ENVIRONMENTAL REVIEW TEAM REPORT
ON THE
LIQUID WASTE DISPOSAL SYSTEM
LYME, CONNECTICUT

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EASTERN CONNECTICUT RESOURCE CONSERVATION
AND DEVELOPMENT PROJECT
Environmental Review Team
139 Boswell Avenue
Norwich, Connecticut 06360

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This report is an outgrowth of a request from the Lyme Conservation Commission to the New London County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Executive Council for their consideration and approval as a project measure. The request has been approved and the measure reviewed by the Environmental Review Team.

The soils of the site were mapped by a soil scientist of the USDA Soil Conservation Service. Reproductions of the soil survey were forwarded to all members of the Team prior to their review of the site.

The Team that reviewed the proposed development consisted of the following personnel: Sherman Chase, District Conservationist, Soil Conservation Service (SCS); Robert Miller, Geologist, Natural Resources Center (NRC), Connecticut Department of Environmental Protection (DEP); Joseph Dowhan, Biologist, NRC, DEP; Donald Capellaro, Sanitarian, Connecticut Department of Health; David Miller, Climatologist, Connecticut Cooperative Extension Center; Barbara Hermann, Team Coordinator, Eastern Connecticut RC&D Project.

The Team met and reviewed the site on April 3, 1975. Reports from each Team member were sent to the Team Coordinator for review and summarization.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and makes recommendations for a monitoring system for the proposed liquid waste disposal system. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Council hopes you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact: Miss Barbara A. Hermann (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Project, 139 Boswell Avenue, Norwich, Connecticut 06360.

INTRODUCTION

The Town of Lyme has proposed to construct a liquid waste disposal area on a 7 1/2 acre site located on the west side of Gungy Road, just north of the CL&P right-of-way. The chief features of the site include an upper rocky area, a relatively limited flat area north of the right-of-way where the soil consists of bony gravel, and an adjoining lower swampy area with a stream which flows to the east. At the present time the site is isolated from any existing dwellings and associated private water supplies.

The proposed facility would be located in the area of gravel. Engineering plans indicate one or two settling lagoons which would be connected into an overflow lagoon. To start with, only one of the settling lagoons would be constructed. The second one would be constructed if and when needed.

The estimated volume of septic tank pumpings to be disposed of in a year's time is 30,000 gallons. It was indicated there would be no industrial wastes.

The prime concern relative to the site is the porous soil and the protection of the adjoining wetlands and ground water from possible adverse effects of pollution. In light of this concern the Lyme Conservation Commission has requested advice on a monitoring system in the vicinity of the septage lagoons. In this report we will provide a brief description of the site, identify further investigation that is needed to properly place a monitoring system, factors regarding the construction and operation of the monitoring system, and the components that should be monitored. Comments or recommendations made within this report are presented for consideration by the town and should not be construed as mandatory or regulatory in nature.

SITE DESCRIPTION

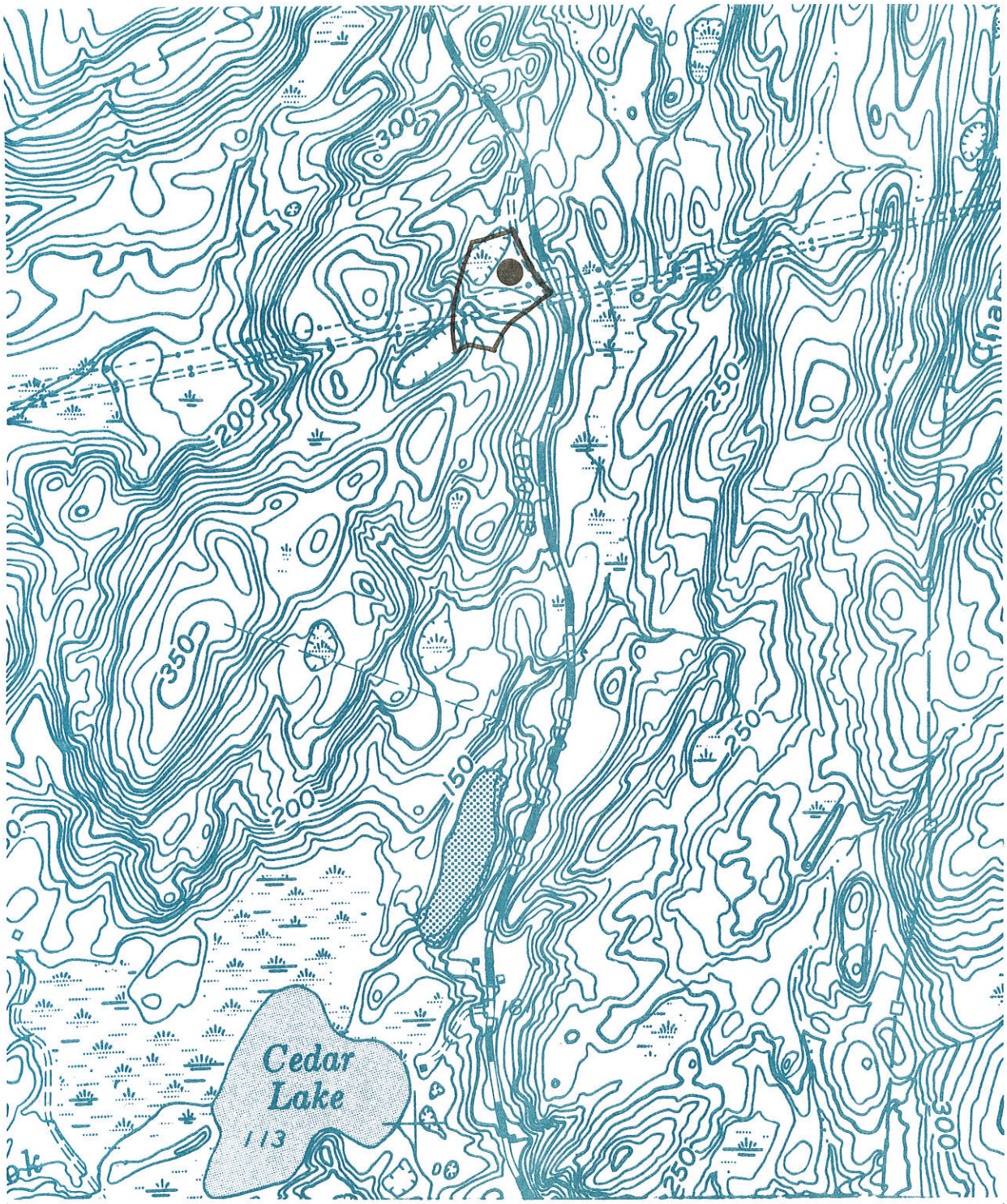
The topography map on the following page shows the site and proposed lagoon area with respect to the surrounding area. The site drains eastward, with a culvert under Gungy Road permitting water to flow into the brook which eventually feeds Gungy Lake (man-made water body on map) and Cedar Lake.

A soil map of the site is shown on page 5 (boundaries are approximated). It shows three soils on the property, each with very different characteristics. Soil 69B, Agawam, is a well to excessively drained soil with a sandy substratum. Permeability is moderate to rapid. The liquid waste disposal facility would be located in this area.

The wetland area consists of soil 43M, Leicester, Whitman, and Ridgebury, and is poorly to very poorly drained. A seasonal water table is near the surface from late fall through early spring. A stream flows eastward and under Gungy Road where it joins a brook flowing southward into Gungy and Cedar Lakes.

The third soil on the property, 17LC (Hollis Rocky Complex), is an upland, rocky soil which is shallow to bedrock. Surface outcrops vary from a few to numerous with varying amounts of surface stones and boulders. Slopes are generally in the range of 3 to 15 percent.

TOPOGRAPHY



APPROXIMATE PROPERTY LINE

LAGOON AREA

1 INCH = 1000 FEET

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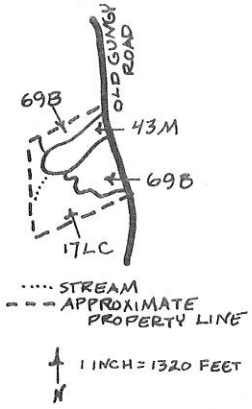
SOIL MAP

LIQUID WASTE DISPOSAL AREA
LYME, CONNECTICUT



Prepared by: UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service

ADVANCE COPY, SUBJECT TO CHANGE *SEPTEMBER, 1975*

The quality of the groundwater in the vicinity of the lagoon is the major concern for several reasons. The highly permeable nature of the gravel will preclude much, if any, surface runoff and probably any overflow from the lagoon. The evaporation from the lagoon will be very low because of its small surface area and the protected shaded site. The evaporation from the lagoon is estimated at 15 to 20 inches of water per year (over the surface area of the lagoons) with 90% of this occurring in the 6 summer months. Therefore, most of the liquid will infiltrate into the ground. It appears the ground water level is at the most 10 feet below the surface and little renovation can be expected to occur in this short distance of gravel. Therefore, most of the liquid dumped, plus 20 to 30 inches of rainfall, will filter through to the water table. For this reason, it is desirable to establish a monitoring system which will determine the impact on the water quality.

FURTHER INVESTIGATIONS

In order to design an adequate monitoring system for the septage lagoon, some further information is needed. Four basic questions which need to be answered are:

(1) What is the depth to the water table?

(2) What is the slope of the water table?

(3) What is the depth of the coarse sand and gravel material the lagoons are to be installed in?

(4) What is the depth, slope, and possibly the texture of the bedrock surface below the proposed site?

By investigating these questions, it can be determined where the monitors should be placed.

Some of the more critical information related to the positioning of the monitors which the above investigation should provide are:

(1) The direction and speed of the ground water. Is it towards the wetland or away from it?

(2) Is the ground water close to the surface?

(3) Manner in which ground water flow and direction is controlled.

(4) Depth at which the ground water flows.

(5) Whether the permeability of the bedrock creates a vertical flow or its surface somehow controls the flow towards or away from the wetland.

Once the direction of groundwater flow is determined for the lagoon site, well locations can be identified above and below the site. A well above the site will provide control data on the natural conditions of the ground water to be used in evaluating the data from wells below the lagoon site. Wells should be located in several places downstream, to be determined once the direction and speed of ground water flow is known.

It is possible to place wells without the above investigations. However, there is a risk that an area being contaminated would be overlooked. Since the wells should be placed according to the direction, slope, and speed of the ground water, an estimate would be made based on the direction and degree of slope of the land surface. In doing this, an assumption is made that the land surface approximates the bedrock surface and the ground water surface. To compensate for uncertainties about bedrock and ground water conditions, additional wells may be necessary. This approach to well location may save initial investigation costs, but may result in higher installation and operating costs due to additional wells. These factors should be carefully considered together with the degree of reliability desired from the monitoring before making a definite decision.

INSTALLATION AND OPERATION

Once the locations of the monitoring wells have been determined, there are other items which should be kept in mind to ensure useful and reliable results. The following specifications were suggested for the wells:

Well size: less than 3 inches in diameter.

Depth: to 10 feet below the water table.

Casing: permeable, all the way down.

An added note of caution should be expressed. The realibility of data obtained from a monitoring system is only as good as the procedures and care taken during its installation. The complete installation should be supervised by someone who is familiar

with the construction procedures involved and the degree of realibility needed from the data.

Prior to any use of the lagoons, the monitoring wells should be in place and at least one sample taken from each monitor. It would be preferable to collect several months worth of smples, including samples during a period of high surface and ground water conditions and during one of low surface and ground water conditions. This background data is necessary in order to note any trends of change in water quality.

Once the lagoons are in operation, the sampling times may vary depending on the use of the lagoons and the availability of funding. Initially samples might be taken weekly. If no changes are seen, then the rate can be slowed to once every 2 or 3 weeks. Samples should be taken during times of heavy rainfall and times of drought as these have different effects on the normal surface and subsurface water flows.

When taking samples, it is important to note the depth at which samples are taken. It would also be desirable to take samples from several water depths at each monitor site. Sampling depths suggested were at the surface of the water table and 1, 3, 6, 9 and 12 feet below the surface. The depth to the water level in each well should be recorded.

The chemical and bacteriological components that might be tested for which there could be significant meaning are:

Nitrogen constituents (ammonia and nitrate).

Biochemical oxygen demand.

Chlorides.

Phosphate or detergents.

Total coliforms and fecal coliforms.

In addition to the wells, there is other monitoring that would be beneficial. Surface water samples should be taken in the adjacent wetland and in the stream before it leaves the property. It would also be helpful to place a rain gage nearby to measure the rainfall. A possible location would be in the transmission line right-of-way.

After the samples are analyzed, the data should be checked against the background data to note any changes in water quality. If significant detrimental changes are noted, then remedial measures should be taken. Assistance in determining the proper measures might be gotten from the State Departments of Environmental Protection and/or Health. One possible measure would be to seal the bottom of the lagoon with a material such as Bentonite. This would allow settling and some renovation of the septic material to occur. As the lagoon fills to capacity, the supernatant would spill over into the overflow lagoon and be permitted to enter the ground.

To assist the town in locating a laboratory for analyzing water samples, a list of laboratories in Middlesex and New London Counties, approved by the State Department of Health, is attached to this report.

CONNECTICUT STATE DEPARTMENT OF HEALTH
LABORATORY DIVISION

APPROVED WATER LABORATORIES
LABORATORIES ACCEPTING SAMPLES FOR ANALYSES ON A FEE BASIS
October 1972

Laboratory and Director	Tel. No.	Laboratory Approved For: Bacterio-logical	Detergents (ABS)	Other Sanitary Chemical Analyses
MIDDLESEX COUNTY				
Middletown				
Middlesex Memorial Hosp. Lab. 28 Crescent Street Christie E. McLeod, M.D.	327-2531	X		
Hallwater Lab. of Chemistry and Biology, Wesleyan Univ. Joseph Masselli, M.A.	347-4421		X	X
NEW LONDON COUNTY				
New London				
Cyto Medical Laboratory 501 Ocean Avenue Zannis Kalams, M.D.	447-1721	X	X	X
Seba Labs., Inc. 154 Broad Street Ernest F. Kydd, Jr. B.A. & Harold B. Kydd, B.A., Co-Directors	442-5024	X	X	X
Norwich				
Ecological Laboratory 212 West Main Street Richard J. Benoit	889-8104	X	X	X