Septic System Survey Report
for
Lauderdale Lakes Area 2

LAUDERDALE LAKES MANAGEMENT DISTRICT

Walworth County, Wisconsin

PROJECT NO.: 91600-0-242-242

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October 21, 1992

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Re: Lauderdale Lakes Area 2
Septic System Survey Report

Gentlemen:

We are pleased to submit 10 copies of the Area 2 Septic System Investigation Report. We have attempted to incorporate the helpful suggestions of the Lauderdale Lakes Management District Board in our investigations in order to make this report a fully complete and usable document.

This report should provide basic technical data and evidence which may be used to help formulate and implement the District's goals of improving the water quality of Lauderdale Lakes. Over 200 inspections of septic systems were conducted for this study and determinations were made regarding the effects these systems are having or the lake water quality.

In addition to the Area 2 inspection, we revisited Area 1 to determine if the sub-code systems had a replacement area. This data is included in the enclosed "Sanitary System Inspection Summary Table" (Area 1).

We appreciated the information we have received from many of the lake residents during our inspections, and we especially want to thank the Board for their insights and assistance throughout the study. If any questions come up during your review of this data, please contact us.

Sincerely,
R. A. SMITH & ASSOCIATES, INC.
ENGINEERS - PLANNERS - SURVEYORS - INSPECTORS

Paul A. Johnson, P.E.
Director of Water Resources

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Enclosures

Lauderdale Lakes Area 2
Septic System Survey
for the
Lauderdale Lakes Management District

Background Data

Over the years, the Lauderdale Lake Improvement Association and more recently the Lauderdale Lakes Management District has been monitoring the water quality of Lauderdale Lakes. The purposes of their activities has been to: 1) determine the causes of deteriorating water quality and 2) find ways to maintain and improve water quality.

As part of this ongoing process, the Lake Boards have initiated several investigations of the soil absorption (septic) systems surrounding the lakes. These now-completed investigations are as follows:

1. Wisconsin Department of Industry, Labor and Human Relations (DILHR), 1988.

2. Walworth County office of Planning, Zoning, and Sanitation (ongoing).

3. Cluster Sanitary System Feasibility Study, R. A. SMITH & ASSOC., INC., 1988.

4. Lauderdale Lakes Area 1, Wastewater Feasibility Study for the Lauderdale Lakes Management District, 1992.

Purpose of Study

As part of the R. A. SMITH & ASSOC., INC. study, "Lauderdale Lakes Area 1 Wastewater Feasibility Study," R. A. SMITH & ASSOC., INC. was retained to provide additional inspections of septic systems in Area 2 (see map, page 5). The number of inspections conducted in Area 1 was 67 and the number in Area 2 was expanded to 196, for a total of 263 inspections.

The primary purposes of the septic system inspections were as follows:

1. Determine if the system is failing in accordance with state (DILHR) standards and the specific reason for failure.

2. Determine if the system is in compliance with current state code.

3. Determine if the lot has an adequate area to install a replacement system.

Study Area

The septic system inspections were conducted along the north shore of Middle Lake and the south and west shores of Green Lake, LL-741 through LL-950 (see map, page 5). An inspection was conducted on every lot within the prescribed study area.

Inspection Procedures

Prior to conducting the inspections, a questionnaire was sent to each resident to gain information about the septic system (see page 6). This procedure proved very helpful with a high percentage of questionnaires returned. In addition, attempts were made to contact the residents on site as the inspections were being conducted.

The private on-site system inspections performed in Area 2 were all conducted in accordance with State standards to maintain a consistency of inspections between the various inspection teams. Using the State system of inspection, each system was categorized according to the following conditions (see page 7):

1. Failure - high ground water
2. Potential failure - seasonal high ground water
3. Failure - bedrock
4. Failure - surface discharge
5. No failure
6. Unknown
7. Safety problem
8. No failure - but does not meet code

An eighth condition was added in this study; no failure - but does not meet code. This condition was added to determine the number of inadequately designed systems (i.e., inadequate by current state code requirements) that do not fail by state inspection standards.

A typical inspection consisted of the following procedures:

1. Contact and interview the property owner.
2. Locate soil absorption system and determine the type of system.
3. Check the vent pipes for surface discharge and water level.
4. Inspect the septic tank and the seepage pits (dry wells) for condition and the water levels.
5. Check the elevation of the system in relation to the lake surface elevation or ground water elevation.
6. Check the horizontal distances to the wells, buildings, lake, and steep slopes.
7. Conduct soil borings or observe open excavations wherever practical.

8. Determine the category of the system, 1 through 8.
9. Determine a potential solution for failing or inadequate systems.
10. Determine if a replacement area is available on the lot.

Inspection Results

A tabulation summary of each individual inspection is included with this report following this section. On page 17 we have included an explanation of the various symbols and categories listed in the tabulation.

1. Seven on-site systems, or 3.5 percent, were found to be failing due to lack of vertical separation, less than 3 feet between the groundwater and the bottom of the system (Category 1).

2. Two systems, or 1 percent, were found to be failing due to seasonally high ground water (Category 2). Most of the soils in the upland areas were found to be highly permeable sands and gravels, which do not see significant seasonal ground water variations.

3. No bedrock was encountered within the depths of the existing septic system (Category 3). The area appears to be covered with a heavy layer of glacial till overburden.

4. No on-site systems were found to be failing due to surface discharge (Category 4). However, 21 systems showed evidence of potential failure from surface discharge.

5. 179 on-site systems, or 86 percent, were considered to be non-failing systems (Category 5).

6. Seven systems, or 3.5 percent, were listed as being in an unknown condition (Category 6).

7. No systems were found to pose a safety hazard (Category 7).

8. 127 on-site systems, or 61 percent, were found to be non-failing by state inspection standards, but were found to be poorly designed or constructed and unable to meet current state code requirements.

In addition to the above data, the following findings of the study are significant in regard to the goals of the Lake District:

1. Eight lots, or 4 percent, presently have holding tanks.

2. Eighty-three (83), or 40 percent of the lots with sub-code systems, do have replacement areas available on their lots (listed as R).

3. Eighty-one (81), or 39 percent of the lots with sub-code systems, do not have replacement areas available on their lots (listed as F).

4. The total number of failed and sub-code systems is 157 (Categories 1 through 4 and 8--note: sub-code systems in Category 4 is 21). The 157 systems is 76 percent of the total systems inspected.

Interpretation of Study

Even though only nine systems were found to be failing by state standards, a total of 157 systems (76%) were found to be sub-code or inadequate in some manner.

State code requirements have increased significantly since the time many of the lake homes were built. For example, the most common existing systems consists of one septic tank and one seepage pit (dry well). The present code for the typical 3 bedroom home would call for approximately seven pits, 6 feet in diameter (see page 8).

The majority of these sub-code systems are not failing by state standards, but are technically "failing" in their ability to properly "treat" the sewage effluent. At best, the liquid sewage will percolate through the seepage pit, hopefully removing the bacteria and pathogens in the process. However, it is unlikely that nutrient removal will take place in this type of system. The denitrification process requires oxygen, warm temperatures, and bacteria, none of which are likely to be present in our typical seepage pit.

As a result, the nutrients will move freely through the permeable outwash sandy soils into the water table. Once into the ground water system, further treatment will not occur, and the nutrients will be transported into the lake.

In general, it is our opinion that undersized and improperly designed soil absorption (septic) systems located in permeable soils are very likely to be a significant source of the increase in nutrient levels in adjacent lakes. Increased nutrients may add substantially to the eutrophocation process of these lakes.

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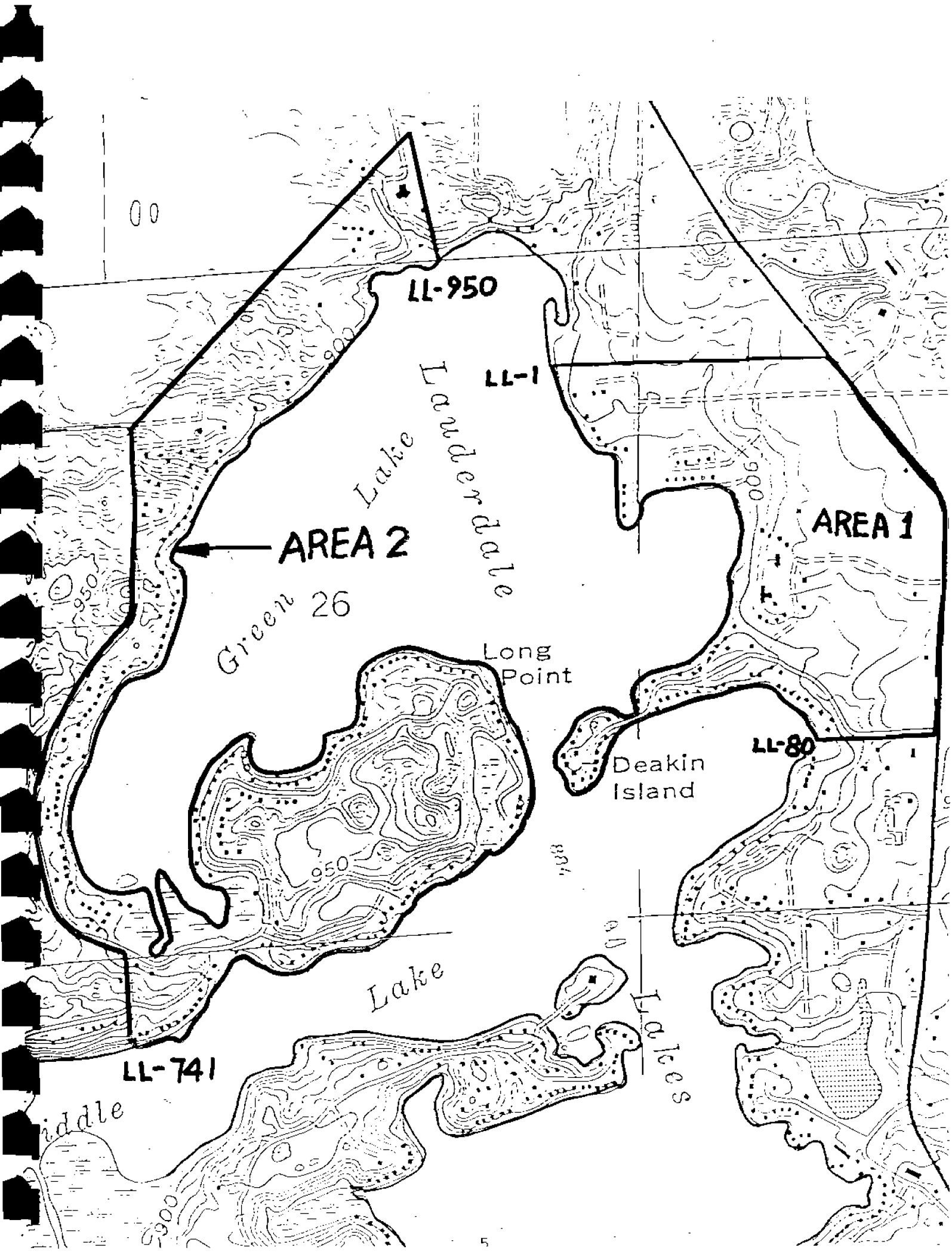

LL-950
LL-1
Lake Lauderdale
AREA 2
AREA 1
Green 26
Long Point
Deakin Island
LL-80
LL-741
Lake
Lakes
900
950

PRIVATE SEWAGE SYSTEM SURVEY QUESTIONNAIRE

Lauderdale Lakes Management District
Walworth County, Wisconsin

1. Name: _____

   On Lake Property Address: LL-_____

2. Are you the owner of the above property? ☐ Yes ☐ No

3. What is the best way to describe your property?

   ☐ seasonal use

   ☐ year-around

   ☐ other. (Please specify)_____

4. Number of bedrooms? ☐ One ☐ Two

   ☐ Three ☐ Four

5. What kind of septic system do you have?

   ☐ Holding Tank ☐ Seepage Pit (dry well)

   ☐ Mound System ☐ Seepage Bed

6. How often do you pump out your septic tank?_____

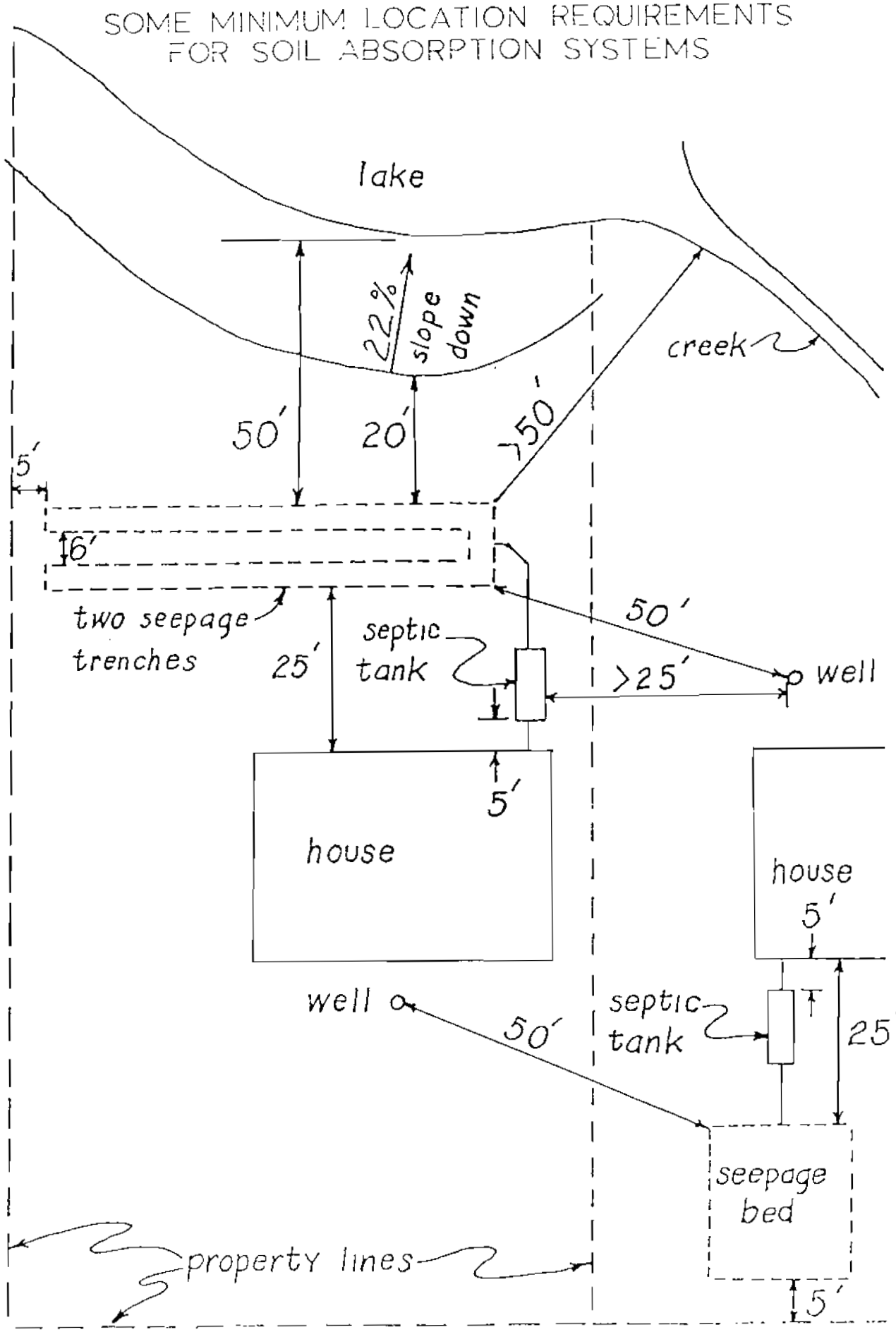
7. Has your septic system failed in the past? ☐ Yes ☐ No

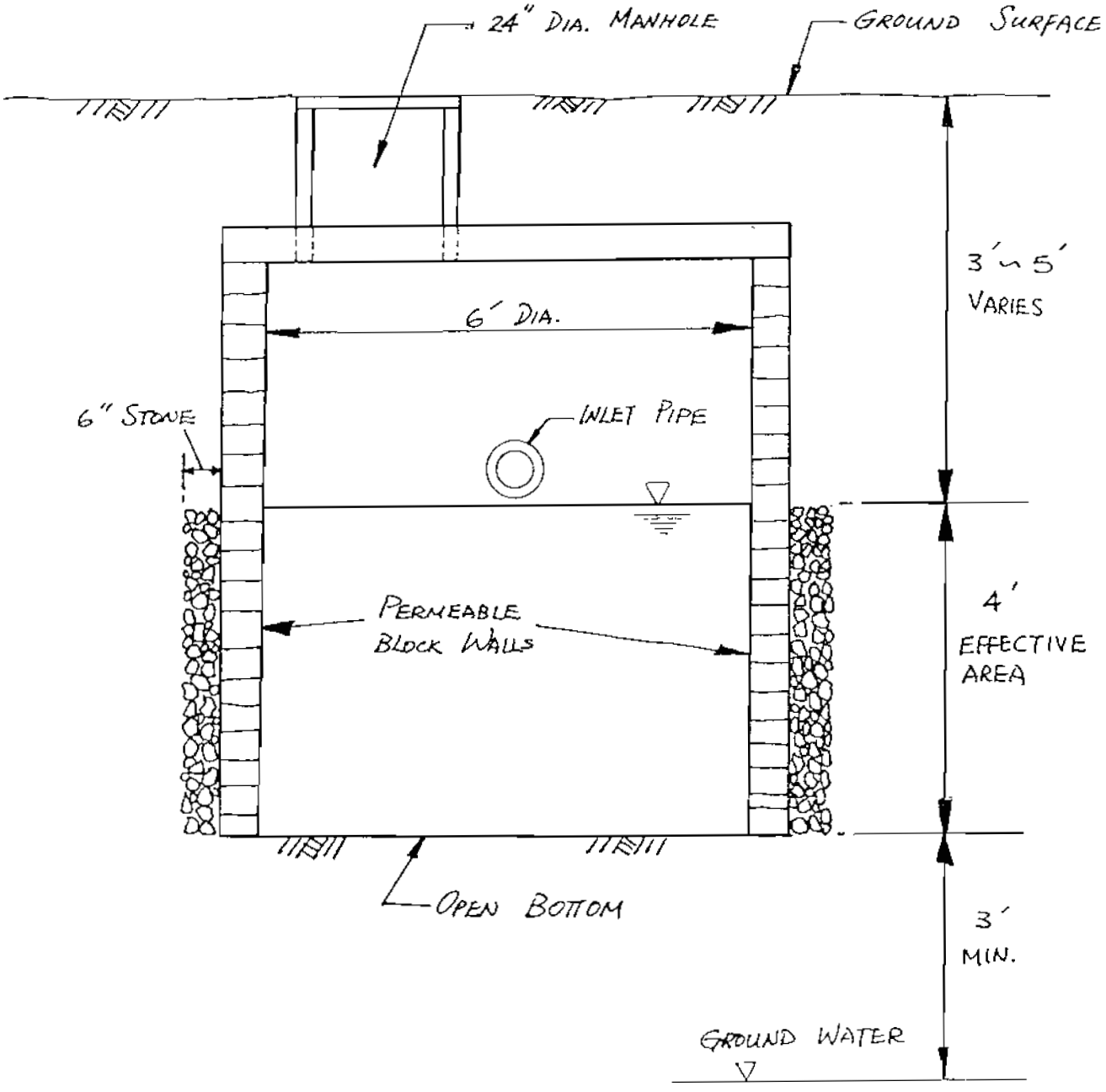
8. Has your system been inspected by the County? ☐ Yes ☐ No

   If yes, what year? _____

9. What year was your system installed? _____

10. Can you sketch the location of your septic system and well on the back of this page?


SOME MINIMUM LOCATION REQUIREMENTS
FOR SOIL ABSORPTION SYSTEMS
lake
22% slope down
creek
50'
20'
>50'
5'
6'
two seepage trenches
25'
septic tank
50'
well
>25'
5'
house
house
5'
well
50'
septic tank
25'
seepage bed
property lines
5'



TYPICAL SEEPAGE PIT

3 BEDROOM HOUSE

CLASS 1 SOIL (SAND & GRAVEL)

7 SEEPAGE PITS REQUIRED