedure started again.

This model is designed for unconfined water table conditions. The aquifer is unconfined on the top with water being released from storage by gravity drainage of the pore spaces (effective storage coefficient). Gravity drainage dewateres the upper portion of the aquifer forming a "cone of depression" around a pumping well. This decreases the saturated thickness and therefore the aquifer transmissivity. Transmissivity is re-calculated at the beginning of each time step, and thus, varies with time throughout the simulation period. The first step in the modeling procedure is to superimpose a square mesh finite difference grid over the aquifer. The intersections of the columns and rows of this grid are called nodes.

The finite difference grid used to simulate the Mine Brook Aquifer contained 17 columns and 13 rows, creating a total of 221 nodes. Each node was 800 feet x 800 feet in area. The grid extended from just over the Medfield line to just south of the Neponset River, and to beyond the eastern and western edges of the Mine Brook Aquifer. Groundwater elevations (aquifer top), till/bedrock elevations (aquifer bottom), average permeability, and groundwater storage and recharge rates were assigned for each node based on surficial geology, pump test data, test well data, and other available well logs. These values are the inputs to the model.

Discharge for nodes containing pumping wells were assigned at the following values:

- 1 Mine Brook 1 at 200,000 gpd, the average value for the summer of 1984,
- 2 Mine Brook 2 and 3 at a combined rate of 500,000 gpd. Well 3 was pumped at an average of 404,800 gpd in the summer of 1984. Well 2 is typically not pumped due to turbidity problems. An additional 100,000 gpd was assigned to this node to simulate limited pumping of well 2.
- 3 Mine Brook 4 at 700,000 gpd. This is the estimated safe yield of this well (Geraghty & Miller, 1964).

Output from the model consists of water table elevations at successive time steps.

The model is run with wells discharging and with wells dormant to determine the horizontal extent of the cone of depression of the pumping wells. The areas of these cones of depression are included in Figure 5, the Groundwater Significance Map.

## Selected References

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Appendix A  
Townwide Aquifer Protection Legislation

REFERENCE

## INTRODUCTION

The hydrogeologic study of the Town which comprises the first section of this report makes clear that Walpole does not have vast municipally exploitable groundwater reserves. The principal aquifers in the Town are those already being utilized, the Mine Brook and School Meadow Brook Aquifers. Some groundwater may also be developed near the Neponset River. It is thus important that the Town (1) protect the integrity of these water supplies, and (2) control growth so as to keep demands on these supplies consistent with the ability of the aquifers and distribution systems to deliver water. The legislative package which follows should be viewed as a means of achieving these objectives.

REFERENCE



TOWN OF WALPOLE

Aquifer Protection Study:  
Groundwater Protection Legislation Recommendations

August 1985

Introduction:

The capability of land to support various different uses differs widely from one parcel to another within the Town of Walpole. Some lands are well suited to intensive residential or commercial development without creating environmental nuisances. Others, such as those defined as water resource protection districts by IEP, Inc. have a limited capacity to support such development and their misuse can result in a direct, costly impact upon the residents of Walpole. *(proposed?)*

The results of misuse include the decline of land values, municipal income sources and the need for expensive public programs to remedy the planning failures resulting in the misuse.

The protection of environmentally sensitive lands within the Town generally and lands within the delineated water resource protection districts specifically, should be considered a high priority within the Town of Walpole. *△*

To that end, the following zoning, subdivision and Board of Health alternatives have been prepared as part of the Town's aquifer protection study. These alternatives should prove useful in a variety of ways.

First, they supplement existing federal and state laws which, although designed to protect water resources, fall far short in protecting public drinking supplies from non-point contamination and municipal over-extension of service delivery.

Second, they will allow Town officials to require data from developers so as to make decisions regarding the impact of developments allowable under existing zoning, but clearly inappropriate when based upon the unavailability of Town water or the proposed development's impact upon existing water resources.

Finally, the adoption of these alternatives will represent a significant step toward public recognition in Walpole that water systems are unavoidably linked to land development patterns and local land use control procedures. It also represents the acceptance of the premise that water resources, up to now considered limitless in quantity, are a precious and finite resource.

REFERENCE



This report is divided into three sections. Section One presents ten zoning alternatives for adoption by Walpole Town Meeting. Section Two presents four Subdivision Rules and Regulations amendments for adoption by the Walpole Planning Board. Section Three presents three Board of Health amendments for adoption by the Walpole Board of Health. The recommendations and amendments are presented in "camera ready" format for adoption and are structured to "fit" within the Town's existing Zoning By-law and Subdivision Rules and Regulations.

It is important to note that several of the recommendations presented in this report refer to moratoriums directly linked to municipal water supply quantity and quality.

IEP takes the position that while moratoriums may be useful tools for handling critical municipal problems associated with growth and development, they are not recommended for the Town of Walpole at this time. They should be considered at some further time, however, should Walpole town officials and residents determine a growth related crisis that required immediate action.

Rather than moratoriums, therefore, IEP strongly recommends the adoption of zoning recommendations four and five contained herein. These two recommendations regulate the numbers of multi-family building permits issued in any twelve month period and the number of building permits issued in new subdivisions.

IEP believes these growth control measures are reasonable, equitable and non-discriminatory as they seek not to stop growth in Walpole, but rather are designed to time Walpole's growth with its ability to provide municipal services such as water and sewer.

In sum, IEP is presenting to the Town of Walpole numerous growth and development related regulatory tools for its review. These tools represent the full spectrum of options available to the Town, but should be reviewed most carefully by town officials prior to presentation before any public body. IEP recommends the adoption of zoning recommendations one thru seven, subdivision rules and regulations one thru four and the two Board of Health regulations contained herein. IEP recommends that zoning recommendations eight, nine and ten be withheld from town meeting until deemed absolutely necessary and then only after consultation with Town Council and full public debate.

REFERENCE



Section One: Zoning Alternatives for the Town of Walpole relative to water quality/quantity protection.

Commentary: Attached are ten specific alternatives for the Town of Walpole relative to zoning amendments designed to ensure greater water/quantity protection of the Town's water resources.

The ten alternatives are as follows:

Alternative 1: Establish performance standards/development impact requirements for all special permit uses within the Town of Walpole.

Alternative 2: Establish specific performance standards for special permit uses within defined water resource protection districts.

Alternative 3: Establish a "cluster" zoning by-law for residential one-family subdivisions.

Alternative 4: Multi-family building permit issuance limitation.

Alternative 5: Subdivision phasing bylaw.

Alternative 6: Environmental impact fee schedule.

Alternative 7: Establish definition of "principal structures".

Alternative 8: Moratorium of new residential, commercial and industrial development within defined water resource protection overlay districts until October, 1986 unless connected to the municipal sewer system in accordance with Department of Public Works specifications.

Alternative 9: Moratorium of new residential, commercial and industrial development lots less than 40,000 square feet within defined water resource overlay districts until October, 1986 unless connected to the municipal sewer system in accordance with Department of Public Works specifications.

Alternative 10: Moratorium of new residential, commercial and industrial development on lots less than 40,000 square feet until October, 1986 unless the lot does not utilize water from the Walpole water system.

Adoption/Amendment Procedure: The Town of Walpole is required to follow the procedure for adoption and amendment of the above noted ten alternatives as established by Massachusetts General Laws, Chapter 40A, Section 5.

REFERENCE



Alternative 1: Establish Performance Standards/Development Impact Requirements for all Special Permit Uses Within the Town of Walpole.

Significance. The attached article is designed to allow the Board of Appeals to require specific data from applicants planning development projects within Walpole. While its primary purpose is "water quality" related, the article provides the Board of Appeals with an important tool for determining the impact of various special permit developments upon a variety of land use, municipal service and economic impact criteria.

A similar article is proposed for the Walpole Planning Board as part of its rules and regulations.

Article \_\_\_\_\_. To see if the Town will vote to amend the Zoning Bylaws as they pertain to Section 8: Board of Appeals, as follows: ADD to Section 8-B: Special Permits, the following:

"8-B-1. Development Impact Statements. For the purpose of protecting the safety, convenience and welfare of the inhabitants of the Town, before approval of any development requiring a special permit, the Board of Appeals may require that the Applicant submit a Development Impact Statement, if the size of the development or the natural features or other characteristics of the land to be developed indicate a need therefor. The Development Impact Statement shall contain appropriate supporting data, setting forth the probable impact or effect of the proposed development on the neighborhood and the Town, generally, if any, when it may be built. In compiling such Impact Statement, the Applicant shall consult with the various Town departments having knowledge and authority in the various subjects cited below, such as the Department of Public Works, Health Agent, Assessors, Finance Committee, Fire and Police Departments, Conservation Commission, etc. Such Impact Statement shall cover at least the subject areas listed hereunder, for comparison with local, state and federal performance standards and such other subject areas as the Board of Appeals may, in particular cases, deem necessary.

a) Availability of Town water: How much new additional water volume will be required by the proposed development? Is there adequate main capacity to provide the projected added water volume to the proposed development without detriment to other users (existing or potential) from the standpoint of pressure, fire-flows from hydrants, etc.? If not, what improvements to the supply system outside of the development will be needed, how soon, and at what projected cost to the Town?

b) In locations where there is no Town water, will the density of dwellings in the future lower or contaminate water table significantly in the area as a result of increased use, at the expense of or detriment to existing homes?

REFERENCE

- c) Environmental Effects of On-Site Sewage Disposal: What is the permeability of the underlying soil? Will individual or collective sewage disposal systems endanger in the foreseeable future, wells for potable water of dwellings either within or outside the proposed development, or will any such disposal systems thus endanger any public water supply source or any marsh, swamp, bog, pond, stream or other body of water by introducing therein excessive nutrients, dangerous chemical substances or pathological organisms?
- d) If the development has access to the municipal sewerage system, is the capacity of such system (pipe sizes, etc.) adequate to handle the additional load created by the development? If not, what improvements to such public sewerage system will be needed, how soon, and at what projected cost to the Town?
- e) What is the estimated taxable value of the lots and buildings to be constructed within the proposed development?
- f) Will the drainage run-off from the systems of roads within the proposed development be likely to damage adjoining property, overload or silt-up or contaminate in any way any marsh, swamp, bog, pond, stream or other body of water or endanger any public or private potable water supply? Will any proposed filling, cutting or other alteration of the topography or any devegetating operations within the development tend to alter existing natural drainage patterns so as to create problems within or outside of the development.
- g) Are the access roads, public or private, by which the proposed development may be reached adequate in width, grades and type of construction to carry, without danger, congestion or confusion, the additional traffic that may be generated by the proposed development.
- h) What are the estimated additional new service requirements, in time and/or cost that the proposed development may place upon the Town for solid waste disposal and snow removal?
- i) What additional burden will the proposed place upon the public safety services (Fire and Police) and at what probable cost to the Town in terms of additional hours (manpower) or additional facilities (vehicles or buildings)?
- j) Will the proposed development have any probable detrimental effect on the ecology of the local area, such as: Increased run-off or rainfall and/or melting snow resulting in lessened recharge of the groundwater table? Disruption of the biological environment so as to endanger or destroy desirable species of trees and other vegetation, and encourage proliferation of undesirable species (i.e., ragweed, etc)? Disruption of the biological environment so as to upset an existing balance between animal or insect

pests and their natural bird, animal or insect predators, resulting in damage or danger to either persons, crops or useful and desirable forms of vegetation?

8-B-2. Decisions. In addition to any specific requirements elsewhere in this Bylaw, or where no specific restrictions are made applicable to a use allowed by Special Permit, the Board of Appeals shall grant a Special Permit only upon its written determination that the proposed use will not have adverse effects which overbalance its beneficial effects on either the neighborhood or the Town, in view of the particular characteristics of the site. The determination shall indicate that the proposed use will be in harmony with the general purpose and intent of this Bylaw and shall include consideration of each of the following:

- a) Adequacy of the site in terms of size for the proposed use;
- b) Suitability of the site for the proposed use;
- c) Impact on traffic flow and safety;
- d) Impact on neighborhood visual character, including views and vistas;
- e) Adequacy of method of sewage disposal, source of water and drainage; and
- f) Adequacy of utilities and other public services.



Alternative 2: Establish specific performance standards for special permit uses within defined water resource protection districts.

Significance. The attached article is designed to ensure that uses allowed by special permit within Walpole's water resource protection districts not connected to the municipal sewer system will not contaminate drinking water supplies by elevating nitrate-nitrogen levels to over 5 parts per million. Excessive nitrate levels (over 5PPM) can produce methemo-globinemia, or Blue Baby Syndrome, and may contribute to some forms of cancer.

Article \_\_\_\_\_. To see if the Town will vote to amend the Zoning Bylaw as they pertain to Section 8. Board of Appeals, as follows:

ADD TO Section 8-B: Special Permits, the following;

"8-B-3. Special Permit Requirements in Water Resource Protection Districts.

a. In addition to the requirements for granting a special permit noted in Section 8-B-2 of this Bylaw, the Board of Appeals may withhold approval of a special permit for any uses allowed upon issuance of a special permit, which are located within the Town's mapped water resource protection districts, if, after weighing all the pertinent facts and evidence the Board of Appeals finds that:

1. The nutrient contribution from the proposed development, when added to the existing and potential nutrient level of developments within the specific recharge area, will generate nitrate-nitrogen concentrations in the groundwater in excess of five (5) parts per million, however, the Board of Appeals shall not withhold approval of an application for a special permit if the applicant provides measures for the reduction of the nutrient loading rate of nitrate-nitrogen concentrations to less than five (5) parts per million. It shall be the responsibility of the applicant to demonstrate to the Board of Appeals that the proposed mitigating measures will work as designed, and the Board of Appeals may require the applicant to demonstrate on an annual basis that said mitigating measures are operating satisfactorily.

REFERENCE

8-B-3-B. Analysis of Development Impact. The applicant, under Section 8-B-3-A, shall provide an analysis of development impact which at a minimum includes the following:

- a) The existing condition of the water supply, including physical characteristics and water chemistry;
- b) The expected change in the condition of the water supply as a result of the proposed development;
- c) The comparison, on a per acre basis, of the total nutrient loading from the proposed development with:
  - 1) The loading rate which would be expected to produce critical eutrophic levels in the water supply i.e., the loading rate which would produce nitrate-nitrogen levels in excess of five (5) parts per million in the groundwater.
- d) In determining the impact of nutrient loading from a development, the following standards and definitions shall be used:
  - 1) Loading per person: 5 lbs. Nitrogen per person per year;
  - 2) Loading from lawn fertilizers: 3 lbs. Nitrogen per 1,000 square feet per year;
  - 3) Loading from road run-off: .19 lbs. Nitrogen per curb mile per day;
  - 4) Critical eutrophic levels: Drinking water = 5 parts per million Nitrate-Nitrogen.

\* Unless the applicant demonstrates to the Board of Appeals that given the nature of the proposed project and/or receiving waters other standards are appropriate.

8-B-3-C. Exemptions. The Board of Appeals may exempt an application from the requirements of Section 8-B-3-A provided that the applicant can demonstrate that:

- a) Nutrients from the development will not in fact be recharged to the designated public water supply well, or
- b) That the development will not result in any increase in loading of the Nitrate-Nitrogen.

8-B-4-D. Relation to Other Requirements of the Zoning Bylaw. Approval of a special permit as noted in Section 8-B-3-A shall not substitute for compliance with any other requirements of the Zoning Act or Walpole Zoning Bylaw.

Alternative 3: Establish a "cluster" zoning Bylaw for residential, one-family subdivisions.

Significance: Some serious problems arise in the design of conventional subdivisions specifically because the developer is forced to utilize the entirety of his or her assembled parcel of land for sale to private ownership or for public streets and rights-of-way. In areas where land is characterized by steep slopes, surface bedrock, boggy depressions, or unique scenic or environmental amenities, preparing a site plan is problematical. In order to avoid building on these areas, a developer will be forced to locate some lots, houses and streets in less-than-ideal places. In attempting to minimize this trade-off situation, the developer may engage in extensive earthmoving or clear-cutting of forested areas, the eventual result of which is erosion of topsoil, increased sedimentation and water pollution in local streams, despoliation of areas of unique scenic value, and loss of important wildlife habitat.

Cluster subdivision offers a reasonable, practical alternative to these problems of conventional subdivision design. It enables the developer to maximize housing on the most suitable areas of land - those having, for example, the best slopes, best soil for septic tank leaching fields, best accessibility, or best views while simultaneously preserving any unique or delicate features such as woodlands, wetlands, or wildlife habitat, setting them aside as permanent, common open space.

Cluster also increases flexibility for siting individual lots and structures because, as aforementioned, the buildable portion will present fewer impediments. The designer is able to site houses for the best exposure, views, accessibility, and privacy. Clusters of houses may be grouped around cul-de-sacs, where through-street traffic is eliminated, or around the commonly-owned green spaces with parking in the rear. Privacy for the individual homeowner becomes a function of design rather than of amount of acreage between neighboring houses.

Article \_\_\_\_\_. To see if the Town will vote to amend the Zoning Bylaws as they pertain to open space residential developments as follows:

CREATE new Section 11: Special Regulations, as follows:

"Section 11: Special Regulations.

11-A. Open Space Residential Development.

11-B. Applicability. Any provisions of Section 4 of this Bylaw to the contrary notwithstanding, when shown on a plan endorsed by the Planning Board "Approved for Open Space Residential Development", lots of less than the minimum areas of widths specified in Section 4 may be laid out and dwellings may be erected on such lots but only in conformance with conditions set forth herein.

REFERENCE

11-C. Requirements. Such endorsement by the Planning Board shall be given only when and if the plan meets the following minimum requirements and conditions. In addition, the approval for Open Space Residential Development shall require a Special Permit. The Special Permit Granting Authority for Open Space Residential Development shall be the Planning Board. After complying with the minimum requirements and conditions listed herein, the Planning Board shall encourage the use of the Open Space Residential Development method if in its judgement:

- 1) Agricultural, farming or similar activity will be preserved and protect from development;
- 2) The natural integrity of environmentally sensitive areas will be enhanced; or
- 3) Scenic vistas will be highlighted and preserved.

11-D. The total area of the tract covered by the Plan shall be at least ten (10) acres. In determining the minimum total area of the tract for purposes of Open Space Development, no waterbody or bog, swamp, wet meadow or march, as defined in M.G.L., Ch. 131, Sec. 40, shall be included.

11-E. The tract is located in a district where the normally permitted minimum lot area is 20,000 square feet or more.

11-F. No dwelling other than single family detached houses shall be permitted within the perimeter of an open space residential development.

11-G. The number of dwelling lots permitted within the perimeter (total area) of an open space residential development shall be determined on the following basis in relation to the normal minimum lot size required in the district in which the open space residential development is located as set forth in Section 4.

20,000 sq. ft. district - 1.67 per acre  
30,000 sq. ft. district - 1.67 per acre  
40,000 sq. ft. district - 1 per acre

Fractions of an acre shall not be counted and shall become a part of the community open space provided herein below.

11-H. The minimum lot area permitted shall be 15,000 square feet, except where a greater area may be required by the Board of Health for sanitary reasons, or because of pollutant impacts or other hazards. No lot shall have a minimum average width or depth of less than seventy-five (75) feet except that if any lot shall include or be bounded by wetlands, as referred to above, the lot boundary farthest from such wetland shall be at no point closer than 100 feet from the edge of such wetlands.



permit issuance will not result in authorizing construction within a 12-month period of more than 20 multi-family units, excluding single family houses, townwide, within a 12-month period.

0004. Exemptions. The following are exempt from the provisions of S0003 of this Bylaw:

- A) Lots created by a subdivision plan as defined by MGL, Ch. 41, S81-L, endorsed by the Planning Board prior to January 1, 1980;
- B) Lots created by a plan not requiring Planning Board approval as defined by M.G.L., Ch. 41, S81-L and 81-P not previously created by a subdivision plan as defined by MGL, Ch. 41, S81-L endorsed by the Planning Board prior to January 1, 1980;
- C) Units designed for low or moderate income residents of all ages receiving or eligible to receive state or federal subsidies;
- D) Building permits for extensions, alterations or modifications of pre-existing structures.

REFERENCE

Alternative 5: Subdivision Phasing Bylaw restricting building permit issuance to 10 per year in new subdivision.

Significance: This bylaw will limit the number of lots built upon within new subdivisions to a specified number within any 12 month period. The goal is to establish a regulation which will equitably pace development in Walpole over the next ten or twenty years. This bylaw is not a "building cap", but rather a phasing program for new residential subdivisions.

0001. Applicability. Any provisions in this bylaw to the contrary notwithstanding, division of land into more than 10 lots in any 12 month period shall be subject to the following regulations and conditions set forth herein.

0002. Requirements. Whenever a new lot or lots is or are formed from a part of any other lot or lots, the assembly or separation shall be effected in such a manner as to conform with the requirements of this bylaw and shall be in accordance with the Subdivision Rules and Regulations of the Town of Walpole.

0003. Division of Land Limitations. The division of a parcel or combined adjacent parcels of land in any zoning district shall not exceed 10 lots if resulting from division or combination of properties in any 12 month period. This provision shall apply to all subdivision of land within the Town of Walpole even if approval under the Subdivision Control Law (M.G.L., Ch. 41) is not required.

0004. Exceptions. Division of land in excess of 10 lots as defined in Sec. 0003 above may be allowed only if one of the following requirements are met:

a. The owner of said land covenants with the Planning Board that he will not build upon more than 10 lots in any 12 month period. Said 12 month period shall commence on the date of endorsement by the Planning Board. The covenant shall identify the lots that may be built upon in each 12 month period. The covenant shall be recorded with all other pertinent documents with the Definitive Plan;

b. The owner of said land applies for and receives a special permit from the Planning Board in accordance with M.G.L., Ch. 40A, Sec. 9 and Sec. 11 to divide greater than 10 lots in any 12 month period. The Planning Board shall grant a special permit for such division only if the Board determines that the probable benefits to the Town outweigh the probable adverse effects resulting from granting such permit.

In reviewing a special permit application under this section, the Planning Board shall consider the impact upon schools, other public facilities, traffic and pedestrian travel, availability and quality preservation of

REFERENCE



drinking water, adequacy of recreational facilities, open spaces and agricultural resources, preservation of unique natural features, housing for senior citizens and people of low and moderate income as well as master plan or growth management plans prepared by the Planning Board in accordance with M.G.L, Ch. 40A, Sec. 9 and Sec. 11 and Sec. 8 of the Walpole Zoning Bylaws relating to the granting and denial of special permits shall, so far as apt, be applicable to a special permit application under Sec. 0004 6.

0005. Zoning Change Protection. Lots whose development have been subject to the covenant as provided for in Sec. 0004 a. of this bylaw shall be governed by the applicable provisions of the Zoning Bylaw in effect at the time of the plan or plan's endorsement by the Planning Board and for a period equivalent to that provided for by M.G.L., Ch. 40A, Sec. 6 except, however, the statutory protection afforded by M.G.L., Ch. 40A, Sec. 6 shall not commence until the lot or lots qualify for construction according to the terms of the covenant noted in Sec. 0004 a. of this bylaw.

REFERENCE

Alternative 6: Establish fee schedules for review of Environmental Impact Statements (Recommendation 1 and 2).

Significance: The burden of review of the technical information required by Recommendations 1 and 2 will fall upon the Town of Walpole and while the Town may not be able to conduct this review using in-house staff, the fee schedule noted below will allow for the establishment of an "Environmental Impact Statement Review" fund for use by the Town in reviewing submitted Environmental Impact Statements. It should be noted, however, that this review fund should be established in close cooperation with the Town Treasurer and Town Counsel in conformance with municipal budgeting procedures.

ARTICLE \_\_\_\_\_. To see if the Town will vote to amend the Zoning Bylaws as they pertain to Section 8: Board of Appeals, as follows: ADD new Section 8-F: Fee Schedule in accordance with M.G.L., Ch. 40A, Sec. 12 as follows:

1. A \$75.00 fee covering administrative costs, abutter notification costs and advertisement publication costs shall be required from all applicants prior to the scheduled public hearing. In addition, the Board of Appeals has the right to require a Five Hundred (\$500.00) Dollar, one-time fee for specific projects requiring analysis under Sections 8-B-1 or 8-B-3 of the Zoning Bylaw. This fee shall be retained and utilized by the Town of Walpole solely for the costs of analyzing data submitted as required by Sections 8-B-1 and 8-B-3.

REFERENCE



Alternative 7: Establish Definition of "Principal Structures".

Significance. This article is required to establish a definition of "principal structures" for use in Recommendation 3.

Article \_\_\_\_\_. To see if the Town will vote to amend the Zoning By-laws as they pertain to Section 1-C Definitions, by establishing new Definition 17 as follows:

17. Principal Structure:

The structure in which the primary use of the lot is conducted, including attached projections of the structure.

REFERENCE



Alternative 8: Moratorium of new residential, manufacturing, business and industrial development within defined water resource protection overlay districts.

Significance. The attached article is designed to prohibit new residential or commercial subdivisions within mapped water resource districts until October, 1986, unless connected to the municipal sewer system in accordance with Department of Public Works specifications.

The goal is to allow the Town of Walpole time to prepare definitive studies regarding allowable densities and land uses within its water resource protection districts. The article must be accepted as temporary in nature with the understanding that the Town will have completed definitive studies well in advance of the moratorium's expiration date. The article should not be used absent a commitment from Town officials that, in fact, the moratorium is designed to provide lead time - the time between the point when a condition in Walpole is recognized and the point when the Town reacts.

Article \_\_\_\_\_. To see if the Town will vote to amend the Zoning Bylaws as they pertain to "performance standards" by establishing new Section 10-A as follows:

ADD:

"10-A: Temporary Restrictions to Protect Public Water Supplies.

1. Introduction

The health, safety and welfare of the residents of the Town of Walpole is dependent upon an adequate supply of clean, high quality fresh drinking water. The possible degradation of this resource, either through contamination or overuse, threatens the Town's economy, affecting both employment and the tax base.

Because rapid development of remaining land within mapped water recharge zones in the Town of Walpole could diminish the amount of available water or, if unsewered, lead to contamination, and because Walpole Town officials have determined that the rate of development and rate of water consumption is occurring faster than the Town's ability to effectively plan and manage for said development, the Town has determined that it is both prudent and necessary, in order to provide reasonable protection protection of the health, safety and welfare of Town residents, to place certain restrictions upon development within these zones of contribution until necessary studies have been completed which will identify safe patterns and densities of future growth.

REFERENCE



2. Restrictions:

To protect the Town's public drinking water supply from possible contamination and over consumption until definitive studies determining allowable densities, types and patterns of land use within zones of contribution of public wells can be completed, the following restrictions are imposed:

Within zones of contribution to public supply wells in the Town of Walpole, as defined by IEP Inc. on a map entitled Water Resource Protection Overlay District which map is on file with the Town Clerk, no new residential or commercial subdivisions will be allowed, unless connected to the municipal sewer system in accordance with Department of Public Works specifications, until October 1, 1986 or until proposed studies are completed, whichever comes first.

3. Exemptions:

The Planning Board may exempt an application from the requirements of Section 10-A provided that the applicant can demonstrate that:

- A. The development at the proposed location is not within the water resource protection overlay district as referred to in Section 10-A.2. of the Walpole Zoning Bylaws.

REFERENCE

Alternative 9: Moratorium of new residential, manufacturing, business and industrial construction on lots less than 40,000 square feet within mapped water resource protection districts until October, 1986, unless connected to the municipal sewer system in accordance with Department of Public Works specifications.

Significance: Similar to Recommendation 2, the attached article allows the Town approximately 18 months to prepare definitive land use studies within its water resource protection districts.

Recommendation 3 prohibits the issuance of building permits for new construction on lots less than one acre (40,000 square feet).

Article \_\_\_\_\_. To see if the Town will vote to amend the Zoning Bylaws as they pertain to "performance standards" by establishing new Section 10-B as follows:

ADD:

"10-B: Temporary Restrictions to Protect Public Water Supplies:

Requirements for Individual Lots.

1. Introduction:

The health, safety and welfare of the residents of the Town of Walpole is dependent upon an adequate supply of clean, high quality fresh drinking water. The possible degradation of this resource, either through contamination or overuse, threatens the Town's economy, affecting both employment and the tax base.

Because rapid development of remaining land within mapped water recharge zones in the Town of Walpole could diminish the amount of available water, or, if unsewered, lead to contamination, and because Walpole Town officials have determined that the rate of development and rate of water consumption is occurring faster than the Town's ability to effectively plan and manage for said development, the Town has determined that it is both prudent and necessary, in order to provide reasonable protection of the health, safety and welfare of Town residents, to place certain restrictions upon development within these zones of contribution until necessary studies have been completed which will identify safe patterns and densities of future growth.

2. Restrictions:

The Building Inspector shall withhold the issuance of a building permit for principal structures not requiring a special permit on a lot or lots located in its (their) entirety until October 1, 1986, within the zones of

REFERENCE



contribution to public supply wells in the Town of Walpole as defined by IEP, Inc. on a map entitled Water Resource Protection Overlay District which map is on file with the Town Clerk unless one of the following conditions are met:

- a) The lot is shown on a plan or described in a deed duly recorded at the Registry of Deeds prior to January 1, 1980, provided that said lot is Zone R, RA, RB or GR;
- b) The lot has been previously subject to the requirements of Section 10-A of the Zoning Bylaws; and
- c) The applicant for a building permit demonstrates to the Building Inspectors that: (1) the lot is not within a water resource protection district as established in Section 10-B.2. of the Walpole Zoning Bylaws, or (2) if said lot is partially within a water protection district, that the use of the lot shall be conducted outside of the water resource district.

3. Relation to the Zoning Bylaw:

Approval of a building permit noted in Section 10-B.2. shall not substitute for compliance with other requirements of the Zoning Act or the Walpole Zoning Bylaw.

REFERENCE



Alternative 10: Moratorium of new residential or commercial construction on lots less than 40,000 square feet until October 1986 unless the lot does not utilize water from the Walpole municipal system.

Significance: The attached article allows the Town approximately 18 months to prepare definitive water supply and consumption studies. This Recommendation prohibits the issuance of building permits for new construction on lots less than one acre (40,000 square feet) unless the lot utilizes private well water and does not utilize water from the Walpole municipal system. Article \_\_\_\_\_. To see if the Town will vote to amend the Zoning Bylaws as they pertain to "performance standards" by establishing new Section 10-C as follows:

ADD:

"10-C. Temporary Restrictions to Protect Public Water Supplies:

Requirements for Individual Lots.

1. Introduction:

The health, safety and welfare of the residents of the Town of Walpole is dependent upon an adequate supply of clean, high quality fresh water. The possible degradation of this resource, either through contamination or overuse, threatens the Town's economy, affecting both employment and the tax base.

Because rapid development of remaining land within the Town of Walpole could diminish the amount of available water, or, if unsewered, lead to contamination, and because Walpole Town officials have determined that the rate of development and rate of water consumption is occurring faster than the Town's ability to effectively plan and manage for said development, the Town has determined that it is both prudent and necessary, in order to provide reasonable protection of the health, safety and welfare of Town residents, to place certain restrictions upon development within Walpole until necessary studies have been completed which will identify safe patterns and densities of future growth.

2. Restrictions:

The Building Inspector shall withhold the issuance of a building permit for principal structures not requiring a special permit on a lot or lots located

REFERENCE

in its (their) entirety until October 1, 1986, within the Town of Walpole unless one of the following conditions are met:

- A) The lot contains at least 40,000 square feet of area;
- B) The lot utilizes private well water and does not utilize water from the Walpole municipal system.

3. Exemptions:

The following shall be exempt from this Bylaw:

- A) Lots previously subject to the requirements of Section 10-A or 10-B of the Zoning Bylaws;
- B) Lots shown on a plan or described in a deed duly recorded at the Registry of Deeds prior to January 1, 1980.

4. Relation to the Zoning Bylaw:

Approval of a building permit noted in Section 10-B.2. shall not substitute for compliance with other requirements of the Zoning Act or the Walpole Bylaw.



Section Two: Subdivision Rules and regulation recommendations for the Town of Walpole relative to water quality/quantity protection.

Commentary: Attached are four specific recommendations for the Town of Walpole relative to subdivision regulations designed to ensure greater water quality/quantity protection for the Town's water resources.

The four recommendations are as follows:

Recommendation 1: Establish performance standards/development impact requirements for all subdivisions within the Town of Walpole.

Recommendation 2: Establish specific performance standards for subdivisions within defined water resource protection districts.

Recommendation 3: When determined necessary by the Planning Board, require that water and sewer mains be provided and installed within new subdivisions regardless of whether Town water or sewer is available at the time of installation.

Recommendation 4: Revise Walpole's Subdivision Rules and Regulations relative to drainage requirements to allow for more flexible drainage design within differing soil conditions.

Adoption/Amendment Procedure: The Walpole Planning Board is required to follow the procedure for adoption and amendment of the above noted four recommendations as established by Massachusetts General Laws, Chapter 41, S81-Q.

REFERENCE

Recommendation 1: Establish performance standards/development impact requirements for all subdivisions within the Town of Walpole.

Significance. The attached amendment is designed to allow the Planning Board to require specific data from applicants proposing subdivisions within the Town of Walpole. This amendment is essentially the same as zoning Recommendation 5 presented in Section One.

Amendment # \_\_\_\_\_. Revise S III-5 of the Walpole Subdivision Rules and Regulations as follows:

ADD to S III-5: Contents of Definitive Plans, the following:

(o). Development Impact Statements. For the purpose of protecting the safety, convenience and welfare of the inhabitants of the Town, before approval of any development requiring a special permit, the Board of Appeals may require that the Applicant submit a Development Impact Statement, if the size of the development or the natural features or other characteristics of the land to be developed indicate a need therefor. The Development Impact Statement shall contain appropriate supporting data, setting forth the probable impact or effect of the proposed development on the neighborhood and the Town, generally, if any, when it may be built. In compiling such Impact Statement, the Applicant shall consult with the various Town departments having knowledge and authority in the various subjects cited below, such as the Department of Public Works, Health Agent, Assessors, Finance Committee, Fire and Police Departments, Conservation Commission, etc. Such Impact Statement shall cover at least the subject areas listed hereunder, for comparison with local, state and federal performance standards and such other subject areas as the Planning Board may, in particular cases, deem necessary.

1) Availability of Town Water: How much new additional water volume will be required by the proposed development? Is there adequate main capacity to provide the projected added water volume to the proposed development without detriment to other existing or potential users, from the standpoint of pressure, fire-flows from hydrants, etc? If not, what improvements to the supply system outside of the development will be needed, how soon, and at what projected cost to the Town?

2) In locations where there is not Town water, will the density of dwellings in the future lower the water table significantly in the area as a result of increased use, at the expense of or detriment to existing homes?

3) Environmental Effects of On-Site Sewage Disposal: What is the permeability of the underlying soil? Will individual or collective sewage disposal systems endanger wells for potable water of dwellings wither within or without the proposed development, or will any such disposal systems thus endanger any public water supply source or any marsh, swamp, bog, pond,

stream or other body of water introducing therein excessive nutrients, dangerous chemical substances or pathological organisms?

4) If the development has access to the municipal sewerage system, is the capacity of such system (pipe sizes, etc.) adequate to handle the additional load created by the development? If not, what improvements to such public sewerage system will be needed, how soon, and at what projected cost to the Town?

5) What is the estimated taxable value of the lots and buildings to be constructed within the proposed development?

6) Will the drainage run-off from the systems of roads within the proposed development be likely to damage adjoining property, overload or silt-up or contaminate in any way any marsh, swamp, bog, pond, stream or other body of water or endanger any public or private potable water supply? Will any proposed filling, cutting or other alteration of the topography or any devegetating operations within the development tend to alter existing natural drainage patterns so as to create problems within or outside of the development.

7) Are the access roads, public or private, by which the proposed development may be reached adequate in width, grades and type of construction to carry, without danger, congestion or confusion, the additional traffic that may be generated by the proposed development.

8) What are the estimated additional new service requirements, in time and/or cost that the proposed development may place upon the Town for solid waste disposal and snow removal?

9) What additional burden will the proposed development place upon the public safety services (Fire and Police) and at what probable cost to the Town in terms of additional hours (manpower) or additional facilities (vehicles or buildings)?

10) Will the proposed development have any probable detrimental effect on the ecology of the local area, such as: Increased run-off of rainfall and/or melting snow resulting in lessened recharge of the groundwater table? Disruption of the biological environment so as to endanger or destroy desirable species of trees and other vegetation, and encourage proliferation of undesirable species (i.e., ragweed, etc)? Disruption of the biological environment so as to upset an existing balance between animal or insect pests and their natural bird, animal or insect predators, resulting in damage or danger to either persons, crops or useful and desirable forms of vegetation?

Recommendation 2: Establish specific performance standards for subdivisions within defined water resource protection districts.

Significance. The attached amendment is designed to allow the Planning Board to require specific water quality related data from applicants proposing subdivisions within defined water resource protection districts. This amendment is essentially the same as zoning Recommendation 6 presented in Section One.

Amendment # \_\_\_\_\_. Revise S III-5 of the Walpole Subdivision Rules and Regulations as follows:

ADD to S III-5. Contents of Definitive Plans, the following:

(p) Special Subdivision Requirements in Water Resource Protection Districts.

In addition to the requirements for approval of a subdivision noted herein the Planning Board may withhold the approval of a definitive subdivision plan located within the Town's mapped water resource protection districts, if, after weighing all the pertinent facts and evidence the Planning Board finds that:

1. The nutrient contribution from the proposed subdivision, when added to the existing and potential nutrient level of developments within the specific recharge area, will generate nitrate-nitrogen concentrations in the groundwater in excess of five (5) parts per million. However, the Planning Board shall not withhold approval of an application for a subdivision if the applicant provides measures for the reduction of the nutrient loading rate of nitrate-nitrogen concentrations to less than five (5) parts per million. It shall be the responsibility of the applicant to demonstrate to the Planning Board that the proposed mitigating measures will work as designed, and the Planning Board that the proposed mitigating measures will work as designed, and the Planning Board may require the applicant to demonstrate on an annual basis that said mitigating measures are operating satisfactorily.

(g) Analysis of Development Impact. The applicant, under S III-5 shall provide any analysis of development impact which, at minimum, includes the following:

1. The existing condition of the water supply, including physical characteristics and water chemistry;
2. The expected change in the condition of the water supply as a result of the proposed development;

3. The comparison, on a per acre basis, of the total nutrient loading from the proposed development with:
  - a. the loading rate which would be expected to produce critical eutrophic levels in the water supply; i.e., the loading rate which would produce nitrate-nitrogen levels in excess of five (5) parts per million in the groundwater;
4. In determining the impact of nutrient loading from a development, the following standards and definitions shall be used:
  - a) Loading per person: 5 lbs. Nitrogen per person per year;
  - b) Loading from lawn fertilizers: 3lbs. Nitrogen per 1,000 square feet per year;
  - c) Loading from road run-off: .19 lbs. Nitrogen per curb mile per day;
  - d) Critical eutrophic levels: Drinking water = 5 parts per million Nitrate-Nitrogen.

\*Unless the applicant demonstrates to the Planning Board that given the nature of the proposed project and/or receiving waters other standards are appropriate.



Recommendation 3: When determined necessary by the Planning Board, require that water and sewer mains be provided and installed within new subdivisions regardless of whether Town water or sewer is available at the time of installation.

Significance. The attached amendment will allow the Planning Board to require, where appropriate, that subdividers install water and sewer mains within their subdivisions regardless of whether water/sewer connections are currently feasible. This amendment is an important tool for planning for future expansions of water and sewer systems. It requires close cooperation and coordination between the Planning Board and Department of Public Works Water and Engineering Divisions.

Amendment # \_\_\_\_\_. Revise S IV-7 of the Walpole Subdivision Rules and Regulations as follows:

DELETE S IV-7 (b) and substitute as below:

IV-7. (b) When required by the Planning Board, the applicant shall provide and install within the subdivision water and sewer mains for water and sewer service to all lots within the development regardless of whether Town water or sewer is available to the subdivision at the time of installation. Installed mains shall be designed in accordance with all current Town of Walpole Department of Public Works specifications and shall be installed under the supervision of the Department of Public Works. All water mains, service connections, fire hydrants and other appurtenances shall be tested in accordance with the requirements of the Walpole Department of Public Works.

REFERENCE

Recommendation 4: Revise Walpole's Subdivision Rules and Regulations relative to drainage requirements to allow for more flexible drainage designs within differing soil conditions.

Significance. Under M.G.L., Chapter 41, the Walpole Planning Board has the authority to regulate the design, location and installation of drainage systems within new subdivisions.

M.G.L., Chapter 41 also provides for a good deal of flexibility in reviewing subdivisions. This flexibility can be of particular value to towns such as Walpole where drainage design and construction within water resource protection areas can have significant impact upon water quality.

For example, the attached recommended amendment will allow the Planning Board to require open drainage systems in areas with high recharge capabilities. Conversely, in areas with poor soil drainage capacities, the Planning Board may require closed drainage systems.

Amendment # \_\_\_\_\_. Revise S IV-6 of the Walpole Subdivision Rules and Regulations as follows:

RE-LETTER S IV-6. b) through S IV-6. n) so that IV-6. b) becomes IV-6. f), IV-6. c) becomes IV-6. g) and so on until IV-6. n) becomes IV-6. s).

Insert new S IV-6 (b) through S IV-6 (e) as follows:

b) Adequate areas of land must be set aside at all significant low points to receive the stormwater. These street drainage catchment areas, along with any drainage easements required, shall be shown on the Definitive Plan so as to become part of the permanent record. All such areas shall be dedicated for drainage purposes and shall not be included in the minimum area of the lot.

c) Storm drainage facilities shall be designed to accommodate the run-off from the entire watershed area, whether inside or outside the subdivision, under conditions of total potential development permitted under the Zoning Bylaw. When the subdivision creates a need for drainage improvements outside the subdivision, the applicant shall be required to secure the necessary easements and provide such improvements.

d) Storm drainage installations including catch basins, pipe lines, leaching basins, culverts, manholes, outlet head wall with rip-rap aprons and paved waterways shall be required to permit impeded flow of all natural watercourses, to insure adequate drainage of all low points along streets, to control erosion of slopes and shoulders, and to intercept stormwater run-off along streets at intervals reasonably related to the extent and grade of the area drained. To the maximum extent feasible, stormwater shall be

REFERENCE

recharged rather than piped to surface waters, and no drainage structure should be installed within 100 feet of any natural water body or wetlands.

e) Natural drainage courses, swales properly stabilized with plant materials and drainage catchment areas shall be utilized to dispose of water on the site through natural percolation. To obtain maximum percolation of run-offs, it is necessary in all drainage areas to retain and leave undisturbed as much existing vegetation as possible, particularly large trees and shrubs. Use of natural areas for drainage is preferred. However, if such natural drainage areas are insufficient or non-existent, drainage areas shall be constructed only under the supervision of the Walpole Department of Public Works. Newly constructed drainage areas shall be planted with shrubs and trees suitable for moist soils. All drainage areas shall be tested for the rate of percolation.



HEALTH REGULATION  
TO  
PREVENT LEAKING OF UNDERGROUND FUEL  
AND  
CHEMICAL STORAGE SYSTEMS

Under Chapter III, Section 31 of the Massachusetts General Laws, the Walpole Board of Health hereby adopts the following regulations to protect the ground and surface water from contamination with liquid fuel or toxic materials from leaking storage tanks. The following regulations apply to all underground fuel and chemical storage systems of 1,000 gallons or greater throughout the Town of Walpole and all systems (regardless of size) within Areas 1 and 2 of the Water Resource Protection Districts as identified by IEP, Inc., consulting environmental scientists, (1985).

Section 1. Definitions

Abnormal Loss or Gain shall mean a loss or apparent gain in product exceeding 0.5 percent of the volume of product used or sold.

Operator shall mean the lessee or person(s) in control of and having responsibility for the daily operation of the facility for the storage and dispensing of flammable and combustible liquids.

Owner shall mean the person(s) who owns, as real property, the tank storage system used for the storage and dispensing of flammable and combustible liquids.

Section 2. Tank Regulation

2.1 Every owner of an underground gasoline, fuel or chemical storage system shall file with the board of health, the size, type, age and location of each tank, and the type of material stored, on or before September 1, 1985. Evidence of date of purchase and installation, including fire department permit shall be included.

2.2 Owners of tanks for which evidence of installation date is not available shall at the order of the board of health have such tanks tested or uncovered for inspection. If in the opinion of the agent of the board of health or head of the fire department, the tank is not product tight, it shall be removed.

Section 3. Inventory Control

(Tanks utilized for the storage of heating oil less than 1,000 gallons in size will be exempt from Sections 3.1, 3.2 and 3.3).

REFERENCE

- 3.1 Underground storage systems shall have a method of accurately gauging the volume contained in the tank and a method of accurately metering the quantity of product removed during service. The metering device shall be maintained in accurate calibration. Storage systems in service at the time of passage of this regulation shall be in compliance within 90 days of the effective date of this regulation.
- 3.2 Accurate daily inventory records, as required by Massachusetts Fire Prevention Regulations-527 CMR 5.05(3), shall be based on actual daily measurement and recording of tank product and water levels and the daily recording of actual sales, use and receipts. The inventory records shall include a daily computation of gain or loss. The mere recording of pump meter readings and product delivery receipts shall not constitute adequate inventory records.
- 3.3 The owner and operator shall participate in a program of regularly scheduled inventory verification. Frequency of inventory verification shall be as follows: annually, for systems from which less than 25,000 gallons/month of product is used or sold; semi-annually for systems from which 25,000-100,000 gallons/month of product is used or sold; quarterly for systems from which more than 100,000 gallons/month is used or sold. Owners shall submit annually to the board of health a certified statement that inventory records have been maintained and reconciled as required by Massachusetts fire prevention regulations. Such records shall be made available to the board of health upon their request.

Where the storage tanks are owned by the operator, inventory verification shall be performed by a certified auditor or other independent qualified person approved by the board of health.

- 3.4 All steel tanks shall be subject to a Petro-Tite (Kent-Moore) Pressure Test or any other pressure test providing equivalent safety and effectiveness 15 years after installation and annually thereafter. The 5 psi air pressure test is a recognized method of leak detection but is not recommended since it can cause explosions.
- 3.5 Nonconforming steel tanks installed prior to January 1, 1966, shall be removed and properly disposed of by January 1, 1986. All other nonconforming steel tanks installed prior to the effective date of this regulation shall be removed when 20 years old. At such time the exhumed tank shall be examined for leaks. If a leak exists an investigation of amount and location of spilled substance shall be undertaken at the expense of the owner. If, in the opinion of the agent of the board of health, the spilled substance poses a significant threat to health and safety, it shall be removed by the owner.

#### Section 4. Report of Leaks or Spills

- 4.1 Any person who is aware of a spill or abnormal loss of product shall report such spill or loss immediately to the head of the fire department, and within two hours to the board of health.
- 4.2 All leaking tanks must be emptied within 24 hours of leak detection and either removed or repaired within a time specified by the board of health, under the direction of the head of the fire department.
- 4.3 Service companies shall report to tank owners and the board of health any unaccounted for significant increase in heating fuel consumption which may indicate a leak.

#### Section 5. Tank Selection and Installation

- 5.1 All tanks shall be properly installed as per Massachusetts Fire Prevention Regulations and manufacturers specification, under the direction of the head of the fire department. Tanks shall be of approved design and protected from internal and external corrosion. The following tank construction systems are considered to provide adequate corrosion protection: all fiberglass construction; steel with bonded fiberglass or enamel coating and non-corrosive internal lining, and the Steel Tank Institute 3-Way Protective System. All underground storage of chemicals other than gasoline and fuel shall be contained in tanks approved by the agent of the board of health. Any other system must be shown to provide equivalent protection.
- 5.2 Tanks shall be installed by a manufacturer's approved installation contractor.
- 5.3 If it is necessary to replace or interior-coat an underground steel tank which developed a corrosion induced leak, all other steel tanks at the facility which are the same age or older whether or not they are leaking shall be interior-coated or replaced with tanks that meet the requirements of 5.1.
- 5.4 If a cathodic protection system is installed, an ongoing monitoring and maintenance program shall be conducted. If sacrificial anodes have been installed, their proper operation shall be confirmed by a qualified person at least once a year.
- 5.5 The operator shall notify the head of the fire department prior to the commencement of tank installation. The head of the fire department or the board of health may require repair of protective coatings prior to installation or final cover.

**REFERENCE**

HEALTH REGULATION  
TO  
CONTROL TOXIC AND HAZARDOUS MATERIALS  
IN THE  
TOWN OF WALPOLE

Section 1. Findings

The Town of Walpole Board of Health finds that:

1. the groundwater underlying this town is the sole source of its existing and future water supply, including drinking water;
2. the groundwater aquifer is integrally connected with, and flows into lakes and streams which constitute significant recreational and economic resources of the town used for bathing and other water-related recreation;
3. accidental spills and discharges of petroleum products and other toxic and hazardous materials have repeatedly threatened the quality of such groundwater supplies and related water resources in other Massachusetts towns, posing potential public health and safety hazards and threatening economic losses to the affected communities; and
4. unless preventive measures are adopted to prohibit discharge of toxic and hazardous materials and to control their storage within the town, further spills and discharges of such materials will predictably occur, and with greater frequency and degree of hazard by reason of increasing construction, commercial and industrial development, population and vehicular traffic in the Town of Walpole.

Section 2. Authority

The Walpole Board of Health adopts the following regulations under its authorization under Chapter III, Section 31.

Section 3. Definitions

- A. The term "discharge" means the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying or dumping of toxic or hazardous material upon or into any land or water of the Town of Walpole.

Discharge includes, without limitation, leakage of such materials from failed or discarded containers or storage systems and disposal of such materials into any on-site sewage disposal system, drywell, catch basin or unapproved landfill.

REFERENCE

X

The term "discharge" as used and applied in this regulation does not include the following:

- 1) proper disposal of any material in a sanitary or industrial landfill that has received and maintained all necessary legal approvals for that purpose;
  - 2) application of fertilizers and pesticides in accordance with label recommendations and with regulations of the Massachusetts Pesticide Control Board;
  - 3) application of road salts in conformance with the Snow and Ice Control Program of the Massachusetts Department of Public Works; and
  - 4) disposal and "sanitary sewage" to subsurface sewage disposal systems as defined and permitted by Title 5 of the Massachusetts Environmental Code.
- B. The term "toxic or hazardous material" means any substance or mixture of such physical, chemical or infectious characteristics as to pose (in the judgment of the Board of Health) a significant actual or potential hazard to water supplies or other hazard to human health, if such substance or mixture were discharged in this town. Any substance deemed a hazardous waste in Massachusetts General Laws Chapter 21C shall be deemed a hazardous material. Toxic or hazardous materials include, without limitation, organic chemicals, petroleum products, heavy metals, radioactive or infectious wastes, acids and alkalies and includes products such as pesticides, herbicides, solvents and thinners. The following activities, without limitation, are presumed to involve the use of toxic or hazardous materials, unless and except to the extent that anyone engaging in such an activity can demonstrate the contrary to the satisfaction of the board of health:
- airplane, boat and motor vehicle service and repair
  - chemical and bacteriological laboratory operation
  - cabinet making
  - dry cleaning
  - electronic circuit assembly
  - metal plating, finishing and polishing
  - motor and machinery service and assembly
  - painting, wood preserving and furniture stripping
  - pesticide and herbicide application
  - photographic processing, and
  - printing.

Alternative 4: Rate of Multi-family Development Bylaw limiting the overall number of multi-family building permits issued within 12-month periods.

Significance: This Bylaw establishes a maximum number of multi-family building permits issued in any 12-month period. This bylaw is somewhat more equitable than "flat-out" building caps as its effectuation does not trigger a building permit freeze, but rather a percentage permit allotment per individual subdivision.

0000. Rate of Development.

0001. Purpose. The purpose of the Rate of Development Program is to allow the Town to provide, in a planned and rational manner, the basic facilities necessary for health, safety and welfare and to adequately support its existing and future population, through the adoption of standards which will coordinate residential growth with the provisions of community facilities. The Town recognizes its obligation to provide its share of the regional need for housing of all types and to manage, not prohibit growth. The Rate of Development shall be considered together with present and future plans (such as the master plan, official maps, growth management plan) and the Town Bylaws, in order to:

- 1) Provide for the most compact, efficient and cost effective Town services by means of long-range planning;
- 2) Protect and enhance the character of the community and its historical and natural resources;
- 3) Discourage rapid rise in service costs which will cause hardship, especially to persons of limited income who live, or may come to live, in the community;
- 4) Carry out the purposes of the Zoning Act, which empowers municipalities to "facilitate the adequate provision of transportation, water, sewerage, schools, parks and other requirements", to conserve natural resources, and to "encourage the most appropriate use of land" throughout the community;
- 5) Provide a degree of predictability as to the location and speed of residential growth, as as to enable comprehensive fiscal, governmental and land-use planning.

0002. Procedure. This Section shall take effect only when and if the Building Inspector determines that 20 multi-family dwelling units, excluding single family houses, have been authorized by permit townwide within a twelve (12) month period.

0003. Issuance of Permits. While this is in effect, the Building Inspector shall issue building permits for construction of new multi-family dwelling units in subdivisions approved and endorsed after January 1, 1980 only if

REFERENCE

## Section 6. Report of Spills and Leaks

Every person having knowledge of a spill, leak or other loss of toxic or hazardous materials in excess of 10 gallons shall immediately report the spill or loss of same to the board of health or Fire Department.

## Section 7. Enforcement

- A. The provisions of the regulation shall be enforced by the board of health. The agent of the board of health may, according to law, enter upon any premises at any reasonable time to inspect for compliance.
- B. Upon request of an agent of the board of health, the owner or operator of any premises at which toxic or hazardous materials are used or stored shall furnish all information required to enforce and monitor compliance with this regulation, including a complete list of all chemicals, pesticides, fuels and other toxic or hazardous materials used or stored on the premises, a description of measures taken to protect storage containers from vandalism, corrosion and spillage, and the means of disposal of all toxic or hazardous wastes produced on the site. A sample of wastewater disposed to on-site septic systems, drywells or sewage treatment systems may be required by the agent of the board of health.
- C. All records pertaining to storage, removal and disposal of toxic or hazardous materials shall be retained by the owner or operator for no less than three years, and shall be made available for review upon the request of the agent of the board of health.
- D. Certification of conformance with the requirements of this regulation by the board of health shall be required prior to issuance of construction and occupancy permits for any non-residential uses.

## Section 8. Violation

Written notice of any violation of this regulation shall be given to the owner and operator by the agent of the board of health, specifying the nature of the violation; any corrective measures that must be undertaken, including containment and cleanup of discharged materials; any preventive measures required for avoiding future violations; and for a schedule of compliance. Requirements specified in such a notice shall be reasonable in relation to the public health hazards involved and the difficulty of compliance. The cost of containment and cleanup shall be borne by the owner and operator of the premises.

## Section 9. Penalty

Penalty for failure to comply with any provisions of this regulation shall be \$20 after notice thereof under Section 8 above.

### Section 3. Well Drillers.

- 3.1 All well drillers shall have a Massachusetts State license issued by the Water Resources Commission.

### Section 4. Water Quality and Quantity

- 4.1 There shall be a minimum yield of 200 gallons per bedroom per day at 20 lbs. P.S.I. at the highest fixture serviced. A bedroom shall include undeveloped area that could be made into a bedroom. System capacity for semi-public supplies must be adequate to meet the projected needs.

- 4.2 Pressure tanks for individual home installations shall have a minimum capacity of 42 gallons.

- 4.3 Quantity tests shall be performed by competent pump or well drilling contractors and a well shall produce a supply for each dwelling unit served by an on-site well as follows:

<u>Well Depth</u>	<u>GPM - 4 hrs.</u>
0 to 150 feet	5-6
150 to 200 feet	4
200 to 300 feet	2-3
300 and over	1-2

- 4.4 Auxiliary power must be available to maintain a water supply for multiple dwellings.

- 4.5 The wall of a dug well shall extend at least 4 inches above the floor or the original ground surface.

- 4.6 Sanitary protection must be incorporated into the construction of the well and final finishing at grade shall include cement platform large enough to extend at least 2 ft. in all directions from the well casing itself.

- 4.7 All newly completed wells shall be disinfected in accordance with instructions from U. S. Environmental Protection Agency Manual of Individual Water Supply Systems.

- 4.8 Before approval, well log and pump test data shall be submitted to the Board of Health in the form attached to these regulations. It shall include a log of the well, showing depth and type of overburden, depth of casing installed below ground surface, diameter of casing and diameter of the hole in the rock, static water level, and the pumping rate which can be sustained for four (4) hours. The well (after pump testing) shall recover to within

## Section 6. Pipes and Equipment

- 6.0 All service pipes and connections shall be of nontoxic material and meet the specification approved by the New England Water Works Association.
- 6.1 The installation of pipes shall be such that they are protected from crushing, freezing and/or attack by rodents.
- 6.2 Dissimilar metals should be discouraged in the water system. The use of non-conductive plastic inserts between pipes and fitting or the installation of sacrificial anodes is helpful in minimizing electric corrosion problems.
- 6.3 Electrical service grounds shall not be attached to the water piping. All electrical service and controls of well must be permitted, inspected and approved according to Town and State regulations.

## Section 7. Prohibitions

- 7.0 Surface water supplies for private or semi-public water supplies shall be prohibited.
- 7.1 Cisterns shall be prohibited.
- 7.2 Cross connections shall be prohibited. No cross connection between a private source of water supply shall be allowed.
- 7.3 Other cross connections for whatever purpose shall not be allowed without a written permit from Mass. Dept. of Public Health.
- 7.4 All homes already on private wells must report to Board of health within 6 months.
- 7.5 No lot may be connected to both town and private water system.

## Section 8. Enforcement

- 8.0 Variances
  - 8.0.1 The Board of Health may vary the application of any provision of these regulations with respect to any particular case, when in its opinion, the enforcement thereof would do manifest injustice, provided that the decision of the Board of Health shall be in writing.
- 8.1 Variance, Grant of Special Permission, Expiration, Modifications, Suspension of

#### Section 4. Prohibitions .

- A. The discharge of toxic or hazardous materials within the Town of Walpole is prohibited.
- B. Outdoor storage of toxic or hazardous materials is prohibited, except in product-tight containers which are protected from the elements, leakage, accidental damage and vandalism, and which are stored in accordance with all applicable requirements of Section 5 of this regulation. For purposes of this subsection, road salts and fertilizer shall be considered as hazardous materials.

#### Section 5. Storage Controls, Registration and Inventory

- A. Except as exempted below, every owner, and every operator other than an owner of a site at which toxic or hazardous materials are stored in quantities totaling at any times more than 50 gallons liquid volume or 25 pounds dry weight, shall register with the board of health the types and quantities of materials stored, location and method of storage. The board of health may require that an inventory of such materials be maintained on the premises and be reconciled with purchase, use, sales and disposal records on a monthly basis, in order to detect any product loss. Registration required by this subsection shall be submitted within 60 days of the effective date of this regulation and annually thereafter. Maintenance and reconciliation of inventories shall begin within the same 60-day period. Exemptions: registration and inventory requirements shall not apply to the following.
  - 1) fuel oil stored in conformance with Massachusetts Fire Prevention Regulations and regulations of the Walpole board of health for the purpose of heating buildings located on the site; or
  - 2) the storage of toxic and hazardous materials at a single-family or two-family dwelling, except where such materials are stored for use associated with a professional or home occupation uses as defined by Section 3.B - 3.K of the Zoning By-Laws of the Town of Walpole.
- B. Toxic or hazardous wastes shall be held on the premises in product-tight containers and shall be removed and disposed of in accordance with the Massachusetts Hazardous Waste Management Act, Chapter 21C, MGL.
- C. The board of health may require that containers of toxic or hazardous materials be stored on an impervious, chemical resistant surface compatible with the material being stored, and that provisions be made to contain the product in the case of accidental spillage.

**REFERENCE**

HEALTH REGULATION  
FOR  
PRIVATE WELL PERMITTING

Under Chapter 111, Section 31 of the Massachusetts General Laws, the Walpole Board of Health hereby adopts the following Regulations to protect the health of the residents of the Town of Walpole who are served by private on-lot wells.

Section 1. Well Permit Applications.

- 1.1 Any resident who wishes to construct a private on-lot well as a source of drinking water shall apply for a permit from the Walpole Board of Health.
- 1.2 Applicants shall provide the Board of Health with a locus map (U.S. Geological Survey quadrangle is recommended) and a copy of the State "Water Well Completion Report" with well location and septic systems (including adjacent lots) shown in diagram.
- 1.3 A fee of \$50 per application shall be charged by the Board of Health to cover sampling, and permitting costs shall be borne by applicant.

Section 2. Wells

- 2.1 Wells shall be located at least 15 feet from any public or private way or street 10 feet from any building, 10 feet from lot lines, 50 feet from any septic tank, and 100 feet from any leaching facility. Greater distances from leaching facilities may be required by the Board of Health if geologic or groundwater flow conditions so warrant.
- 2.2 A plot plan shall be submitted with the application for a well permit to the Board of Health indicating the proposed location of the well, all building, boundary lines, septic systems (within 200 ft.)
- 2.3 Well must be properly curbed and covered to prevent entrance or contamination and to divert surface drainage away from the well.
- 2.3 A pitless adapter shall be provided such that the permanent watertight casing of the well shall terminate a minimum of 12 inches above finished grade and/or the elevation of the 100-year flood.

eighty-five (85) percent of the original static water level within a twenty-four (24) hour period. The results of all testing shall be submitted to the Board of Health for approval and the well contractor shall be responsible for all data submitted.

- 4.9 Wells shall be cleared and sampled in the presence of an agent of the Walpole Board of Health. Sampling methods selected should minimize agitation of the sample.
- 4.10 pH and specific conductance shall be measured in the field by an agent of the Walpole Board of Health.
- 4.11 The water sample shall be iced, picked up (within 24 hours) by a State-certified water quality laboratory and shall be analyzed for total coliform bacteria, turbidity, iron, manganese, nitrate-nitrogen, chloride and copper.
- 4.12 A bacteriological test to indicate a 0-100 ML coliform density shall be required. A total bacteria count shall also be determined at 35°C.
- 4.13 Water quality results shall meet the following limits to conform to current and Federal and Mass. Drinking Standards.

pH	5.5-7.5
Specific Conductance	500 Mmhos/cm
Turbidity	5 SU
Iron	.03 ppm*
Manganese	0.05 ppm*
Nitrate-Nitrogen	10 ppm
Chloride	250 ppm
Copper	1.0 ppm

\* Excessive iron and manganese may be treated to achieve the required water quality standards.

\* Sodium to be reported to the homeowner if greater than 20 mg/l. Other parameters will be evaluated on a case by case basis by the Board of Health to establish the water's suitability as a domestic water supply.

#### Section 5. Water Conditioning

- 5.0 Permanent disinfection of a polluted supply is prohibited. If the natural water quality does not meet the physical and chemical criteria, water conditioning shall be required. Water softener or other treatment backwash shall not be discharged into the septic system.

- 8.1.1 Any variance or other modification authorized to be made by these regulations may be subject to such qualification, revocation, suspension or expiration as the Board of Health expresses its grant. A variance or modification authorized to be made by these regulations may otherwise be revoked, modified, or suspended, in whole or in part, only after the holder thereof has been notified in writing and has been given an opportunity to be heard.
- 8.2 General Enforcement
  - 8.2.1 The provisions of Article 1 of the State Environmental Code shall govern the enforcement of these regulations.
- 8.3 Orders: Service and Content
  - 8.3.1 If an examination as provided for in regulation 3.2.1 or 3.2.2 reveals failure to comply with the provisions of these regulations, the Board of Health may order the person responsible to comply with the violated provision.
- 8.4 The inspection and these regulations cannot be construed as a guarantee by the Town of Walpole, or its agents, that the water system will function satisfactorily.
- 8.5 The Board of Health may require a restriction to be recorded in the Registry of Deeds in cases which, in the opinion of the Board of Health, the water analyses show marginal compliance with the criteria of these regulations.

#### Section 9. Adoption and Date of Effect

These rules and regulations were adopted by vote of the Board of Health, Town of Walpole, Massachusetts, and are to be in full force and effect on and after August 14, 1985 and shall, before said date, be published in this Town and a copy thereof shall be deposited in the office of the Town Clerk.



Appendix B  
Test Well Logs

REFERENCE

<u>Test Well No.</u>	<u>Depth (in feet)</u>	<u>Description</u>	<u>Water Table</u>	<u>Pumping Rate</u>
9	0-21 21-28 28	vf/vc sand till refusal	well not pumped	-----
10	0-21 21	silt/vc sand refusal	well not pumped	-----
11	0-21 21-28 28	silt/vc sand till refusal	well not pumped	-----
12	0-24 24-27 27	vf/vc sand till refusal	well not pumped	-----
13	0-13 13-20 20-34 34-40 40	f/m sand f/c sand silt/f sand f/c sand refusal	4 feet 8 "	5 gpm
14	0-20 20-26 26	clay till refusal	well not pumped	-----
15	0-6 6	f/c sand refusal	well not pumped	-----
16	0-9 9	f/c sand refusal	well not pumped	-----
17	0-3 3	f/c sand refusal	well not pumped	-----
18	0-13 13-17 17-20 20-34 34-41 41-45 45-47 47	f/c sand silt/f sand m/c sand silt/vc sand f/vc sand f sand c sand refusal	5 feet 1 "	38 gpm

REFERENCE



<u>Test Well No.</u>	<u>Depth (in feet)</u>	<u>Description</u>	<u>Water Table</u>	<u>Pumping Rate</u>
27	0-5 5-13 13-20 20-34 34-43 43	peat f sand/gravel c sand/gravel silt/c sand m/c sand refusal	4"	8 gpm

REFERENCE