NH WORK TASK 89-5.2.2

TOWN OF NEWFIELDS

WATER RESOURCES MANAGEMENT AND PROTECTION PLAN

1990

Supplement to the Newfields Master Plan

Prepared for
The Newfields Planning Board

Prepared by
The Rockingham Planning Commission

HD
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ATTACHMENT #16

WATER RESOURCE MANAGEMENT AND PROTECTION PLAN

for the

Town of Newfields Master Plan

Prepared for the
NEWFIELDS PLANNING BOARD

by the

ROCKINGHAM PLANNING COMMISSION

June, 1990

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

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INTRODUCTION

This component of the Town of Newfields Master Plan addresses the requirements, established by the New Hampshire Office of State Planning under the authority of RSA 4-C:20,I, for the preparation of local water resource management and protection plans.

The purposes of this chapter are to identify and describe surface and groundwater resources; to identify existing and potential threats to these resources; to evaluate the adequacy of water resources to meet the current and future needs of the Town; to evaluate existing local programs which have the potential to impact water resources; and to identify regulatory and nonregulatory programs that could further enhance water resource management and protection efforts.

The protection and wise use of water resources are of critical concern to the Town of Newfields. With a large majority of the Town dependent on groundwater, from both private wells and the Town of Newfields Water Department wells, the quantity and quality of this resource must be protected from depletion and/or contamination. Other Town water resources, such as swamps, ponds, rivers, streams, and wetlands, are important not only because they are often hydrologically related to groundwater, but because they provide ecological, scenic and recreational value to the Town as a whole.

In general, there is a direct relationship between land use and water quality. The right use in the wrong area, or the right use carried out in the wrong way can degrade and contaminate both surface and groundwater, increase flood hazards, destroy water-based wildlife and interfere with scenic and recreational values. It is the responsibility of the Town to take reasonable precautions to protect all water resources from incompatible uses and, in so doing, protect the health and general welfare of the community.

I. SURFACE WATER RESOURCES

Watersheds

The Town of Newfields contains three regional watersheds, as depicted on Map A - "Regional Watersheds" - the drainage areas for the Squamscott, Piscassic and Lamprey Rivers. The Squamscott River and Lamprey River watersheds are identified on the "New Hampshire Hydrologic Unit Map" (source: U.S. Department of Agriculture, Soil Conservation Service, May 1982), and the Piscassic River Watershed boundary was delineated by the Rockingham Planning Commission using 7.5 minute topographic maps (Newmarket Quadrangle, NH and Epping Quadrangle, NH; U.S. Geological Survey, 1973).

The following paragraphs provide a general description of each watershed.

a) Lamprey River Watershed: The Lamprey River has a total length of about 42 miles. The watershed area covers portions of 12 towns - Northwood, Deerfield, Candia, Raymond, Fremont, Epping, Newmarket, Durham, Lee, Newfields, Barrington, and Nottingham. The total area is approximately 135,900 acres (211 square miles). The area of the Lamprey River watershed contained within Newfields is about 576 acres (.9 sq. mi.).

b) Piscassic River Watershed: The Piscassic River has a total length of about 12 miles. The watershed area covers portions of Fremont, Epping, Exeter, Newfields, and Newmarket. The total area is approximately 13,500 acres (21 sq. mi.). The area of the Piscassic River watershed contained within Newfields is about 2,124 acres (3.3 sq. mi.).

c) Squamscott River Watershed: The Squamscott River has a total length of approximately 6.8 miles. The watershed area covers portions of Newmarket, Stratham, Newfields, and Exeter. The total area of the Squamscott watershed is 12,019 acres (18.8 sq. mi.). The area of the Squamscott River watershed contained within Newfields is about 2,016 acres (3.1 sq. mi.).

Watersheds Within Municipal Boundaries

The three regional watersheds contained within Newfields are drained by a number of smaller streams. These drainage areas are depicted on Map B - "Watersheds and Perennial Water Bodies" (source: Newmarket, Exeter and Epping, N.H. Quadrangle; 7.5 minute topographic maps; U.S. Geological Survey, 1973). Description of each drainage system are provided below.

a) Lamprey River

Unnamed stream in Northwest corner of Town, elevation of 100 feet, flows Northeasterly for a distance of 1.5 miles into a pond at Town's border. Approximately 3,200 feet of this stream is classified as intermittent. A second intermittent stream converges with this stream and is approximately 2,250 feet long. In addition, just below the pond, a short unnamed perennial stream of 1,500 feet joins the stream.

The Lamprey River is fed by two unnamed perennial streams in Newfields, shown on the map as L-1 and L-2. L-1 begins at a point just west of Bald Hill Road and flows north 4,500 feet at an approximate elevation of 80 MSL into an unnamed pond at the Newmarket Town Line. Stream L-2 is fed

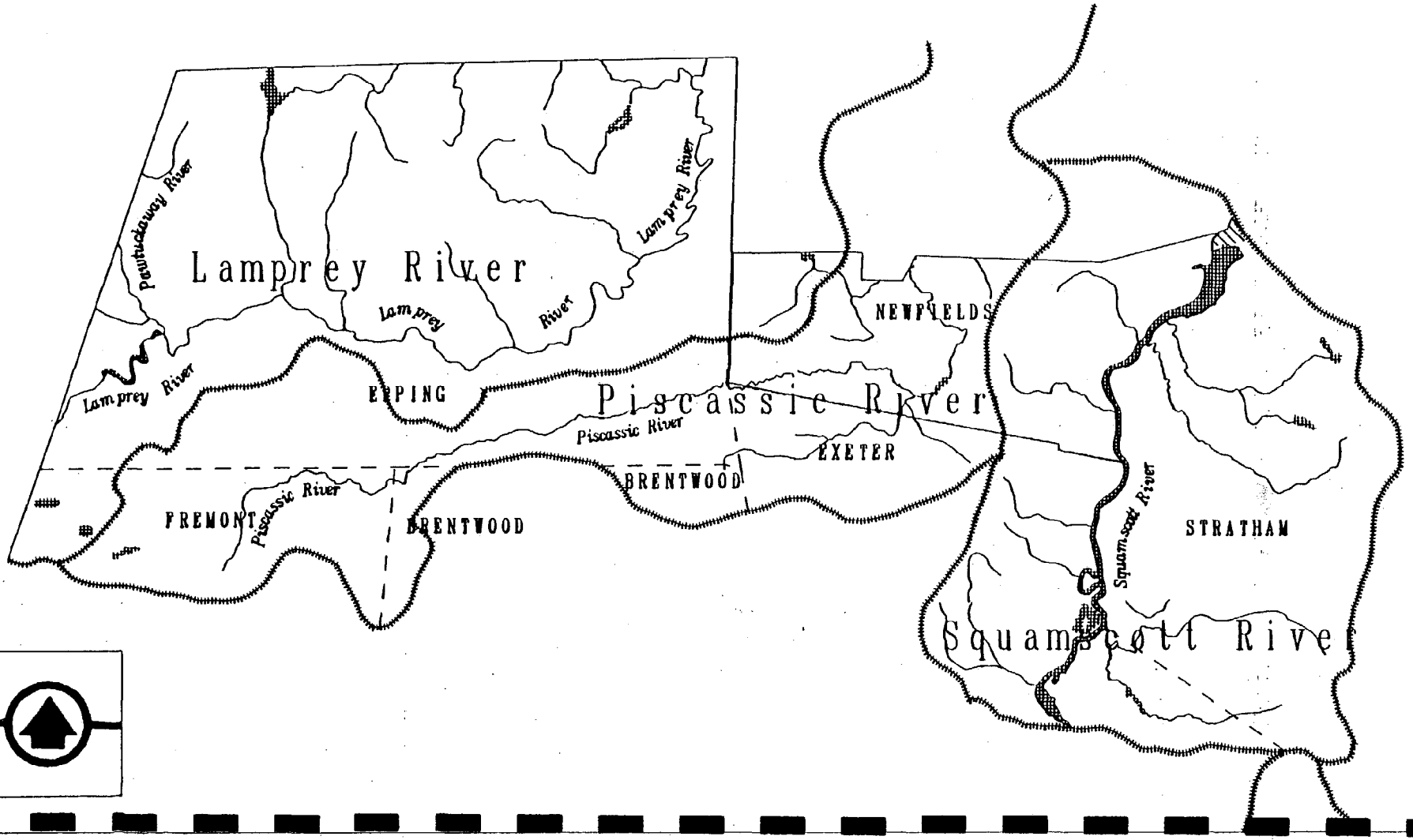
Regional Watersheds

Map A

Source: USGS 1:100000 DLG Files

Prepared by the Rockingham Planning Commission
June 1990
Scale 1:93780 or 1" = 1.5 Miles SRG

Regional Watersheds



by two intermittent streams labeled LI-1 and LI-2 on Map B. The combined distance of these two intermittent streams is 5,500 feet.

L-2 west at an elevation of 80 feet MSL for 1,500 feet and then joins stream L-1. Both unnamed perennial streams and both unnamed intermittent streams have a legislative classification of "B".

b) Piscassic River

The Piscassic River flows for 4.3 miles, from southwest to north central, through the Town of Newfields. From its entry into Town at the southwest corner, the River drops from an approximate mean sea level elevation of 110 feet to roughly 80 feet MSL. The legislative classification of the Piscassic River is "A" which is the best state classification and denotes highest water quality.

The Fresh River and four unnamed perennial streams serve as tributaries to the Piscassic River in Newfields. Each has a legislative classification of "A".

1) Fresh River flows northward from Exeter at an elevation of approximately 100 MSL. Within Newfields it flows for approximately 500 feet into the Piscassic Ice Pond.

2) Unnamed Streat P-1 flows northward out of Exeter for 1,250 feet at approximately 100 ML and joins the Fresh River at the southern end of Piscassic Ice Pond.

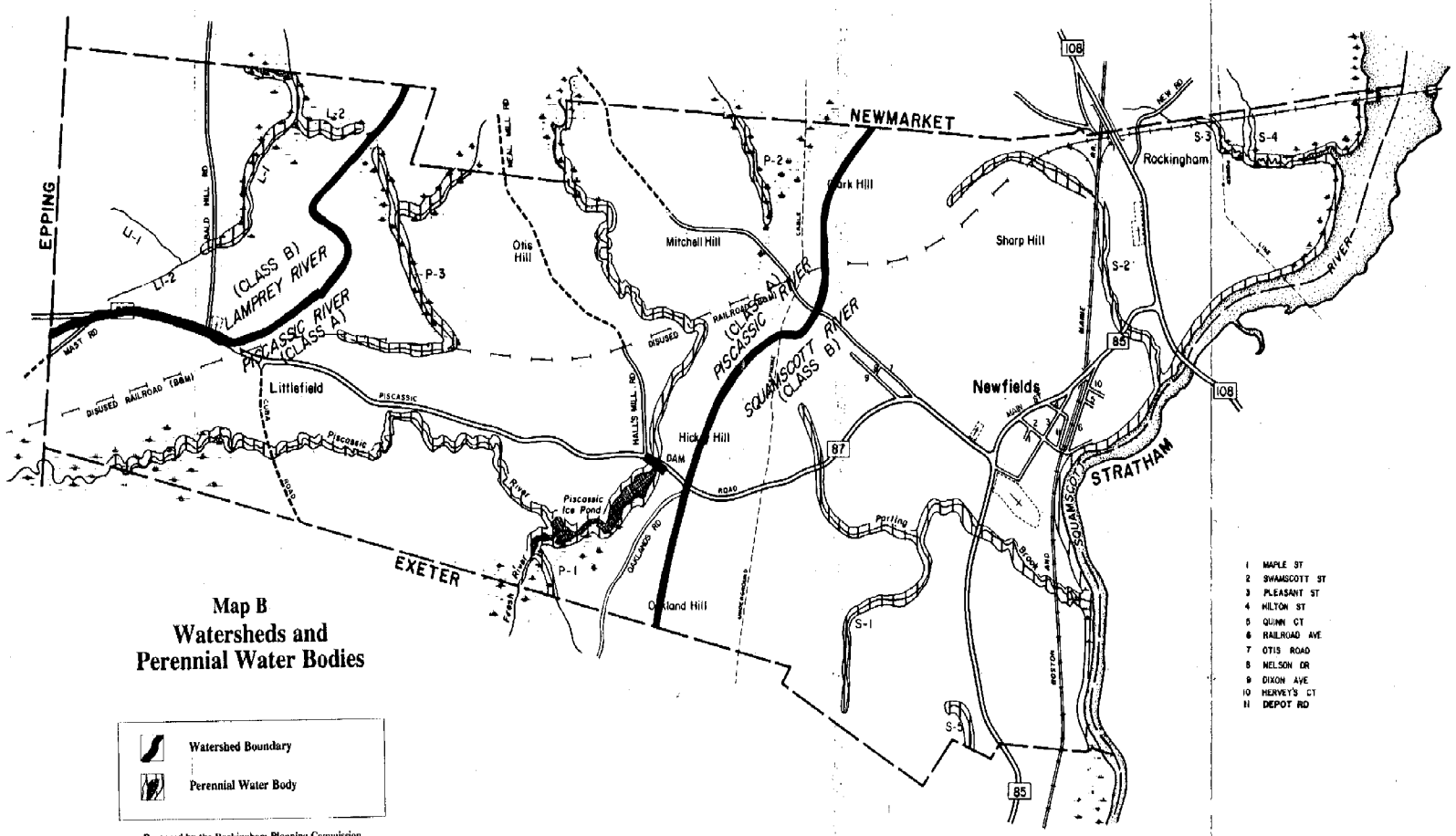
3) Unnamed streat P-2 flows from north central Newfields at an elevation of roughly 80 feet MSL for a distance of 2,500 feet into Newmarket.

4) Unnamed stream P-3 flows northerly from a starting elevation of approximately 106 feet just north of Littlefield for roughly 7,500 feet. When this stream exits, Newfields at the Newmarket town line its MSL elevation is approximately 80 feet.

5) Unnamed stream P-4 flows in a southerly direction for 1,000 feet until it joins with stream P-3 (described above) at 80 feet MSL.

Within the Piscassic River Watershed is one perennial artificial pond, the Piscassic Ice Pond. Located in southeastern Newfields, the pond is approximately 10.3 acres in size and is at an elevation of 90 - 100 feet MSL. The pond is fed by the Fresh River and P-1 (see Map B) from the south and the western section of the Piscassic River. The eastern section of the Piscassic River flows out of the northeastern end of the pond. The pond has an approximate shoreline of 1.3 miles.

At the northeastern end of the pond is a dam registered as number 171.01 with the New Hampshire Water Resources Board (depicted on Map B - "Watersheds and Perennial Water Bodies"). The Board has given the dam a hazard class rating of "AA". Class "AA" dams are so designated because failure would not result in a menace to public safety. This is the least hazardous structure classification.



Map B
Watersheds and Perennial Water Bodies

Watershed Boundary

Perennial Water Body

Prepared by the Rockingham Planning Commission
June 1990

Sources: Newmarket, Exeter, and Epping 7.5 minute quadrangles, U.S. Geological Survey.

"Dam Data for Rivers and Streams", N.H. Water Resources Board; February 1989.

TOWN OF NEWFIELDS, N.H.

Feet 5800 2700 1800 900 0 1/4 1/2 3/4 1 Mile

STATE OF NEW HAMPSHIRE
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT

DRAFTED BY ALEC NICHOLAS	DATE AUG 1974
SOURCE:	
REVISION UPDATE / CORRECTIONS	
DRAFTING BY S. GRIFFITHS RPC	DATE JULY 1988
REVISION	
DRAFTING BY	DATE:
SHEET NO OF	FILE NO. TF 11-100
INSET NO OF	

c) Squamscott River

The Squamscott River flows for 2.8 miles serving as the eastern town boundary from north to south. The Squamscott River is a tidal river that flows into Great Bay, as a result the elevation is 0 feet MSL for its entire distance in Newfields. The legislative classification for the Squamscott River is "B".

Within the Town of Newfields, the Squamscott River is fed by 6 perennial streams, one of which has been named Parting Brook. All six have a legislative classification of "B".

1) Parting Brook: Beginning at a point just north of Piscassic Road in central Newfields, the Brook flows southeasterly 1.6 miles. The Brook begins its flow at an elevation of 100 feet MSL and ends at the Squamscott River (0 feet MSL).

2) S-1: Beginning at an elevation of approximately 90 feet MSL in southeastern Newfields, this stream flows north for a distance of 4,250 feet and joins Parting Brook at an elevation of roughly 55 feet MSL.

3) S-2: Beginning at an elevation of approximately 70 feet MSL in northeastern Newfields, this stream flows south 1.4 miles before entering the Squamscott River (0 feet MSL).

4) S-3: Begins at a point on the northeastern Newfields town line at an elevation of 20 feet MSL and flows south 3,250 feet to empty into the Squamscott River (0 feet MSL).

5) S-4: Begins at a point 500 feet east on the same town line as S-3 above, at an elevation of approximately 10 feet MSL and flows south 250 feet where it joins stream S-3 to enter the Squamscott River (0 feet MSL).

6) S-5: Beginning at a point on Newfields' southeastern border with Exeter, the stream flows south for roughly 500 feet at an elevation of 60 feet MSL and exits into Exeter before joining the Squamscott River.

Table 1 - "Acreage of Wetlands and Floodplain Areas", presents a breakdown of the acreage of floodplain areas, and poorly drained and very poorly drained soils within Newfields' three regional watersheds. The areas for muck and ponded soils, both of which are classified as very poorly drained soils, are also inventoried.

Table 1
Acreage of Wetlands and Floodplain Areas

	Squamscott River	Piscassic River	Lamprey River
Poorly drained soils	285 acres	426 acres	99 acres
Very poorly drained soils			
Muck	0 acres	41 acres	0 acres
Peat	88 acres	52 acres	12 acres
Ponded	21 acres	78 acres	23 acres
Other	57 acres	71 acres	66 acres
Floodplain	301 acres	487 acres	92 acres

Map C - "Wetlands", depicts the locations of wetland areas throughout the Town of Newfields. This information was taken from an Soil Conservation Service County Soil Survey Map (source: USDA Soil Conservation Service, 1985). Wetlands are defined as poorly and very poorly drained soils. Much of these wetlands are contained in Newfields 100 year flood zones, which are depicted on Map D - "Flood Hazards and Bedrock Geology". Flood boundaries are those shown on the Town of Newfields "Flood Insurance Rate Map" (effective date June 5, 1989), published by the Federal Emergency Management Agency (FEMA). In general, the 100-Year flood zone surrounds the major water courses throughout Town. The largest contiguous flood areas surround the Squamscott River, Parting Brook and the Piscassic River.

Development should be located away from wetlands and floodplains. The filling of and use of wetlands for building construction not only destroys wetlands and their benefits, but may also lead to groundwater contamination. Building within a floodzone may also reduce the floodplain's capacity to absorb and retain water during periods of excessive precipitation and runoff. Moreover, in regard to building within floodplains, contamination may result from flooding damage to septic systems. Without specific floodproofing design and construction, design within floodplains poses threats to public health, safety, and welfare.

In accordance with NH Code of Administrative Rules (Wr700) the Water Management Bureau (of the Water Resources Division, NH Department of Environmental Services (DES)) compiles data on all water users throughout the State which withdraw or discharge more than 20,000 gallons of water per day. According to the Bureau, the Town of Newfields presently has no major users of surface waters.

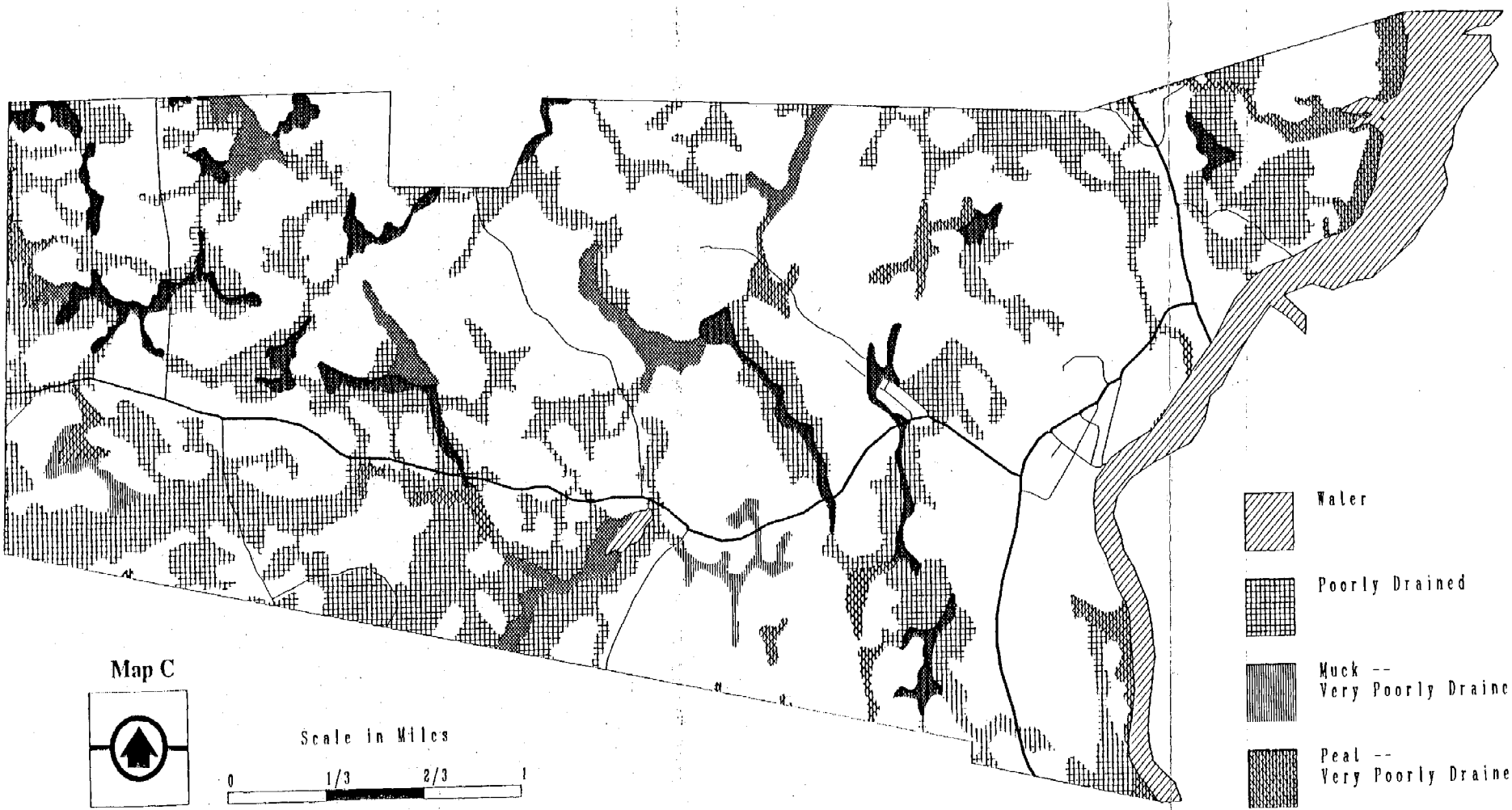
Potential Surface Water Supplies

The Piscassic River in the largest fresh water river in Newfields and is the only one with a legislative classification of "A". According to RSA 149:3-1 "Class A waters shall be of the highest quality.... There shall be no discharge of any sewage or wastes into waters of this classification. The waters of this classification shall be considered as being potentially acceptable for water supply uses after disinfection". According to the New Hampshire Water Quality Report to Congress 305(b), the Piscassic River is in full compliance with the water quality standards set by their legislative classification (source: NH Department of Environmental Services, Water Supply and Pollution Control Division; April, 1988). This is true of all of the water bodies within Newfields except the Squamscott River. Although, at this time, the most economical and practical source for public water from within Newfields would be from groundwater, the potential for using surface water resources does exist. A report prepared by Hydroscience Associates of Durham in 1986 for the Newfields Water Comissioners found that a surface water supply on the Piscassic River was possible but further studies were needed to determine feasibility. As discussed in the next section, a municipal water supply system is presently operated in Newfields.

II. GROUNDWATER RESOURCES

The term "aquifer" is defined as earth material containing sufficient quantities of groundwater for pumping. The U.S. Geological Survey has been working on aquifer delineation maps for the communities located in the Lower Merrimack/ Coastal area for over two years, and although this new information is available it has not yet been published . Therefore, other sources have also been used to assess the groundwater resources for Newfields.

Town of Newfields -- Wetland Soils



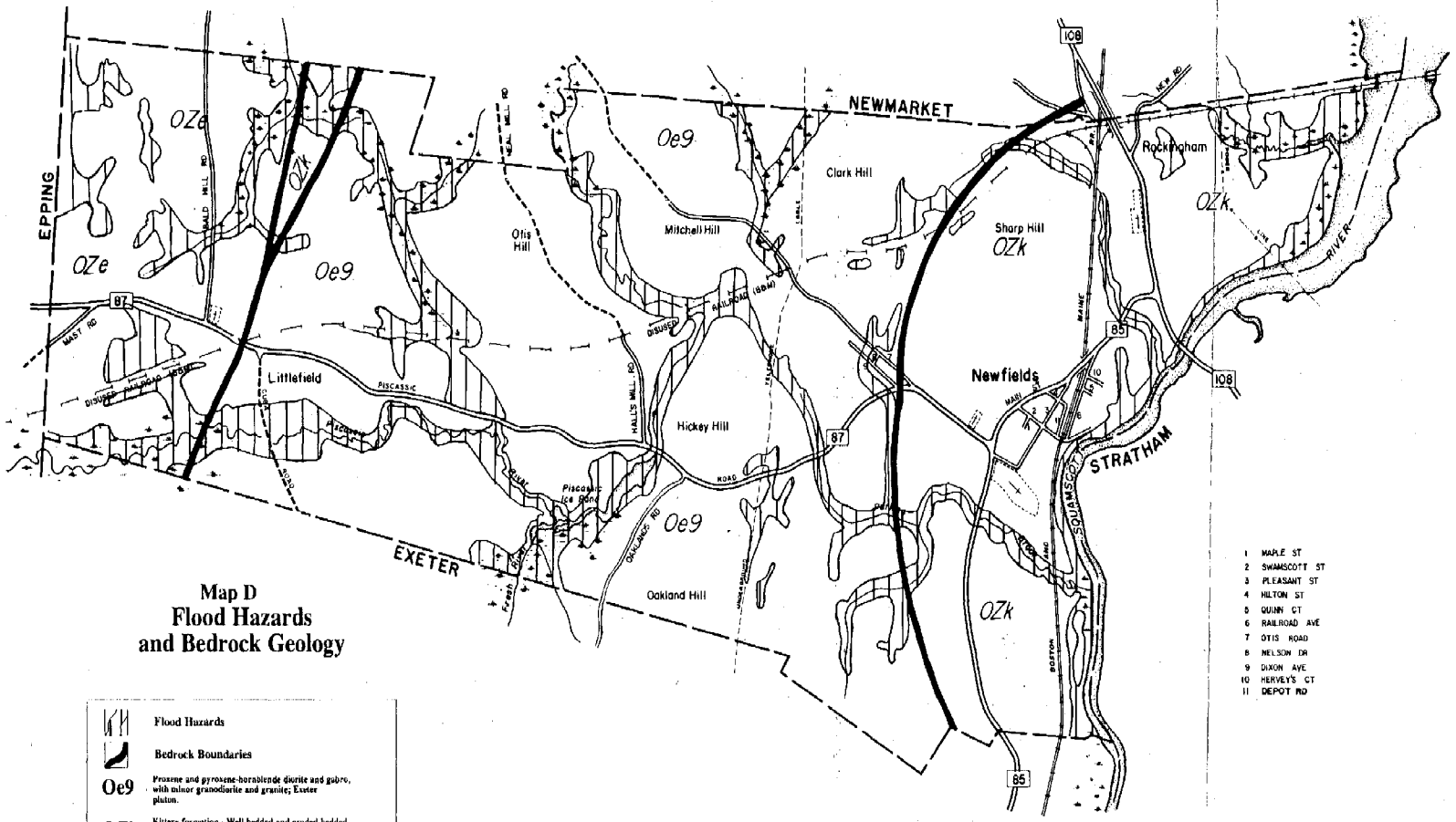
Map C

Scale in Miles

0 1/3 2/3 1

Sources: Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

Prepared by the Rockingham Planning Commission, May 1990. SRG



Map D
Flood Hazards and Bedrock Geology

Flood Hazards

Bedrock Boundaries

Oe9 Proxene and pyroxene-hornblende diorite and gabro, with minor granodiorite and granite; Exeter pluton.

OZk Kittery formation - Well bedded and graded-bedded purple and green phyllite and tan calcereous silstone, grading upward into the Eliot formation.

OZe Eliot formation: gray to green phyllite, quartzite and quartz mica schist and well-bedded calc-silicate.

Prepared by the Rockingham Planning Commission
June 1990

Sources: "Flood Insurance Rate Map, Town of Newfields Rockingham County, New Hampshire;" Federal Emergency Management Agency, June 5th 1989.

Geological Map of New Hampshire: U.S. Geological Survey/State Geologist, 1986.

TOWN OF NEWFIELDS, N.H.

Feet 3600 2700 1800 900 0 1/4 1/2 3/4 Mile

STATE OF NEW HAMPSHIRE
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT

DRAFTED BY ALEC NICHOLAS DATE AUG 1974
SOURCE
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Stratified Drift Aquifers

The groundwater resources of Newfields have been investigated several times. Two federal agencies - the U.S. Army Corps of Engineers (USACE) and the U.S. Geologic Survey (U.S.G.S.) - based their findings on the surficial geology of the Town. They assumed that areas in Town which contained stratified drift formations would also yield the greatest amount of groundwater. As mentioned previously, the Town contracted with Hydroscience of Durham in 1986 to prepare a study detailing present and future demand for water. In addition, D.L. Maher Company produced a study entitled "Evaluation of Alternative Groundwater Supplies - Newfields, N.H.". These four sources provided the basis for the aquifers shown on Map E - "Aquifers".

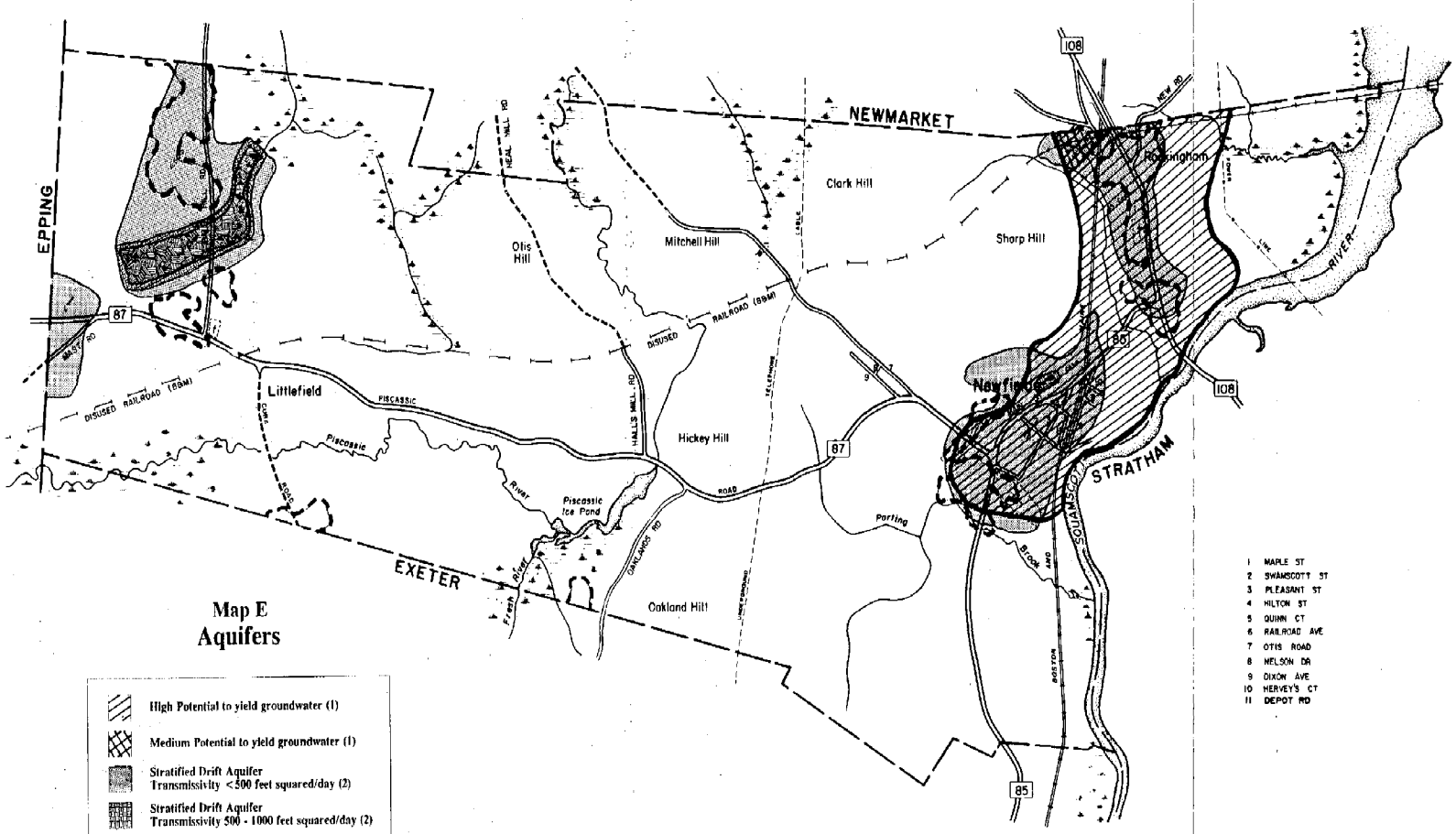
Of the four sources reviewed, the studies completed by the U.S.G.S. entitled Availability of Groundwater in the Piscataqua and Other Coastal River Basins, Southeastern New Hampshire, by John E. Cotton, Water Resource Investigations 77-70, 1977 (hereinafter referred to as the Cotton map) and Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern, N.H."; 1990 gives the best aquifer delineations. These studies identified areas of high, medium or low potential to yield significant quantities of groundwater (see Map E). The reference map provides the following narrative with respect to the delineated aquifers on the Cotton Map:

Potential High Yield Aquifers - "Areas inferred to be underlain by medium to very coarse sand or sand and gravel with sufficient saturated thickness to have high potential to yield water. Included are areas with fine-grained surficial deposits, which are inferred to be underlain by medium to very coarse sand or sand and gravel. Wells located by systematic ground-water exploration within these areas should yield sufficient quantities to meet or augment municipal and industrial requirements. Deposits are thinner and wells would be less productive along the margins of these areas. Pumping wells adjacent to streams or lakes may induce surface water to infiltrate the aquifer."

Potential Medium Yield Aquifers - "Areas inferred to be underlain by relatively thin saturated sections of medium to very coarse sand or sand and gravel that have medium potential to yield water. Shallow wells and infiltration galleries located by systematic groundwater exploration within these areas may yield sufficient quantities of water for small municipal and rural water districts and commercial and light industrial use. Deposits are thinner and wells would be less productive along the margins of these areas, except where they border areas of high potential. Pumping wells adjacent to streams or lakes may induce surface water to infiltrate the aquifer."

Potential Low Yield Aquifers - "Areas inferred to be underlain by fine and very fine sand, silt, and clay that have low potential to yield water. These deposits may yield sufficient water to wells for domestic and light commercial use. In places, thin lenses of coarse sand and gravel with higher potential yield may occur within or underlie these deposits, but these lenses may or may not have adequate storage or recharge to provide large sustained well yields. Pumping wells adjacent to streams, lakes, or tidewater may induce surface water to infiltrate the aquifer."

The Cotton study found one high yield aquifer to exist in Newfields. Located in the northeastern section of town, this aquifer encompasses the entire



1 MAPLE ST
2 SWAMSCOTT ST
3 PLEASANT ST
4 HILTON ST
5 QUINN CT
6 RAILROAD AVE
7 OTIS ROAD
8 NELSON DR
9 DIXON AVE
10 HERVEY'S CT
11 DEPOT RD

Map E
Aquifers

- High Potential to yield groundwater (1)
- Medium Potential to yield groundwater (1)
- Stratified Drift Aquifer Transmissivity < 500 feet squared/day (2)
- Stratified Drift Aquifer Transmissivity 500 - 1000 feet squared/day (2)
- Stratified Drift Aquifer Transmissivity 1000 - 2000 feet squared/day (2)
- Groundwater Potential (Best) (3)

Prepared by the Rockingham Planning Commission
June 1990

Sources:
(1) "Availability of Groundwater in the Lower Merrimack Valley River Basin, Southeastern N.H.", J.E. Cotton, U.S.G.S.; 1977.
(2) "Geohydrology and Water Quality of Stratified-Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern N.H.", U.S.G.S.; 1990.
(3) "Index for Groundwater Potential", Hydroscience Associates, 1986; Newfields Master Plan Update, 1988.

TOWN OF NEWFIELDS, N.H.

Feet 3600 2700 1800 900 0 1/4 1/2 3/4 Mile

STATE OF NEW HAMPSHIRE
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT

DRAFTED BY ALEC NICHOLAS DATE AUG. 1974
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Newfields Town Center. Its boundaries lie almost entirely within the Town of Newfields and its size is approximately 482 acres.

The 1990 U.S.G.S. study verified this location and provided information regarding the transmissivity of this aquifer as well as the other aquifers existing in Town. Transmissivity is the rate at which water is transmitted through a unit width of aquifer under a unit of hydraulic gradient. It is equal to the product of hydraulic conductivity and saturated thickness (source: Groundwater Resources of the Lamprey River Basin, Southeastern New Hampshire: J.E. Cotton; U.S. Geological Survey, Water-Resources Investigations Report 84-4252; 1988). This information is displayed on Map E.

Areas of high and medium potential to yield groundwater have been mapped. In addition, those areas determined by Hydroscience Associates to have the best potential to yield groundwater as detailed in the 1988 Newfields Master Plan Update are shown in the south and southwestern sections of Town.

Bedrock and Till Aquifers

The State Geologist Map (previously cited), which depicts Newfields' surficial geology, contains information regarding the location and extent of till (and marine sediment) formations. In general, till material has poorly sorted grain sizes, which results in limited porosity, transmissivity and hydraulic conductivity. Given these qualities, till formations would not be suitable for municipal water supply wells. Hence, these areas have not been delineated in this plan.

The bedrock geology of Newfields was determined using the "Interim Geologic Map of New Hampshire", U.S. Geological Survey/State Geologist (1986), prepared at a scale of one inch equals approximately four miles. As previously stated, Map F depicts the bedrock wells which were mapped by the Water Well Board. In addition, the fault lines of different formations are shown on Map D - "Flood Hazards and Bedrock Geology".

Newfields has three general types of bedrock geology:

1. Kittery Formation (metamorphic)

    a) OZk - well bedded and grade-bedded purple and green phyllite and tan calcareous siltstone;

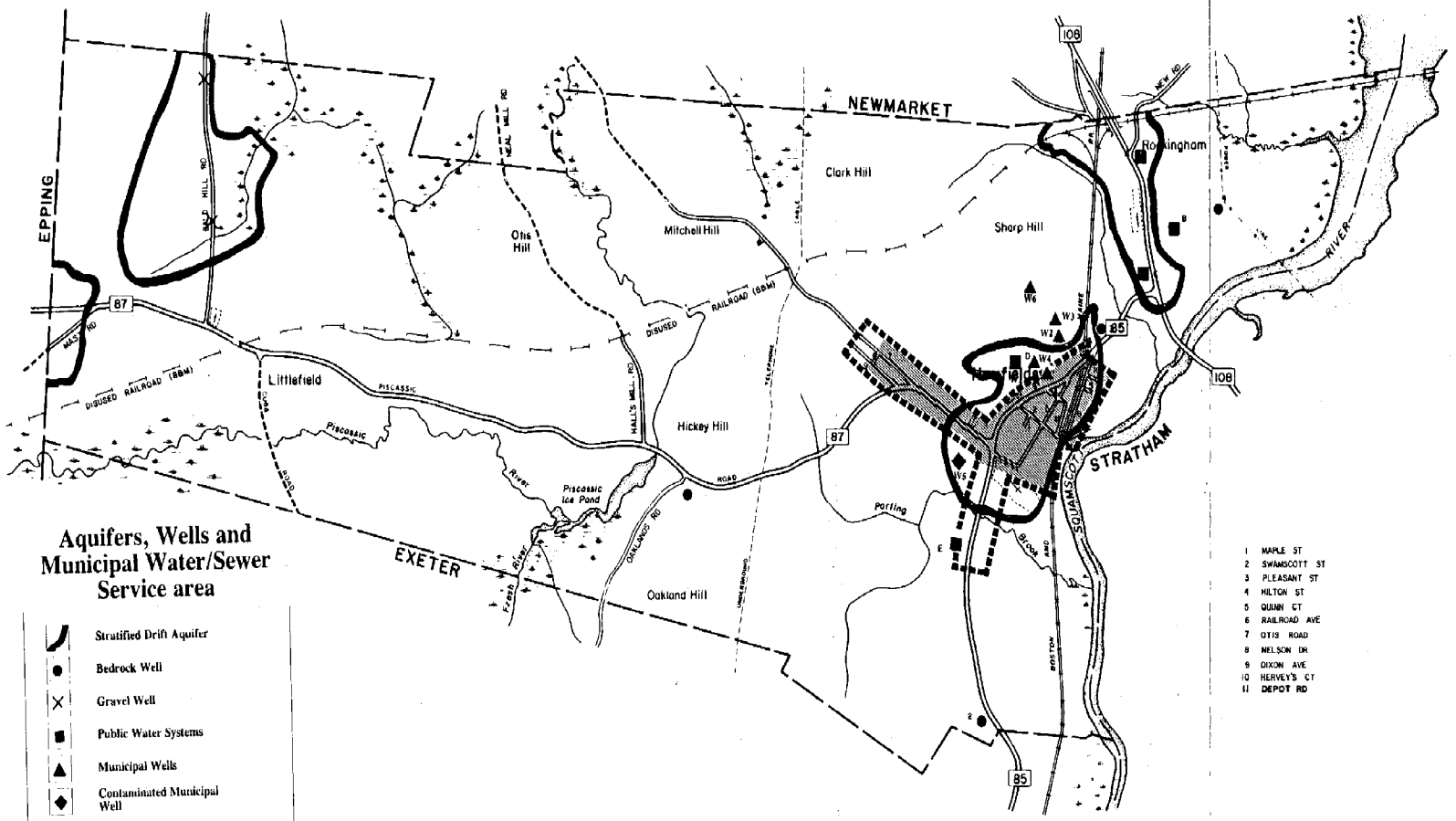
2. Elliot Formation (metamorphic)

    a) OZe - gray to green phyllite, quartzite and quartz mica schist and well-bedded calc silicate.

3. Ordovician Plutons (igneous)

    a) Oe9- proxene and pyroxene - hornblende diorite and gabbro, with minor granodiorite and granite; Exeter Pluton.

Appendix I includes a list of well log data for Newfields. Map F depicts the location of wells that are located outside the stratified drift aquifers previously identified.



Aquifers, Wells and Municipal Water/Sewer Service area

- Stratified Drift Aquifer
- Bedrock Well
- Gravel Well
- Public Water Systems
- Municipal Wells
- Contaminated Municipal Well
- Sewer District
- Water District

1 MAPLE ST
2 SWAMSCOTT ST
3 PLEASANT ST
4 MILTON ST
5 QUINN CT
6 RAILROAD AVE
7 OTIS ROAD
8 NELSON DR
9 DIXON AVE
10 HERVEY'S CT
11 DEPOT RD

Prepared by the Rockingham Planning Commission
June 1990

Sources: "Geohydrology and Water Quality of Stratified-Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern N.H.", U.S.G.S.; 1990.

State of New Hampshire Water Resources Board, "Summary of Well Completion Report Data for the Town of Newfields", August 1988.

State of New Hampshire Water Supply Engineering Bureau, Water Supply & Pollution Control Division, Dept of Enviromental Services. "Public Water Systems Inventory", May 1988.

Town of Newfields Master Plan Update, Public Utilities Section, 1988.

TOWN OF NEWFIELDS, N.H.

Feet 3600 2700 1800 900 0 1/4 1/2 3/4 Mile

STATE OF NEW HAMPSHIRE
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT

DRAFTED BY ALEC NICHOLAS — DATE AUG. 1974
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Radon

Radon contamination in water from bedrock wells has recently become a concern throughout the U.S. Radon is a colorless, odorless, cancer-causing gas produced as uranium (typically occurring in trace amounts) decay. This gas escapes from water once it is brought up from the ground. For example, when a shower is used in a home with radon-containing water, radioactive gas diffuses into the air.

Several years ago, New England was surveyed for its susceptibility to radon using remote sensing techniques. A map was produced from this project entitled: "Generalized Bedrock Geologic Map of New England with Emphasis on Uranium Endowment and Radon Production", (W. J. Olszewski, Jr.; UNH, 1986). Around this time, the U.S.G.S. drafted a map (unpublished but available for inspection at the State Geologist Office) showing the uranium concentration in rocks throughout New Hampshire. In April 1989, the State Geologist devised a "radon susceptibility rating" system for the bedrock types in the region, based on the probability of radon occurrence. This rating system ranged from "very low" to "very high". The bedrock types listed above and shown on Map D have been rated as follows: OZk = medium; OZe = medium; and Oe9 = very low.

Potential Groundwater Supplies

Groundwater is a very valuable resource for the Town of Newfields. For decades, it has been the source of water for individual wells and the Newfields municipal water system. Groundwater has the potential to provide the Town with drinking water for many generations to come. However, the resource is vulnerable to contamination or depletion if not properly managed and protected.

Groundwater quality can be impaired by a variety of materials. Sources of groundwater contaminants include landfills, commercial and industrial wastes, agricultural fertilizers, human sewage, road salting, etc. Groundwater quantity is reduced by contamination of available groundwater supplies, over-pumping in the aquifer zone, and increasing impervious surfaces such as roof tops and parking lots, thereby preventing recharge of the aquifer. These threats to groundwater are discussed further herein (see Section 111).

All five of the municipal wells operated by the Newfields Water department are located within the aquifer described as having high potential to yield water, according to the Cotton Maps cited previously. The five-well municipal system lost the use of one well in 1988 due to contamination. This loss has placed the Newfields water municipal system at maximum service capacity, and has necessitated the active search for a new source of groundwater.

The most current information regarding the delineation and the capacity of existing aquifers inn Newfields is the result of research undertaken by the U.S.G.S. over the past two years. This report quantifies important pumping factors, such as water table elevation, saturated thickness, transmissivity, direction of groundwater flow, and water quality. This report has been finalized, although it is not yet in circulation for the general public. The boundaries for aquifers within Newfields, according to this study, are displayed on Map E. This map also displays saturated thickness and transmissivity. In light of this information, and corroborated by the Cotton and Hydroscience reports, it appears that additional groundwater wells would be best located in the aquifers located in the northwestern corner of Town and in the aquifers in the central and northeastern areas of Town (see Map E).

Newfields' most practical source for additional water supplies is from its aquifers (with the possible exception of the surface waters of the Piscassic Ice Pond), because of their accessibility and relative purity. It is therefore necessary for the Town to protect its aquifers by enforcing measures which will promote groundwater recharge and reduce the risk of contamination. This course of action will help to safeguard an excellent source of drinking water for the future residents of Newfields.

III. POTENTIAL THREATS TO WATER RESOURCES

Potential Nonpoint Pollution Sources

A. Within Newfields

1. Existing Potential Pollutant Sources:

Nonpoint sources of pollution involve the diffuse discharge of wastes from sources which are widely spread, difficult to identify, and hard to control. Nonpoint pollution is typically produced from land runoff during times of rain and snowmelt.

The following is a general list which briefly describes potential nonpoint pollution sources, and their associated mitigation techniques, within the Town of Newfields:

Table 2
Nonpoint Pollution Sources and Remedies

Source	Remedy
subsurface sewage disposal	replacement and/or relocation;
agricultural runoff and infiltration	best management practices, e.g., concrete manure pits, no winter manure-spreading, etc.;
road salt storage and application	salt sheds, decrease salt to sand ratio, emphasize mechanical snow removal using plows, graders, etc., reduce frequency of application; increase use of calcium chloride and other de-icing chemicals;
storm runoff from construction sites	erosion control measures e.g., haybales, silt fences, straw mulch, etc.;
storm runoff from parking lots	catch basins which trap grit, oil and/or grease;
sediments from silted-in catch basins and detention ponds	maintenance programs
application of lawn fertilizers and pesticides to farmland, gardens, and lawns.	integrated pest management, e.g., soil testing, biological pest control, timing of lawn care, etc.
runoff/leachate from junkyards and abandoned landfills	drainage collection/treatment systems, and proper disposal of hazardous materials, e.g. battery acid, gasoline, etc. with a certified hauler;
leaking underground storage tanks	remove abandoned tanks, monitor and regulate existing tanks;
roadside application of insecticide for mosquito control	biological pest control, e.g., use of non-toxic insecticides such as bacteria which attacks mosquito larvae.

In 1982, the Water Supply and Pollution Control Division (of the N.H. Department of Environmental Services (DES)) published a report entitled: Inventory of Groundwater and Surface Water Potential Nonpoint Pollution Sources. The report's scope covered most of Strafford and Rockingham Counties. Newfields was cited as having the following potential nonpoint pollution sources:

- Pesticides: Newfields participates in the Seacoast Area Mosquito Control (SAMC) program. After flooding events, SAMC crews spray a biological pesticide ("BTI") on salt marshes and, to a lesser extent, freshwater wetlands throughout Town. The pesticide contains bacteria which attacks mosquito larvae. Biological control of larvae mosquitos has much less potential for adverse health impacts than spraying adult mosquitos with a synthetic and more toxic insecticide (e.g., Resmethrin). Although cited by the State's Pollution Inventory, Newfields' pesticide application program has relatively minor environmental impacts.

- Salt Sheds and Salted Roads: There are two salt sheds located in Town. One is a State of New Hampshire facility located on Route 108 just north of the Route 85 junction. The second shed is Town-maintained and is located on the east side of Squamscott Street. Both of these facilities are located within the primary aquifer in Town. Newfields contains several roads that are subjected to substantial winter salting. Road salting should be minimized within the Town's aquifer area.

Other potential nonpoint pollution sources within Newfields, but not identified by the 1982 DES inventory, are described below.

- Underground Storage Tanks: As of December 5, 1989, the N.H. Department of Environmental Services had identified eleven underground fuel storage tanks at four sites throughout Newfields. The capacity of these tanks range from 1,000 to 20,000 gallons, while the ages range from 3 to 25 years. Detailed data relative to tank location (by street address), owner's name, tank number, capacity, type of product stored and the tank's age is presented in Appendix II, - "Inventory of Underground Storage Tanks".

- Pesticide Application: As of May, 1989, the N.H. Office of State Planning released a map - "Potential Pollution Sources, Southern N.H. Water Supply Study" - which showed two sites in Town where pesticides are applied. All pesticides should be applied according to best management practices as prescribed by the Rockingham County Conservation District. In addition, "integrated pest management", using biological pest control, should be considered for these sites.

Information was also taken from the Waste Site Inventory, maintained by the Waste Management Division of the New Hampshire Department of Environmental Services, dated September 1987 (the most recent inventory available). The only facility cited within Newfields is Harvard Industries, formerly the Kingston- Warren Plant.

The sites described above are depicted on Map G - "Potential Nonpoint Pollution Sources."

2. Future Potential Pollutant Sources

a. Near Term - As of May 1990, the Newfields Planning Board did not approve any residential or non-residential development which could be considered a future potential pollutant source.

b. Long Term - Review of the Newfields Zoning map and Future Land Use map shows that a significant amount of land along the western side of NH Route 108, north of the intersection with NH Route 85, is zoned commercial/industrial. This is also the location of the Town's best aquifer, as well as four of the Town's municipal wells. When reviewing future developments within this district, runoff from commercial and industrial sites should be considered as potential sources of non-point pollution to groundwater and surface waters.

B. Contributing Areas Outside of Newfields

In determining the areas outside of Newfields which exhibit potential threats to the Town's water resources, it was appropriate to categorize Newfields' water resources into surface water and groundwater.

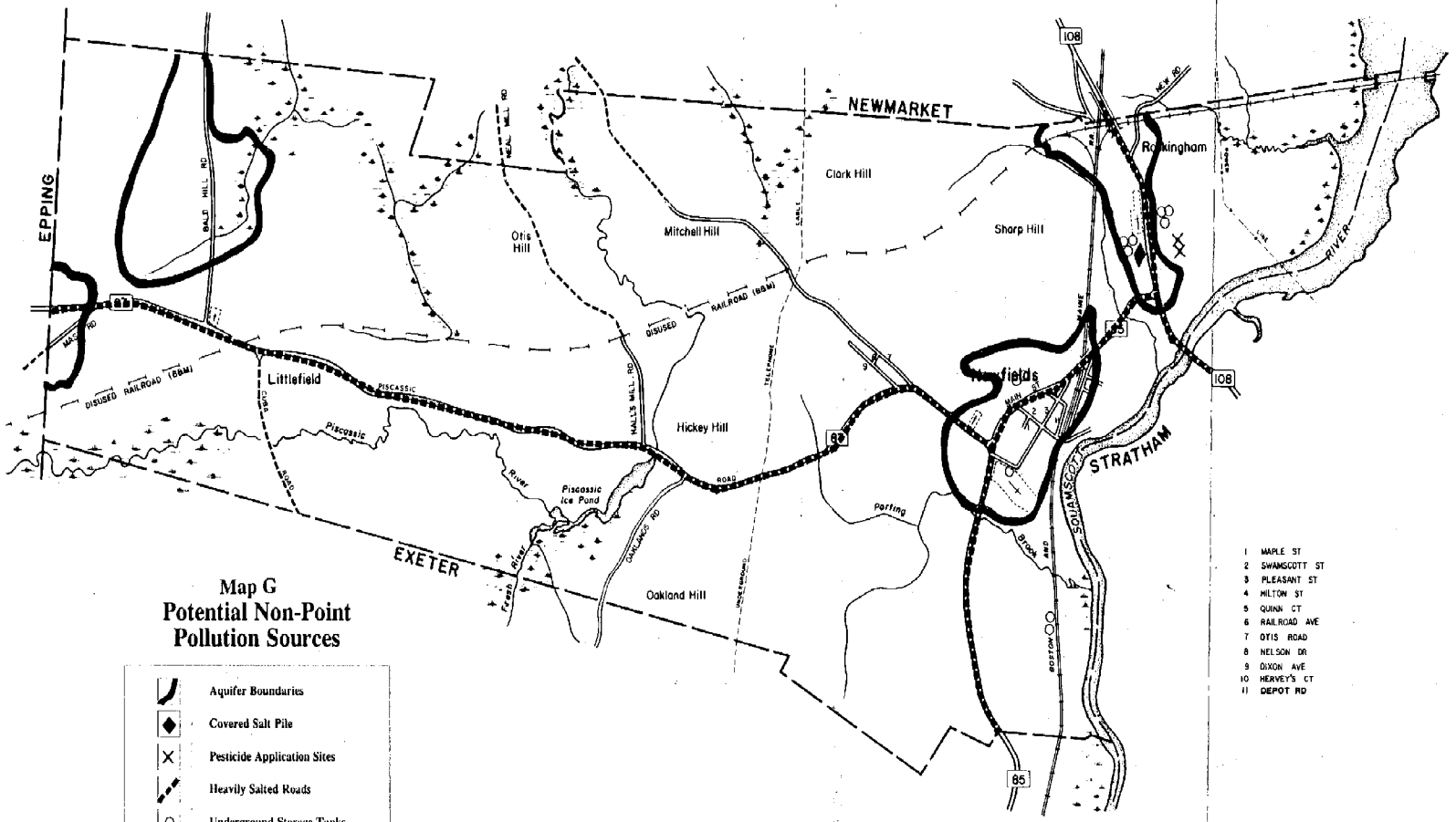
1. Groundwater

a. Existing Potential Pollutant Sources

As displayed in Map E - "Aquifers" - most of Newfields' aquifers that have been determined to be of high enough quality to serve as a source of municipal drinking water are located entirely within Town boundaries. This means that responsibility for their protection is a Town function. However, the aquifer located in the northeast section of Town and the source for all of the existing municipal wells, extends northward into the Town of Newmarket. In this area land uses are varied and could pose a otential threat. For the most part, the area is zoned rural residential (2 acre density). Along Route 108 however, lots that immediately front the road are zoned business. In addition, within a half mile of the Newfields town line, on the eastern side of Route 108, there is an industrial subdivision currently served by sewer and water. The Town of Newmarket has one potential threat near the northeast aquifer that is a pesticide application site as identified by the NH Department of Agriculture.

b. Future Potential Pollution Sources

Future land use information for aquifers extending beyond Newfields' boundaries is based on telephone discussions with the Town of Newmarket Planning Board.



Map G
Potential Non-Point Pollution Sources

- Aquifer Boundaries
- Covered Salt Pile
- Pesticide Application Sites
- Heavily Salted Roads
- Underground Storage Tanks

Prepared by the Rockingham Planning Commission
June 1990

Sources:
"Geohydrology and Water Quality of Stratified-Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern N.H.", U.S.G.S.; 1990.

"Waste Site Inventory", Waste Management Division, N.H. Department of Environmental Services, November 1986.

"Inventory of Groundwater and Surface Water Potential Non-Point Pollution Sources", N.H. Dept. of Environmental Services, February 1982.

"Underground Storage Tank Information", N.H. Dept. of Environmental Services, March 1989.

"Pesticide Application Sites", N.H. Dept. of Agriculture/Complex Systems Research.

TOWN OF NEWFIELDS, N.H.

Feet 3600 2700 1800 900 0 1/4 1/2 3/4 1 Mile

STATE OF NEW HAMPSHIRE
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT

DRAFTED BY: ALEC NICHOLAS	DATE: AUG. 1974
SOURCE	
REVISION: UPDATE / CORRECTIONS	
DRAFTING BY: S. GRIFFITHS RPC.	DATE: JULY 1986
REVISION	
DRAFTING BY	DATE:
SHEET NO. 07	FILE NO TP 11-100
INSET NO. 07	

The northeastern aquifer shared with Newmarket is zoned a mix of rural/residential, business, and industrial. These uses are planned to continue in the future for this area. The Town of Newmarket has adopted an Aquifer Protection Ordinance that prohibits land uses that would negatively impact groundwater.

2. Surface Water - Piscassic River and Squamscott River Watersheds

a. Existing Potential Pollution Sources

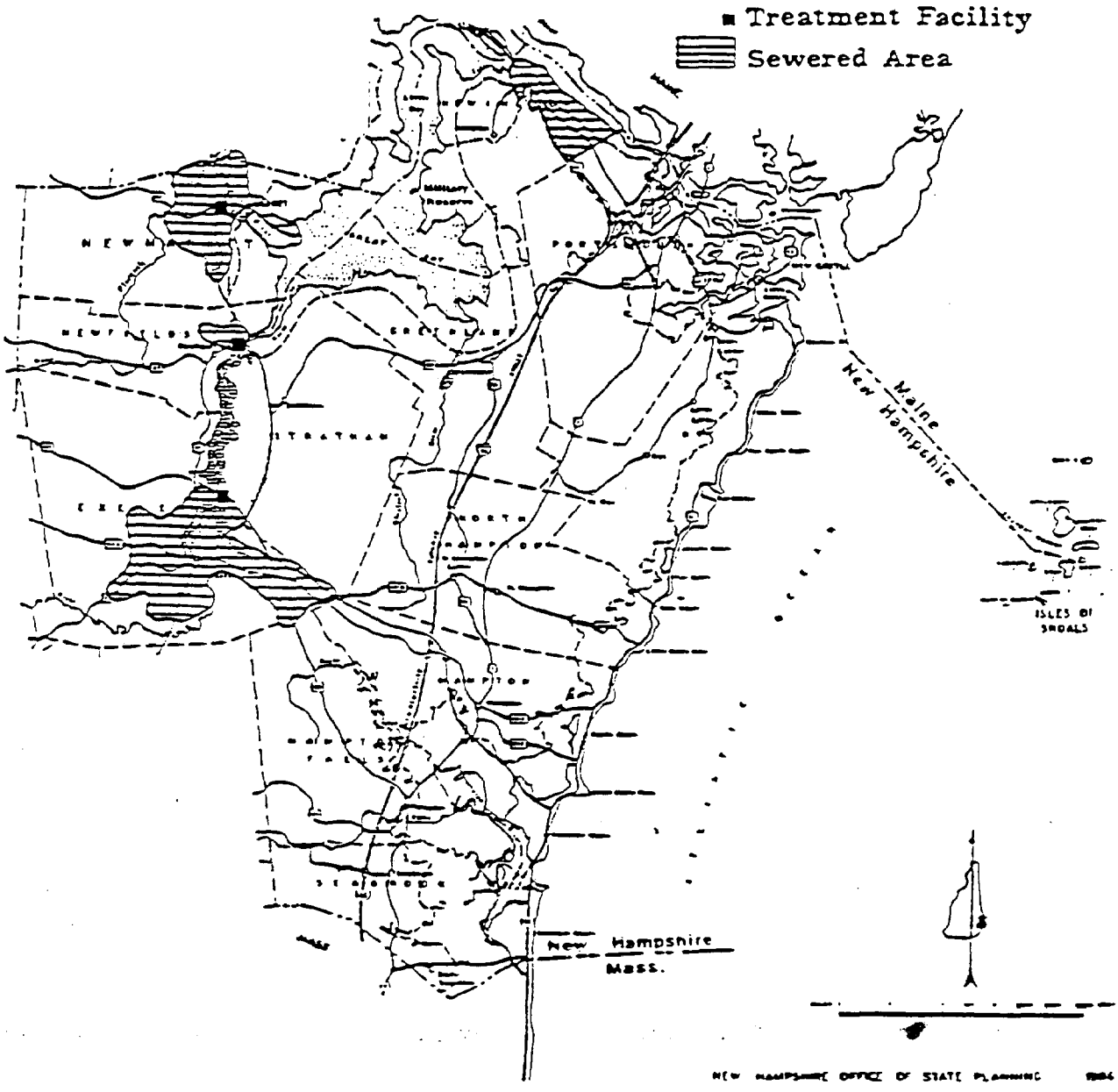
The Town of Epping has the greatest impact on the Piscassic River due to the short distance it travels in the Town of Exeter. In Epping, the Piscassic flows through areas of divergent land use, including low-density residential, commercial, and industrial. The 1982 Inventory of Groundwater and Surface Water Potential Nonpoint Pollution Sources list Keefe Environmental Service as a hazardous waste site currently regulated under the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA). The area in which the Piscassic travels through Exeter is low-density residential that is predominantly undeveloped woodlands.

The Squamscott River serves as a portion of the municipal boundary for the communities of Exeter, Stratham, Newfields and Newmarket. It is fed by surface waters from the Towns of Exeter, Stratham and Newfields. The area along the River in Exeter is zoned low density residential. In Stratham, the corridor located next to the Squamscott River is zoned predominantly rural/agricultural with a small section zoned for professional offices. Both Stratham and Exeter are members of the Seacoast Area Mosquito Control (SAMC) program. Periodic spraying of biological pesticide on salt marshes and freshwater wetlands takes place. Although cited by the State's Pollution Inventory, this pesticide application program has relatively minor environmental impacts. This is the major nonpoint pollution threat to the Squamscott River.

There are three major point pollution sources on the Squamscott River that impact the shellfish capacity of Great Bay. Periodically the gathering of shellfish in Great Bay is restricted because bacterial counts reported in excess of the 70 coliform bacteria per 100 milliliters standard for such waters. The pollution problems of Great Bay stem primarily from the municipal sewage treatment plants operated by the Towns of Newmarket, Newfields, and Exeter. The treatment plants are shown on Map H - "Principal Point Pollution Sources to the Squamscott River and Great Bay". Two of these plants have a direct impact on the Squamscott River in Newfields. A brief review of the operating conditions and possible improvements as described in

PRINCIPAL POINT POLLUTION SOURCES TO THE SQUAMSCOTT RIVER AND GREAT BAY

Map H



the Interagency Report on the Shellfish Waters of New Hampshire (by Water Supply and Pollution Control Division, N.H. DES, February 1989) follows.

1. Newfields

   This facility is underloaded and has good treatment; however, the automatic tide clock designed to control discharge on the outgoing tide has never worked properly. With four NPDES coliform violations during a 15-month period in 1988-89, there is a need to assess the contact tank baffle configuration to assure effective kill over varying conditions.

2. Exeter

   Although improvements have been made to this system, it remains inadequate for present and future loadings and is occassionally out of permit compliance. A major upgrading (i.e., expansion of lagoon capacity, chlorination contact chambers, etc.) is presently close to completion and should result in an adequate facility.

If these recommendations are carried out, public health will be protected and shellfish resources will be restored for surrounding communities.

b. Future Potential Pollution Sources

The Town of Epping has a riverbank protection ordinance which prohibits specific land uses within 75 feet of the Piscassic River and this should limit potential threats in the future.

The communities of Exeter and Stratham both enforce shoreland protection ordinances that should serve in the future to limit inappropriate land uses along the Squamscott River.

IV. GROWTH IN DEMAND FOR WATER

Projected Growth in Demand for Water

In June, 1987, the Water Management Bureau of the N.H. Department of Environmental Services, Water Resource Division, initiated the Water User Registration and Reporting Program. The objective of the program is to gather accurate data on the major users of the State's water and the demands placed upon aquifers, streams, and rivers. To accomplish this objective, all facilities which use an average of 20,000 gallons (or more) of water per day must register with the Division. According to the Bureau's latest list (October, 1988), the Town of Newfields' Water Department is the only user in Town of 20,000 gallons of water per day.The lack of detailed data on water usage makes it extremely difficult to quantify water consumption and to identify changing trends in water use. An attempt was made to calculate the gross daily consumption from residences using household and population data published by the N.H. Office of State Planning. In 1988, Newfields' estimated population was 848 persons. Assuming a standard of 150 gpd per capita per day (source: Subdivision and

Individual Sewage Disposal System Design Rules", N.H. DES, Water Supply and Pollution Control Division; April, 1987), Newfields used 127,200 gallons of water per day in 1988.

Table 3 below reveals the projected demand for water for Newfields utilizing population projections supplied by the Office of State Planning.

Table 3
Projected Demand for Water

	Population	Average Daily Production Need (gpd)*
1990	1,036	155,400
1995	1,185	177,750
2000	1,330	199,500
2005	1,500	225,000
2010	1,679	251,850

* ADPN = 150 gallons per capital per day

The water demand for the non-residential sectors will be entirely dependent upon the types of commercial or industrial uses located within Newfields and whether or not they are water-intensive uses. There is very little non-residential use in Town now. Most of what exists is connected to the municipal water system. At this point it is assumed that residential water demand will account for the majority of Newfields' water usage during the next 10 to 20 years. During this time, the Town's water demands will be met by the Newfields' Water Department and the continued use of private wells.

In December of 1988, the U.S. Army Corps of Engineers released a report entitled "New Hampshire Route 108 Water Supply Study" to provide a starting point for the investigation of instituting a regional water system along Route 108. In this study, the municipal water systems of several communities along the Route 108 alignment were inventoried. From this information, projections of future water demand were made for each community, as well as the study area as a whole.

The Newfields' Water Department had a reported yield of 135,000 gpd in 1988. The study further indicated that according to figures released for 1986, the Newfields Water Department provided an estimated 78 gallons per day per capita to individuals on Town Water service. A projection for water demand was developed assuming that by the year 2,010 there would be 100 percent water service for Newfields' residences and that per capita water use would increase by 15 percent over the study period. According to projections made under these assumptions, the average daily demand for water in 2,010 would be .15 MGD and the reported supply would be .14 MGD; resulting in a demand deficit of .01 MGD (10,000 gallons). This information combined with the results of projections for water demand for the other communities in the study area supported further investigation into the viability of a regional water supply.

V. INFRASTRUCTURE

A. Septic System Usage

According to the Town of Newfields' 1988 Master Plan, approximately half of Newfields' 323 dwelling units are served by septic systems and half are served by the Newfields Wastewater Treatment Plant. This plant was constructed in 1983 to serve the Village of Newfields and the two manufacturing facilities operated by the Kingston Warren Company.

In 1988, the plant processed 35,000 gallons of effluent per day. The facility is designed for a maximum capacity of 117,000 gallons per day. Although septage (material removed from septic systems) that originates in Newfields can be disposed of at the Newfields Wastewater Treatment Plant, it is not encouraged by the plant operators. Due to the low volume of daily wastewater, the facility has very limited septage disposal capabilities. As a result, most of the septage created by the homes outside of the Town Sewer District is disposed of through an agreement with the Newmarket Wastewater Treatment Plant.

There are no plans for major expansion of the Sewer District in the near future. This means that there is a high potential for growth in the number of septic systems in Town. It is probable that the lion's share of future development (during the next ten years) will be served by septic systems.

B. Soil Potential Ratings

Using national standards, virtually all of Newfields' soil types have received a "severe" rating for septic system development. In fact, there are only a few soils throughout Rockingham County that are not classified as having "severe" limitations for septic system development. In light of this, the Rockingham County Conservation District and the USDA Soil Conservation Service developed a more meaningful set of land use guidelines based on soil types.

In May 1987, the "Soil Potentials for Development - Rockingham County" manual was published by the RCCD. Five soil potential classes were provided: very high, high, medium, low and very low. Low and very low potentials are assigned to those soils having severe soil limitations, with costs of design measures extremely high or prohibitive.

Map I - "Soils Suitability for Septic Systems" - depicts the general areas of Newfields which have different soil potentials for septic system development. Soils with low and very low potential were mapped because they had limitations due to steep slopes or high water tables (as well as high shrink-swell properties, short depths to bedrock, and stoniness).

C. Solid Waste Disposal

The Town of Newfields is a member of the Lamprey Regional Solid Waste Cooperative. Household trash is picked up weekly and trucked to the district incinerator at UNH. Large, noncombustible items such as appliances are presently hauled to the Newmarket dump through an inter-municipal agreement.

Town of Newfields --
Soil Suitability for Septic Systems

Map I

Scale in Miles

0 1/3 2/3 1

ources: "Soils Potential for Development-Rockingham County"; U.S.D.A. -Soil Conservation Service and Rockingham County Conservation Dist.; May 1987.

Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

Prepared by the Rockingham Planning Commission, May 1990. SRG

D. Public Water Supply

Map F shows the location of five public water systems, all of which draw from groundwater. Of these five systems, only the Newfields' Water Department wells are defined by the N.H. Water Supply Engineering Bureau as "community" systems. The remaining wells are "non-community" systems. A complete inventory of these systems is provided in Appendix III.

The Water Supply and Engineering Bureau requires periodic water quality testing of public water systems throughout Newfields. In 1988, such testing revealed unacceptable levels of volatile hydrocarbons at municipal well number five (see Map F). This discovery of contamination has resulted in the closing of the bedrock well which has a capacity to pump at 30 gallons per minute. Appendix IV is a copy of the Organic Chemical Analysis of the well indicating those substances exceeding primary standards.

Newfields' most significant public water system, in terms of service area (1.32 square miles) and population served (423 residents), is the Newfields' Water Department. The water system draws from 4 wells with a maximum daily yield of between 50,000 and 55,000 gpd and an average daily production of 47,700 gpd. The service area for the Newfields' Water System is shown on Map F.

According to information contained in the report entitled "Southern N.H. Water Supply Study, Volume 2, Appendices Draft, June, 1989", the water quality from all four wells is good and no treatment is required, however, chlorine is added.

Because of the well contamination discussed above, a moratorium on any new service connections has gone into effect. This situation is currently being rectified by the addition of a sixth well to the system shown on Map F as W6. Capacity tests of this well have shown it to be capable of sustaining yields of 85 gallons per minute. Plans have this well being incorporated into the municipal system by the early fall of 1990.

VI. EXISTING PROGRAMS AND POLICIES

Each ordinance and regulation in Newfields was reviewed for the purpose of identifying the elements of each which have the potential to impact on any of the following eight water resource parameters (WRP):

1) Erosion and sedimentation;
2) Surface water flows;
3) Groundwater recharge;
4) Management of existing and potential contaminant sources;
5) Flood storage;
6) Encroachment on wetlands;
7) Nutrient levels; and
8) Wildlife and fisheries habitat.

Building Ordinance

a. Sewerage: Section 2(b)2 requires that all septic systems must meet minimum State and local standards (#7, #3).

b. Special Flood Hazard Area: Article VIII: Requires a permit for any construction or substantial improvement that proposes to alter or relocate a water course, prohibits any project which reduces the flood carrying capacity of a water course (#5, #2, #8).

Zoning Ordinance

a. Residential District: Section 4.4.2(c) prohibits manure piles within a 400 foot radius of Town wells (#3, #7).

b. Commercial District: Section 4.5.1(b) mandates that the percentage of buildings and accessory structures shall not cover more than 30% of the lot area (#2, #3).

Section 5.4.2(e) requires that during commercial excavations the minimum elevation shall be four feet above annual mean high water table and that drainage ways shall be provided to prevent ponding. Erosion control devices are required to prevent siltation (#1, #3).

c. Shoreland Protection District: Article 11 provides performance standards and regulates certain land uses with specified district boundaries which could potentially damage water or environmental quality (#2, #4, #6, #8).

d. Aquifer Protection District: Article 12 provides performance standards and prohibits certain land uses which are considered to be potential contaminant sources, within the Town's designated aquifers (#3, #4).

Subdivision Regulations

- Section IV,(b) mandates that land subject to period flooding or poor drainage, or inadequate capacity for sanitary sewage disposal, shall not ordinarily be subdivided (#3, #5, #6).

- Section IV,(j) requires that in teh absence of public sewers, each lot must prove adequate area for the installation and operation of an individual sewage disposal system including information on percolation and test pits (#4, #7).

- Section IV,(l) requires a performance bond for road construction including drainage structures (#4, #5).

- Section V,(c)(d) requires that the preliminary subdivision plan shows the following information: existing watercourses, ponds, or outstanding water; existing water mains, sewers, culverts, drains and proposed connections or alternative means of providing water supply and disposal of sewage and surface drainage, designs of any bridges or culverts (#2, #4, #5).

- Section VI,(b)2 requires that the final plot plan display the following:

  - drainage courses and easements(#2, #5);
  - proposed methods of sanitary sewerage and computations therefore, with soils data showing results and locations of percolation tests and test pits(#4, #7);
  - proposed storm drainage accompanied by a drainage analysis map and computation for the entire watershed area, methods of supplying water (#2, #8, #7);

- if a subdivision is to be served by a public water supply or by public sewers, a statement from the department involved, attesting to the availability of such service (#3, #7).

- Section VII Road and Utility Standards require:
  - a) sewer and drain construction must conform to Town standards, drainage facilities be installed and constructed under supervision of the Town Engineer (#2, #5).
  - d) Street Construction
    - 4. subgrade and all ditches shall be constructed and maintained so that drainage will not be impeded (#2, #5).
  - e) Drainage Design
    - 1. drainage design must not direct run-off on to abutting properties unless proper drainage easements are created (#2, #5).
    - 2. drainage facilities must be adequate to accommodate potential run-off from the entire upstream drainage area (#2, #5).
    - 4. no natural water course shall be altered or obstructed in such a way as to reduce the natural run-off capacity (#1, #2, #5).
    - 5. culverts shall be provided for any driveways which cross a water course (#2, #5).
    - 6. drainage pipe design must be based on Burkli-Zeigler or Rational Formula computations (#2, #5).
  - f) Drainage Construction
    - 2. Catch basins and manhole covers shall be constructed in accordance with Water Supply and Pollution Control Division (#1, #2, #5).
    - 4. Concrete headwalls shall be constructed at the open ends of any drain pipe where the same serveas outlets to the drainage system (#1, #2, #5).

Site Plan Review Regulations

- Section IX,(d),4, requires access parking and loading areas are constructed so as to minimize dust, eriosion and run-off conditions that would have a detrimental effect on abutting property (#1, #2, #5).

- Section IX,(d),8, water supply and sewage disposalfacilities are sized to adequately meet the needs of the proposed use under regulations of New Hampshire Water Supply Pollution Control Division (#3, #7).

- Section IX,(f), Required Exhibits:
  - sketch of site showing water bodies (#'s 1-8)
  - the size and proposed location of water supply and sewage facilities, future expansion of same facilities, and distances from existing water and sewage facilities (#3, #7)
  - the type and location of solid waste disposal facilities (#4, #7)
  - The location, elevation and layout of catch basins and other surface drainage features (#1, #2, #5)

VII. ANALYSIS

Analysis Regarding Water Supplies

According to the New Hampshire Water Supply Study, July 1989, 55 percent of Newfields population is served by the municipal water service and 45 percent is served by small, private wells. It is assumed that the municipal system will experience growth gradually, but a ratio of service similar to the one existing will continue for at least the next 10 years.

The Town of Newfields appears to have at least three potential sources for a future municipal water system. These options (described more fully in Section IV) are listed below:

1) Drill additional wells into the Town's primary stratified drift aquifers (located near the Town Center and on the west side of Town).

2) Investigate the possibility of using the surface waters of the Piscassic River as a municipal water source as discussed in the Town Master Plan.

3) Pursue the concept of a regional water supply using the Lamprey River. (This option seems the least likely of the three.)

Analysis Regarding Other Water Resource Purposes

a) **Discharges:** There are no significant sources that discharge wastes into the Town's surface water. Therefore, there is presently no need to determine the "assimilative capacity" of Newfields' surface water resources.

b) **Recreation:** Relative to other towns within Rockingham County, Newfields has many streams and rivers. The Town also contains an extensive shoreline along the Squamscott River. Water-related recreational activities include shell and fin fishing, boating, swimming, and skating.

In 1977, the N.H. Office of State Planning published a study entitled: "Wild, Scenic, and Recreational Rivers for New Hampshire." Out of 67 other rivers being classified throughout the State, the study classified the Piscassic River as a "Recreational River" (and the Squamscott River as a "Scenic River"). The study defined recreational rivers as those: which provide outstanding recreational opportunities in natural surroundings. These rivers should be protected for their natural qualities which can provide for a wide range of active and passive outdoor recreation activities. Recreational rivers should: be readily accessible,; have high water quality; have enough water to provide for fishing and canoeing; and be at least five miles long.

The Squamscott River and Piscassic River are the most suitable waters for boating. Canoeing is particularly popular along the Squamscott River. Newfields has one public access area: the Town's landing at the foot of Squamscott Street. Since the Town-owned landing has such a limited area (2 acres), the Town should investigate acquiring additional land or conservation easements around this site.

The Piscassic Ice Pond in Newfields has sufficient volume, quality, and/or access to be suitable for public swimming. All water-related recreation requires high water quality for an ideal experience. Poor quality affects the safe enjoyment of water recreation and impairs its aesthetic appeal. Newfields must safeguard its surface water quality, particularly that of the Squamscott and Piscassic Rivers, in order to provide the opportunity of sports fishing, boating, and swimming for present and future townspeople.

c) **Wetlands:** Wetland types found in Newfields include shrub swamps, shallow and deep marshes, meadows, and forested swamps. Lands with soil having a high seasonal water table, and classified as poorly or very poorly drained soils by the USDA Soil Conservation Service, are also considered to be wetlands. Wetlands are important, valuable, natural resources and worthy of protection from inappropriate use. They have been found, in general, to provide critical ecological and socially valuable functions, including:

1) provide habitat and reproduction areas for plants, fish and wildlife;
2) help maintain ground and surface water levels;
3) act as flood water storage areas;
4) absorption and filtration of pollutants and sediments (caused by up-stream erosion);
5) provide opportunities for recreation and education;
6) contribute to scenic values.

Many of the wetland areas in Newfields are adjacent to rivers and streams. The salt marsh along both sides of the mouth of the Squamscott River represents approximately one half of all the marsh in the Great Bay estuarine system - over 400 acres (source: Great Bay National Estuarine Research Reserve Management Plan - Draft; N.H. Office of State Planning, Concord, NH; January 1989). This complex of extensive salt marsh and adjacent farmland is prime habitat for migratory waterfowl. In addition, four rare and endangered plants -- the large salt marsh aster, the exerted and the prolific knotweeds, and the stout bulrush -- have been identified in this area by the N.H. Natural Heritage Inventory.

The filling of and use of wetlands for building construction not only destroys wetlands and their benefits, but may lead to groundwater contamination as well. Leaching fields constructed in filled areas are likely to be placed too near the seasonal high water table below and to have an inadequate receiving layer for proper treatment of the septic system's effluent.

There is an ongoing need to protect wetlands in Newfields. Statewide, wetlands are under increasing development pressure due to the depletion of the most developable land. Although the U.S. Army Corps of Engineers and the State of New Hampshire have laws and regulations governing wetlands, they do not always provide the degree of protection needed. Existing regulations look at each dredge and fill request as a separate application, resulting in a piecemeal approach. In addition, the inadequate number of federal and State inspectors means that some wetlands are not sufficiently protected. A local wetlands ordinance enables the community to protect wetlands in a Town-wide context. Unlike State and federal rules, local regulations can give the Town control over the location of structures and septic systems in relation to wetlands. For these reasons, local control over the use of wetlands should be instituted in Town.

d) **Fisheries:** The Piscassic and Squamscott Rivers,and the Piscassic Ice Pond are the most commonly fished water bodies in Newfields. These resources, are currently being stocked with anadromous fish by the N.H. Fish and Game Department as part of a Statewide restoration program. This program involves stocking the rivers with game fish such as rainbow trout, river herring, American shad, steelhead, brown trout, salmon, and eastern brook trout.

Newfields must safeguard its surface water quality in order to provide the opportunity of commercial and recreational fishing for both present and future townspeople.

e) **Wildlife Habitat:** River, stream, and wetland corridors provide the richest habitat for the greatest number of fish, wildlife, and flora. Fish and wildlife populations cannot succeed within a limited range, and waterfowl and other birds need ground-level nesting habitat. Protection of these linear corridors is essential to the stability of wildlife populations.

Riparian corridors (i.e., shorelands) also contribute much in terms of recreational benefits, i.e., canoeing, hiking, fishing, birding, horse trails, cross country skiing, picnicking, etc. Shorelands are also sensitive due to flooding, erodibility, and proximity to open water. Moreover, soil type and percent slope typically limits the development potential of a shoreland area.

The Great Bay Estuary provides prime habitat for many wildlife species. According to a N.H. Fish and Game study, more than 90,000 birds reside in the estuary (source: Inventory of the Natural Resources of Great Bay Estuarine System; N.H. Fish and Game Department; December 1981). Thousands of Canada geese and black ducks rest and feed in the fall. Osprey are common in the spring and fall migration. Three rare and endangered animal species that live within in the estuary include the bald eagle, common tern, and the common loon.

In addition to excellent coastal habitat, Newfields also has important inland habitat areas. Examples include: wetlands; river and stream corridors; forests such as coniferous, hardwood, and mixed woodlands; and open lands comprised of meadows and fields. These habitat types support a wide range of animals including game species such as deer, coyotes, raccoons, rabbits, and pheasant. Newfields' prime wildlife habitat areas include the Squamscott River corridor, many acres of salt marsh, The Piscassic River, Parting Brooke, and the Piscassic Ice Pond.

f) **Hydropower:** There are no hydropower dams in Newfields, nor are there plans for any in the future. The hydropower market is not as strong as it was ten years ago (during the height of the nation's energy shortage) because of uncertain markets for electricity, environmental restrictions, and alternative power sources which are more economical.

Harnessing hydropower is not always benign to the fish, animals, and people that use the impacted river. Hydro development can result in the loss of productive habitat, degrade water quality, and cause direct mortality of fish (especially juvenile fish traveling downstream) and other aquatic organisms.

If any hydropower facilities are proposed in the future, no decision should be made by Town officials until a thorough site review and evaluation is performed. The cumulative impacts of hydropower dams along the river should also be considered.

g) **Fire Protection:** Newfields' Subdivision and Site Plan Review Regulations enable the Planning Board to require fire safety facilities, such as fire ponds and dry hydrants. Historically, the Board has required at least one fire pond and dry hydrant within or adjacent to a large development. Considering the regular occurrence of wetlands throughout Town, development engineers have had no problem locating areas suitable for fire ponds.

h) **Conflicting Uses:** The principal conflict that exists between competing uses involves the Squamscott River, which receives waste water flows from the municipal sewage treatment plants of surrounding towns (i.e., Exeter, Newfields, and Newmarket), and where recreational and commercial fishing takes place. This conflict could be mitigated by upgrading these treatment plants, and separating their combined storm sewers, and discouraging significant increases of sewage loading to Great Bay.

Management of Potential Threats

Section III, "Potential Threats to Water Resources", presents a full discussion of existing and permitted future land uses that pose threats to water resources within Stratham. A brief discussion of Stratham's primary potential threats to identified water resources, including mitigation measures, is presented below.

1) **Road Salting:** Newfields contains three major highways (e.g., N.H. Routes 85, 87, and 108) that are heavily salted during winter months. Certain segments are located over parts of Newfields' primary aquifers (see Map G). Road salting should be minimized throughout Town, but especially along roads that overlay aquifer areas. Road salt reduction methods are specified in the following section under "Nonregulatory Programs", #10.

2) **Salt storage:** The Towns salt storage shed is located within the primary aquifer utilized for municipal water service. Even though this facility is covered, Town officials should closely monitor potential leaching effects on the aquifer. If necessary, this site should be relocated. The New Hampshire State Department of Transportation salt shed is locted within the same aquifer on the west side of NH Route 108.

3) **Agricultural runoff:** Areas of tilled farmland can be found throughout Town. Farmers should employ Best Management Practices (promoted by the Soil Conservation Service) for manure, herbicides, pesticides, and fertilizers in order to minimize agricultural runoff that could be harmful to surface and groundwater resources.

4) **Pesticide application:** Two sites in Town have been, and continue to be, sprayed with pesticides. In addition to using Best Management Practices, "integrated pest management" using biological pest control should be considered for these sites.

5) **Underground storage tanks:** Eleven active or abandoned underground petroleum storage tanks have been identified and described in Appendix II. All of these should be considered potential risks to water resources. Further measures to manage underground storage tanks are described in section VIII.

As a final note, most existing and future non-residential land uses, particularly those which use and discharge water, should be regarded as potential threats to surface and groundwater resources. Sites with failing septic systems should also be considered potential threats to water resources.

Additional management and protection techniques for water resources are described in the following section.

VIII. RECOMMENDATIONS

Nonregulatory Programs

It is recommended that the Town of Newfields employ the following nonregulatory programs in order to manage and protect its water resources:

1. Through hydrogeologic studies and pumping tests the Town should determine the viability of its identified aquifers (depicted in Map F) as additional sources for the municipal water supply.

2. The Town should consider redefining the Industrial District. As shown on the future land use map for the Town the northern industrial district lies almost entirely within the Town's primary high yield aquifer.

3. Educational and informational programs should be developed in order to provide the general public with an understanding of the operation, proper use, and maintenance of septic systems and leach fields (i.e., regularly pumping out septic tanks, avoiding disposal of hazardous or harmful wastes, etc.) This would likely prevent unnecessary system contamination and failures, thereby protecting surface and groundwater resources.

4. Develop a septic system inspection program, especially for primary aquifer recharge areas, in order to ensure that these systems are adequately maintained.

5. Continue to promote and participate in the annual Household Hazardous Waste Collection, sponsored by the Rockingham Planning Commission. For past collections, Stratham's share of the costs was funded directly by the Town.

6. Appropriate money for land acquisition to be used for the protection of land and water resource conservation areas. There are generally five different methods for protecting these natural areas:

   a) Land Purchase;
   b) Option of Right of First Refusal;
   c) Purchase and Resale;
   d) Bargain Purchase;
   e) Easements - Conservation Restrictions and/or Purchase of Development Rights.

   Conservation funds enable the Town to act on short notice when a valuable parcel of land is threatened. This land may be of critical importance for protecting significant wetlands, shoreland, wildlife habitat, or recreational areas.

7. The Conservation Commission should also seek land acquisition funding through State and Federal grants (e.g. Trust for New Hampshire Lands, the Land and Water Conservation Fund, and the Pitman-Robertson Fund through the N.H. Fish and Game Department).

8. The Conservation Commission should work with people who own land having conservation potential by promoting the tax incentives associated with the donation of land or easement restrictions. The Current Use Assessment Program also provides tax abatements on parcels of 10 acres or more or on "natural preserves" of any size.

9. The Newfields Planning Board should work with their counterparts in surrounding towns to promote land use planning practices that are mutually beneficial to protect the Squamscott River and Great Bay and common watersheds, wetlands, and aquifers. Newfields may choose to develop inter-municipal agreements (pursuant to RSA 53-A) to protect these shared resources. During the 1989 session, the N.H. Legislature approved Senate Bill 161 which authorizes agreements between municipalities to develop water resources management plans.

10. Continue and enhance the Town's program to reduce the amount of road salt used, especially in aquifer recharge areas. The following methods should be employed:

    a) Emphasize mechanical snow removal;
    b) Mix sodium chloride with calcium chloride and/or sand to reduce the total amount of sodium chloride applied;
    c) Periodically re-calibrate salt spreaders so that they apply the correct amount of salt/sand mix; and
    d) Post areas where reduced salting is practiced, which will encourage drivers to reduce speeds and drive more cautiously.

    This program should be adopted for both Town and State-owned roads. In the meantime, the N.H. Department of Transportation should be notified of the Town's desire to reduce road salting within its primary aquifer areas.

11. Develop a program to inspect and maintain drainage control facilities, (e.g. catch basins and detention ponds, and culverts) throughout Town. If these devices become filled with sediment, they can no longer perform their function.

12. Develop a program emphasizing water conservation. Using less water may increase the efficiency and useful life of individual sewage disposal systems throughout Town.

13. Encourage farms and pesticide users to employ Best Management Practices (BMP's) as prescribed by the Soil Conservation Service. BMP's include storage of manure in concrete pits, and more efficient and better timed application of fertilizer and pesticides.

14. Develop a water quality data base for monitoring contamination events in both surface and ground waters throughout Town.
15. The Planning Board should be kept informed by the Rockingham Planning Commission regarding the availability and appropriateness of regional or State water resource data.

16. The Great Bay estuarine system has been designated as the Great Bay National Estuarine Research Reserve by the National Oceanic and Atmospheric Administration (NOAA). The Great Bay reserve is one of 17 throughout the country. The research reserve system is a non-regulatory federal program that emphasizes research, education, and land protection. The Office of State Planning has provided the initiative in establishing the program in New Hampshire, although once under full implementation, the State Fish and Game Department will assume program responsibility.

    Another organization committed to conserving the land and water resources of Great Bay is the Great Bay Estuarine System Conservation Trust (GBESCT). The GBESCT is a private, non-profit citizen's group whose membership is drawn largely from the Seacoast area. Although originally organized as a local land trust, the GBESCT also has worked to protect water quality, as well as air quality and critical marine habitat.

    In order to promote the protection of the Great Bay Estuary, the Town should work with the abutting landowners, the Office of State Planning, the GBESCT, the Water Supply and Pollution Control Division, the Fish and Game Department, the Rockingham County Conservation District, and the Rockingham Planning Commission on wise land stewardship of the watershed.

The costs of instituting these nonregulatory programs are expected to be variable, but relatively low. For example, any assistance provided by the Rockingham Planning Commission is either at reduced cost or no cost, as part of Newfields' annual membership in the Commission.

The most expensive programs include hydrogeologic studies and land acquisition. Costs associated with land conservation efforts involving donations of land and easements would involve survey, legal, and recording fees. The outright purchase of these lands or the purchase of development rights would obviously entail substantially greater costs.

Household Hazardous Waste collection and disposal costs, which can be expensive even in a regional program, may in the future be covered by the dues paid to the Lamprey Regional Solid Waste District. Matching funds are available from the Waste Management Division of the N.H. Department of Environmental Services.

Virtually all of these nonregulatory programs could probably be carried out by existing voluntary and paid manpower. It should not be necessary to hire additional personnel to conduct or supervise any of these activities with the possible exception of #2, establishing a septic system inspection program. Hydrogeologic studies, however, would require contracting with professional consultants.

Regulatory Programs

The Town of Newfields enforces a building ordinance, a zoning ordinance, subdivision regulations, and site plan review regulations. All have been reviewed and found to contain provisions specifically pertaining to water resource protection.

All options for regulatory programs (required by the State's Administrative Rules for water resource plans) were considered, and the following new or revised

regulatory programs are recommended in order to improve and/or enhance existing local water resource management and protection mechanisms:

1. A wetlands conservation district ordinance should be adopted by the Town to regulate land uses near wetland resources.

2. Erosion and sedimentation control regulations should be adopted by the Planning Board. These regulations provide standards and guidelines for development planning, for the purpose of controlling erosion and preventing sediment transport to wetlands and streams. The Rockingham County Conservation District has developed a model ordinance which the Town could use as a starting point.

3. Newfields should develop its own Underground Storage Tank (UST) regulations. Requirements to be considered are as follows:

   a) Require the removal of all abandoned tanks;
   b) Ban all new underground heating oil tanks with a capacity of less than 1,100 gallons. These tanks need not be registered with the N.H. Water Supply and Pollution Control Division, thereby making them difficult to monitor and regulate;
   c) Amend the Site Plan Review regulations to require development plans to identify the location, type, content and capacity of each proposed inground petroleum and chemical storage tanks in order to maintain a current inventory.

   The N.H. Water Resources Action Project has developed other such guidelines which Newfields could use to develop and administer a local UST regulatory program (source: "Guidelines for Controlling Underground Storage Tanks", Tools for Community Water Supply Protection, N.H. Water Resources Action Project, 1985, prepared by Sharon F. Francis, N.H. Natural Resources Forum, Sky Farm, Box 341, Charlestown, NH 03603).

4. Large subdivisions and the associated roads and drainage facilities can have a negative impact on the environment, including water resources. The Subdivision Regulations should be amended to require an environmental impact study for large subdivisions to insure that the damage to the environment is minimized.

5. The types of land uses reviewed under the Site Plan Review regulations may require large volumes of water. These uses have the potential to deplete other wells in the area relying on the same groundwater resource for their supplies. Therefore, if a proposed land use requires large water supply volumes, the following information should be required:

   a) The on-site location of the proposed well, its expected yield, pumping duration and quantity (maximum) of water withdrawn;
   b) Subsurface groundwater conditions (e.g., saturated thickness, direction of groundwater flow, etc.);
   c) Location of abutting water supply wells, amount of water being pumped, and maximum capacity needed;
   d) Effect of proposed use on abutting water supplies.

6. Amend the Subdivision and Site Plan Review regulations as follows:

   a) Promote the use of catch basins designed to trap oil and sediments;
   b) Encourage road designs that require less use of de-icing chemicals (e.g. roads with minimal slope and/or turning radius, etc.);

c) Require that runoff be retained on-site and that no degradation of water quality shall occur. This will provide for groundwater recharge through the infiltration of retained water. This provision will also safeguard abutting properties from increased flows which can cause flooding and erosion damage.

7. The Newfields Conservation Commission should consider mapping and documenting prime wetlands as authorized under RSA 483-A:7, and subsequently recommend their adoption as part of the Zoning Ordinance in accordance with RSA 675:3. The State of New Hampshire Wetlands Board is required to give special consideration to prime wetlands during the review of dredge and fill permit applications.

Generally, the cost of preparing proposed amendments to regulations and ordinances is minimal. Technical assistance can be provided at low or no cost by the Rockingham Planning Commission or the Rockingham County Conservation District. There would be some expense involved with complying with the statutory requirements for the publication of hearing notices. The Town should not need to hire any personnel for the preparation of the proposed amendments to regulations and ordinances.

Unless the members of the Conservation Commission possess certain technical qualifications relative to the mapping and identification of wetland areas or can obtain voluntary assistance from qualified residents, some funding may have to be budgeted for training or the provision of limited technical assistance for prime wetlands mapping.

Since the goal of the surface and groundwater portions of this Plan is to assure that local land use decisions resulting from this planning process are based upon the most comprehensive and reliable scientific and technical information available, it is important that all implementing ordinances and regulations include: (1) a process that allows applicants for local approvals to present documented scientific and technical information which differs from the information used to prepare this Plan; and (2) mechanisms that would enable local decision makers to consider the scientific and technical information submitted by the applicants prior to making a final decision.

APPENDICES

APPENDIX I	Summary of Well Completion Report Data for the Town of Newfields
APPENDIX II	Inventory of Underground Storage Tanks
APPENDIX III	Public Water Systems Inventory
APPENDIX IV	Organic Chemical Analysis of Well #5

APPENDIX I

SUMMARY OF WELL COMPLETION DATA

SUMMARY OF WELL CONSTRUCTION RECORD DATA FOR THE TOWN OF NORTHFIELD

AREA	WELL#	NAME	ROAD	MAP	PARCEL	ELEV	DCOMP	USE	RSN	TYPE	DOTD	DOKD	CASING	YIM	YID	YTQ	SWL	OVERBURDEN	QC	NOTE
[illegible]	[illegible]	[illegible]	Bald Hill Rd			151.0	8/10/17	8	5	2	42.0	46.50	40.50				31.72	12-1-12-5	1	OK
[illegible]	[illegible]	[illegible]	Bald Hill Rd			101.0	8/09/20	8	5	2	52.0	63.50	51.50				0.00	4-1-5	2	
[illegible]	457-66-5c	S. Stocum	Bald mill Rd		3		8/08/20	1	1	1	420.0	37.00	48.00	3	1.00	30.00		3	2	Y.
[illegible]	[illegible]	Colonial Restorations	Bald mill Rd		Lot 7		8/09/12	1	1	1	26.0	16.00	24.00	3	1.00	30.00	10.00	2	2	
[illegible]	457-266-88	D. Willett	Bald Hill Rd	203	2 2		8/11/25	1	1	1	300.0	55.00	70.00	3	1.00	3.00	10.00	1346	2	Controlled Overburden Drill
[illegible]	477-975	D. Rogers	Capretins meadow Ad Rte 25		Lot 28		8/02/13	1	1	1	140.0	14.00	26.00	3		60.00		2	2	
[illegible]	477-750	M. Goodrich	Hall Hills Rd				8/10/30	1	1	1	200.0	6.00	20.00	3		6.00		3	2	
[illegible]	5c8-12288772	D. Roy	Hells Hill Rd				8/12/27	1	1	1	320.0	3.00	20.00	3		3.50	40.00	1	2	
[illegible]	457-55-87	R & J Voltaire	Hells Hill Rd	1	55-1		8/06/20	1	1	1	400.0	15.00	34.00	3	1.00	2.00		124	1	YL
[illegible]	457-173 88	W. Fearon	Hells Hill Rd		9		8/08/19	1	1	1	400.0	20.00	41.00	3	1.00	10.00		5	2	YL
[illegible]	[illegible]	T. Bassett	Garrison Rd				8/05/29	1	1	1	800.0	5.00	41.00	3	1.00	2.00		2	2	YL
[illegible]	[illegible]	[illegible]	Garrison Rd				8/07/07	1	1	1	700.0	2.25	42.00	3	1.00	2.00	15.00	1	1	YL
[illegible]	5c8-1103	Town of Northfield	Old Tee Rd				8/09/09	1	1	1	500.0	14.00	23.00	3	1.00	2.00	12.00	34	2	
[illegible]	[illegible]	[illegible]	Old Tee Rd			140.0	8/12/07	1	1	1	241.0	55.00	77.00	3	1.00	4.00		4	2	YL
[illegible]	[illegible]	Great Bay Camping Area	Rte 108			23.0	8/08/24	1	1	1	140.0	9.00	21.00	3		20.00		1	1	
[illegible]	[illegible]	[illegible]	Rte 25			60.0	8/08/22	1	1	1	345.0	20.00	45.60	3	0.50	60.00	15.00	12	2	
[illegible]	[illegible]	J. Eastman	Rte 85				8/03/02	3	1	1	379.0	39.00	60.00	3	10.35	100.00		124	2	
[illegible]	5c8-1103	Town of Northfield	off Rte 87				8/09/27	3	1	1	402.0	55.00	60.00	3	0.50	65.00		12	2	Gravel Pit, grading and [illegible]
[illegible]	5c8-1103	Town of Northfield	off Rte 87																	
[illegible]	3-159	A. Rhue	Rte 87			120.0	8/12/15	1	1	1	440.0	15.00	25.00	3	1.00	2.50	10.00	3	1	YL
[illegible]	367-80	E. Patterson	Rte 87	214	8		8/12/19	1	1	1	240.0	40.00	61.00	3	0.33	4.00		1-4	2	
[illegible]	477-674	G. Verville	Rte 87				8/07/18	1	1	1	220.0	125.00	137.00			15.00		1-4	2	
[illegible]	895-149	M. Woodard	Rte 87				8/03/10	1	1	0	55.0			2	8.00	15.00	7.00	1-4-2	2	Drilled Hand dug
[illegible]	367-27	G. Hodgdon	Rte 87	214	3		8/06/25	1	1	1	180.0	50.00	76.00	3	0.25	50.00		1	2	
[illegible]	477-875	G. Verville	Rte 87				8/07/19	1	1	1	140.0	86.00	94.00	3		100.00		14	2	
[illegible]	367-53	D. Chick	Rte 87	207	27		8/09/28	1	2	1	240.0	15.00	41.00	3	0.17	7.00		1	2	
[illegible]	367-38	B. Knowlton	Rte 87	214	1		8/06/29	1	1	1	200.0	50.00	81.00	3	0.17	30.00		1	2	
[illegible]	406-854	A. Nichols	Rte 87				8/06/07	1	1	1	202.0	21.00	39.00	3	0.50	25.00		2	2	
[illegible]	477-674	G. Verville	Rte 87				8/07/18	1	1	1	220.0	125.00	137.00	3		15.00		1	3	
[illegible]	367-60	F. Pattison	Rte 87	214	27		8/09/10	1	1	1	305.0	80.00	95.00	3	0.17	30.00		1-4	2	
[illegible]	477-976	J. Swanson			Lot 6		8/12/17	1	1	1	510.0	9.00	21.00	3		2.00		1	2	
[illegible]	3-523	F. Malone					8/08/02	1	1	1	303.0	5.00	20.00	3	1.00	12.00		3	2	

APPENDIX II

INVENTORY OF UNDERGROUND STORAGE TANKS

01111861001	NEWFIELDS	HOOPERS GENERAL STORE	RR 2 RTE. 108	ROWELL & WATSON CO., INC.	(603) 742-2418	04	4,000	Now In Use	Petroleum - Diesel Y
01111861002	NEWFIELDS	HOOPERS GENERAL STORE	RR 2 RTE. 108	ROWELL & WATSON CO., INC.	(603) 742-2418	04	8,000	Now In Use	Petroleum - Gasoline Y
01111861003	NEWFIELDS	HOOPERS GENERAL STORE	RR 2 RTE. 108	ROWELL & WATSON CO., INC.	(603) 742-2418	04	8,000	Now In Use	Petroleum - Gasoline Y
01105054001	NEWFIELDS	KINGSTON-WARREN CORPORATION	ROUTE 85	KINGSTON-WARREN CORPORATION	(603) 772-3771	07	20,000	Now In Use	#2 HEATING OIL Y
01105054002	NEWFIELDS	KINGSTON-WARREN CORPORATION	ROUTE 85	KINGSTON-WARREN CORPORATION	(603) 772-3771	03	20,000	Now In Use	#2 HEATING OIL Y
01105061001	NEWFIELDS	KINGSTON-WARREN CORPORATION	SWAMSCOTT STREET	KINGSTON-WARREN CORPORATION	(603) 772-3771	16	10,250	Now In Use	#2 FUEL OIL Y
02203591001	NEWFIELDS	NEWFIELDS COUNTRY STORE	MAIN STREET	NEWFIELDS COUNTRY STORE	(603) 659-2152	25	1,000	Now In Use	Petroleum - Gasoline U
02203591002	NEWFIELDS	NEWFIELDS COUNTRY STORE	MAIN STREET	NEWFIELDS COUNTRY STORE	(603) 659-2152	25	1,000	Now In Use	Petroleum - Gasoline U
01122621001	NEWFIELDS	STATE OF N.H. D.O.T. PATROL 6	ROUTE 108	STATE OF NH DOT	(603) 271-2055	06	4,000	Now In Use	Petroleum - Diesel
01122621002	NEWFIELDS	STATE OF N.H. D.O.T. PATROL 6	ROUTE 108	STATE OF NH DOT	(603) 271-2055	06	4,000	Now In Use	Petroleum - Gasoline
01122621003	NEWFIELDS	STATE OF N.H. D.O.T. PATROL 6	ROUTE 108	STATE OF NH DOT	(603) 271-2055	08	2,000	Now In Use	#2 FUEL OIL

APPENDIX III
Public Water Systems Inventory

TN: NEWFIELDS

PUBLIC WATER SYSTEMS INVENTORY
Water Supply Engineering Bureau
Water Supply & Pollution Control Div.
Dept. of Environmental Services

Date: 3/88

See Map to Locate System
(X X -)

SYSTEM NAME	LATITUDE/ LONGITUDE	OWNER'S NAME	OWNER'S MAILING ADDRESS	TOWN (no Zip)	TELEPHONE (No Area Code)
NEWFIELDS WATER DEPARTMENT	0430223/0705630		TOWN HALL	NEWMARKET 2	NH 772-4627
CONNORS BOTTLING COMPANY	0430156/0705644	ALFRED CONNORS	P.O. BOX 196	NEWFIELDS	NH 772-3376
N.H. PUBLIC WORKS & HWY. DEPT.	0430243/0705558	VINCENT BATEMAN	ROUTE 108	NEWFIELDS	NH 778-8876
GREAT BAY CAMPING VILLAGE	0430249/0705546	GEORGE W. STAPLES	P.O. 1323	SEABROOK	NH 474-9029
THE HALF BARN	0430301/0705556	GORDON SWANSON	ROUTE 108	NEWFIELDS	NH 778-7898

State of New Hampshire
WATER SUPPLY AND POLLUTION CONTROL COMMISSION
WATER SUPPLY DIVISION

Organic Chemical Analysis

#5 well

Sample No.: 47279
EPA No. 1581015 - BRW 2 BEHIND SCHOOL
System Name NEWFIELDS WATER DEPARTMENT
Owners Name
City or Town NEWFIELDS

[redacted]:
Person sampling: RENE
Date Submitted: 09-16-05,15:20
Date Completed: 10-14-05
Person submitting: PAC

Raw/Treated/Unknown_
AW_

Comments:
TAP IN PUMP HOUSE

[redacted]

Test Name		Result (ug/l)	Test Name		Result (ug/l)
Volatile Organics			**Volatile Organics (cont.)**		
Benzene	<	5.0000	1,2-dichloropropane	ND	
meta Xylene	<	5.0000	1,3-dichloropropene	ND	
Ortho and Para Xylene	<	5.0000	1,3-dichloropropane	ND	
Dichloromethane	ND		Chlorobenzene	ND	
Chlorodibromomethane	ND		Dichlorobenzene	ND	
Tribromomethane	ND		Ethylbenzene	<	5.0000
Trichloromethane	ND		Toluene	<	5.0000
Chloroethane			Dichlorobromomethane	ND	
1,1-dichloroethane	ND				
1,2-dichloroethane	ND				
1,1,1-trichloroethane	ND		**Pesticides & Herbicide**		
1,1,2-trichloroethane	ND				
Tetrachloroethane	ND				
1,1-dichloroethylene	ND		Endrin	(0.2)	
dichloroethylene (c+t)	ND		Lindane	(4.0)	
Trichloroethylene	ND		methoxychlor	(0.2)	
Tetrachloroethylene	ND		Toxaphene	(0.5)	
Vinyl chloride			2,4-D	(100.0)	
Bromomethane			2,4,5-TP Silvex	(0.005)	
Chloromethane					
Trichlorofluoromethane	ND		**Trihalomethanes**		
Acetone	ND				
Tetranydrofuran	ND				
Diethylether	ND		Total Trinalomethanes		
Methylethyl ketone	ND				
Methylisobutyl ketone	ND				

ug/l = micrograms per liter
> = greater than
< = less than
ND = none detected
PR = Present

#5

State of New Hampshire
WATER SUPPLY AND POLLUTION CONTROL COMMISSION
WATER SUPPLY DIVISION

Inorganic Chemical Analysis

Sample No.: 47299
EPA No. 1681015 - BRW 2 BEHIND SCHOOL
System Name NEWFIELDS WATER DEPARTMENT
Owners Name
City or Town NEWFIELDS

Date sampled: 09-17-85, 13:10
Person sampling: RENE
Date Submitted: 09-18-85, 15:20
Date Completed: 10-14-85
Person submitting: PAC
Comments:

TAP IN PUMP HOUSE

[redacted]

Sample contains indication of low level contamination - Suggest resampling

Test Name	MCL		Result (mg/l)	Test Name	MCL	Result (mg/l)
Primary Standards				**Secondary Standards**		
Arsenic	(0.05)	<	.0056	Chloride, Cl	(250)	15.0000
Barium	(1.0)			Copper, Cu	(1.0)	
Cadmium	(0.010)			Iron, Fe	(0.30	.4000
Chromium	(0.05)			Manganese, Mn	(0.05	.0600
Lead	(0.05)	<	.0100	Sulfate, SO4	(250)	24.2000
Mercury	(0.002)			Sodium, Na	(20-250	30.0000
Selenium	(0.01)	<	.0100	Turbidity	(N.T.U.	
Silver	(0.05)			Specific Conductance	(mhos	311.0000
Nitrate/Nitrite	(10.0)	<	.2500	pH	(units	7.8900
Fluoride, F -	(2.4)		.2000	Total Hardness as	CaCO3	108.0000
Coliform Bact./100 ml			0	Calcium Hardness as	CaCO3	54.9000
Non-Coliform Bact.			0	Total Alkalinity as	CaCO3	123.2000
Iron Bacteria				TDS (tot. Dis. Sol.)	(500)	
Coliform, Tot. MPN/100				Corrosive Indices		
Other Heavy Metal				Aggressive		
				Langelier		
Aluminum, Al			.0300	Color (15 apparent units)		
Antimony, Sb				Foaming Agents, MBAS	(0.5)	
Molybdenum, Mo				Hydrogen Sulfide	(0.05)	
Vanadium, Va				Odor	(3 T.O.N.)	
Zinc, Zn			.0300	Temperature	C.	
Radioactivity				**Radioactivity (cont.**		
Gross Alpha	(15pC/l)			Uranium		
Radium 226,228	(5pC/l)			Radon		1939.0000

mg/l = milligrams per liter - (otherwise noted)
CN = Confluent Growth
> = greater than
< = less than
ND = none detected
PR = Present
pC/l = picocuries per liter

Resample of Well # 5 [redacted]

Sample taken by Rene Pelletier
Copy given to D. Taylor

State of New Hampshire
WATER SUPPLY AND POLLUTION CONTROL COMMISSION

Water Supply Report

Reporting and Billing Address

NEWFIELDS WATER DEPARTMENT
ATT: WENDELL SARGENT
RFD #2
NEWMARKET, NH 03857

Sample Location

EPA Number: 1681015 - [redacted]
Owners Name: RENE
System Name: NEWFIELDS WATER DEPARTMENT
City or Town: NEWFIELDS

Additional Information

Sample No.: 52229
Person Sampling: RENE
Date sampled: [redacted]
Date Received: [redacted]
Date Completed: 01-30-86
Person Receiving: HOWARD

Comments:

PUMP STATION - DUPLICATE OF 52228

[redacted]

Test Name		Result (see units)	Standards Recommended	Standards Allowable	Above Limit
Methane, dichloro-	ug/L	ND			
Methane, dichlorobromo-	ug/L	ND			
Methane, tribromo-	ug/L	ND			
Methane, trichloro-	ug/L	ND			
Methane, tetrachloro-	ug/L	ND			
Methane, chlorodibromo-	ug/L	ND			
Ethane, 1,1 dichloro	ug/L	ND			
Ethane, 1,2 dichloro	ug/L	ND			
Ethane, 1,1,1trichloro	ug/L	ND			
Ethane, 1,1,2trichloro	ug/L	ND			
Tetrachloroethane	ug/L	ND			
Ethylene, 1,1 dichloro	ug/L	ND			

Ethylene, trichloro	ug/L	ND	
Ethylene, tetrachloro	ug/L	ND	
Propane, 1,2 dichloro	ug/L	ND	
1,3dichloropropane	ug/L	ND	
Benzene	ug/L	<	5.0000
Benzene, chloro	ug/L	ND	
Benzenes, dichloro	ug/L	ND	
Benzene, ethyl	ug/L	ND	
Toluene	ug/L	ND	
Xylene meta isomer	ug/L	ND	
Ethylene, chloro	ug/L	ND	
Methane,trichlorofluoro	ug/L	ND	
Styrene	ug/L	ND	
Acetone	ug/L	ND	
Tetrahydrofuran	ug/L	ND	
Diethyl ether	ug/L	ND	
Methyl ethyl ketone	ug/L	ND	
Methyl isobutyl ketone	ug/L	ND	
Propene 1,3 dimethyl t	ug/L	ND	
Xylenes (ortho & para)	ug/L	ND	
Trichlorotrifluoroeth.	ug/L	ND	
1,2Dichloroethylene c+t	ug/L	ND	
Cyclohexane	ug/L	ND	
ChlorofluoroMethane	ug/L	ND	
DichlorodifluoroMethane	ug/L	ND	
DichlorotrifluoroEthane	ug/L	ND	

cts/100ml	= Counts per 100 ml	SC	= Screen Sample
CN	= Confluent	>=	= Greater than or equal
>	= Greater than	<=	= Less than or equal
<	= Less than	@@	= Sample of MCL
ND	= None Detected	PR	= Present
DE	= Deleted		

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