

SINCE 1972

TWIN PORTS TESTING INC.

**LAKE NEBAGAMON
SEPTIC SYSTEM SURVEY REPORT
LAKE NEBAGAMON, WISCONSIN
DECEMBER, 1997 TPT# 638-96E.MM**

**Village of Lake Nebagamon
Box 316
Lake Nebagamon, WI 54849**

Attn: Swan Dawson

**LAKE NEBAGAMON
SEPTIC SYSTEM SURVEY
LAKE NEBAGAMON, WISCONSIN**

I. INTRODUCTION

Twin Ports Testing, Inc. (TPT) was contracted by the Village of Lake Nebagamon (the Village) on May 30, 1996 to conduct a septic system survey involving the residential properties located along and in the vicinity of the shore line of Lake Nebagamon in Douglas County, Wisconsin. The purpose of the survey was to establish a basis for administrative decision-making on the part of the Village, the Lake Nebagamon Sanitary Sewer Commission, and the Douglas County Health Department with regard to the community's present and future sanitary effluent disposal needs. The project addressed each property owner's septic system on an individual basis, collecting a variety of information and data from the property owners and from TPT field work performed at each site. Through the compilation of this information and data, an over-all picture of the present state of the general effectiveness of the community's individual systems has been compiled and is presented in this report.

The project's original scope included the following tasks, shared by the Village and TPT as indicated:

Village: Compile a comprehensive inventory of all of the study area properties and property owners to be included in the survey;

Village: Issue mailings to all Lake Nebagamon property owners chosen for the survey, explaining the project's purpose and involvements and soliciting initial information regarding the septic system present on each property.

TPT: Place one hand-augered soil boring in the vicinity of each property's septic leach field, extended 6 feet below the surface, with descriptive field logging to include soil types encountered and the presence of ground water if encountered. Should auger refusal occur, a minimum of one additional boring attempt would be made;

TPT: Conduct an elevation survey linking the height of each property's septic system to lake level (if possible), to the height of the soil boring, and to an arbitrary bench mark;

TPT: Conduct property owner interviews when possible during the field visits;

TPT: Dig five calibrated test pits at separate locations around the lake using a backhoe at locations to be specified by the Village;

TPT: Conduct five fluorescent die tests around the lake at locations to be determined by the Village;

TPT: The preparation and submission of a written summary of the project.

Following the commencement of the project, the project's scope was modified by the Village to exclude the digging of test pits and the conducting of fluorescent die tests. TPT did however, lend additional assistance to the Village in generating a second mailing of questionnaires.

An aspect of primary importance in the study was the general level of compliance of the community's septic systems with current state environmental regulations. A simple and direct indicator of individual septic system compliance was devised from a compilation of three Wisconsin Dept. of Commerce codes and a general estimation of the maximum depth of typical leach field piping: Comm 83.09-4a specifies that 3 feet of suitable soil (unsaturated by groundwater) must lie beneath the aggregate of all septic leach fields; Comm 83.13-5 specifies that ½ foot of aggregate must lie beneath all leach field piping; Leach field piping is approximately ½ foot in diameter; the typical depth of leach field piping commonly ranges to 2 feet. The summation of these measurements leads to the conclusion that groundwater should lie more than 6 feet deep in the vicinity of a leach field for the septic system to be in compliance with state regulations. Therefore, for the purpose of this study, the appearance of groundwater less than 6 feet deep in the vicinity of a given leach field, was chosen to indicate a lack of compliance with state regulations, and the system was designated as a failing system. Conversely, a lack of groundwater appearing within 6 feet of the surface of a leach field was chosen to indicate compliance, thus a passing system.

II. PROJECT METHODS

The Village's initial mailing to the Lake Nebagamon property owners was conducted in June, 1996, and included a cover letter explaining the project as well as a questionnaire (attachment). The questionnaire, to be filled out by each property owner and returned to the Village Clerk, requested general information regarding the type, location and configuration of the septic system used on each property, its estimated amount of use, contact information regarding the property ownership, and a request for permission from the property owner for TPT to visit the property and conduct the survey. Of the initial mailings the Village sent out, 245 completed questionnaires were returned. As the project's field work commenced, the responses were examined for completeness and

applicability (not all properties had septic leach fields). A second mailing was conducted by the Village in November, 1996 to reach as many of the remaining landowners as possible. An additional 48 responses were received following the second mailing.

Many of the property owners returning the questionnaires authorized TPT to conduct the surveys on their properties at any time, in or without their presence. Such properties were then visited at times scheduled by TPT so as to maximize the project's efficiency. A large portion of the respondents however, consented to the field work only if it was conducted in their presence. For such individuals, TPT made attempts by telephone to schedule meeting times at their conveniences. For many land owners, such arrangements were successfully made and the field work was completed for their properties. Many properties for which the owner's consent could not be gained by telephone, received hand written notes attached to their doors; the posting of such notes yielded limited additional contact success. Properties for which permission was not granted were not surveyed by TPT.

TPT began the project's field work in July, 1996. In as much as possible property visits were arranged back-to-back over the course of each work day, and required approximately one hour each to complete using a crew of two personnel. The number of property septic systems which could be surveyed in a single day was found to vary generally between six and eleven, depending largely upon the circumstances and aspects inherent with each site. The general procedure for each septic system survey was as follows:

- 1) TPT conducted a follow-up interview with the land owner (if present) to clarify any apparent discrepancies in the survey questionnaire and to better establish the location and/or configuration of the septic system.
- 2) A single hand auger boring was placed in the vicinity of the property's septic leach field and extended to a depth of 6 feet below the surface. As the boring progressed, a descriptive field log of the soil types encountered and their depths was recorded, with any evidence of groundwater also noted. If the first attempt at completing the boring as specified was unsuccessful, at least one additional boring was attempted.
- 3) An elevation survey was conducted using a surveyor's level and rod. An arbitrary bench mark was chosen, and elevation sightings were recorded from the bench mark, the ground surface at the hand auger boring, the ground surface of the leach field, the tops of any leach field vent pipes present, and the lake level if reasonably close and accessible.

- 4) A site map was completed showing the general site layout, locations of the septic tank, the leach field, the hand auger boring, the lake, and any other pertinent and near-by features.
- 5) The hand auger boring was backfilled and the site was restored to its former condition in as much as possible.

The project's field work extended from July through November, 1996, and from June through October, 1997.

III. PROJECT RESULTS

Results of the investigation initially recorded on the individual project questionnaire and survey forms are summarized on the data table accompanying the body of this report. The data table was designed to present the project's most pertinent information in a standardized format for general inspection, and to eliminate as much as possible the need for the reader to reference the questionnaire and survey forms directly. The reader is thus encouraged to refer to the data table for specific items of concern; only general observations and remarks will be presented below.

Over the course of the project, the dominant soil material encountered was sand. Varying amounts of gravel, silt, clay and cobbles were encountered throughout the region, commonly evident in enriched zones appearing to extend over large areas. Most of the surveyed sites (72%) were successfully augered to depths of 6 feet deep (or to the water table if less than 6 feet deep). Areas rich in gravel and cobbles often proved difficult or impossible to penetrate using a hand auger, regardless of the number of attempts. Often two to three attempts were made per site in such problematic soils before the task was either completed or abandoned.

The depth to groundwater at each property's septic leach field was established whenever possible from the 6 foot vertical soil profile recorded at each site. As mentioned in the Introduction, if no groundwater was encountered in the 6 foot soil profile, the septic system was given a passing status (that is, the system appeared to be in compliance with state regulations). If groundwater was encountered within the 6 foot profile, the system was designated as failing. If TPT was unable to extend the hand auger boring to its full 6 feet of depth (auger refusal), the status of the site was designated as undetermined.

A brief summary of pertinent project data is as follows:

<u>Description</u>	<u>Tally</u>	<u>% of Total</u>	<u>% of Surveys Conducted</u>
Number of entries:	359		
Number of non-applicable sites:	13		
Number of surveys conducted:	257	72%	
Number of properties not receiving surveys:	102	28%	
· Number of systems that passed:	101		39%
· Number of systems that failed:	82		32%
· Number of surveyed systems given an undetermined status:	74		29%

IV. DISCUSSION AND CONCLUSIONS

Despite the difficulties of the project's data gathering and the resulting limitations of the final data base, it appears that a sufficient amount of current information regarding the community's effluent disposal aspects has been gathered for Village, Sewer Commission and Health Dept. administrators to begin their determinations regarding the area's present and future sanitary effluent disposal needs. Should additional information be collected for the area residents, their properties or their systems, such information can be added to the present data base with a minimum of format adjustment.

It appears from the information and data collected during this study that the following conclusions can be made regarding the community's current sanitary effluent disposal practices:

- Most of the properties surrounding Lake Nebagamon appear to be served by independent septic systems having leach fields. Only 13 of the 359 properties included in the study were identified as having alternate forms of effluent disposal.

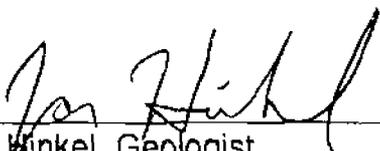
- Of the septic systems that were surveyed, slightly more than half (55%) appear to be in compliance with regard to current state regulations relating to allowable groundwater depth in leach field areas.

It should be noted that many of the sites having undetermined statuses due to auger refusal could, at the discretion of the reviewer, be categorized as passing or failing with a reasonable degree of certainty. Such judgements could be based on site specific elevations, soil types, and previous augering results.

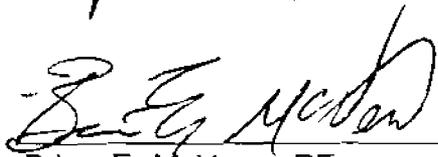
In consideration of the Village's present needs, these conclusions are provided by TPT as an aid to decision-making. Additional factors regarding the possible impacts of the community's septic systems on the lake, including the distances of each system from the lake, the amount of use and the time period of use of each system, and other factors may also need to be considered by the Village, the Sanitary Sewer Commission, and the County Health Department before final conclusions are made.

This report was completed December 10, 1997.

TWIN PORTS TESTING, INC.



Jon Winkel, Geologist



Brian E. McVean, PE
Environmental Dept. Manager

- Attachments:
- 1) Map of Study Area
 - 2) Copies of TPT Project Bid and Signed Contract for Project Commencement
 - 3) Sample Copies of Mailings, Questionnaire and Survey Forms
 - 4) Data Table Summarizing the Project Results
- Separately Bound: Original Questionnaires and Survey Forms
- Copy Distribution: Village of Lake Nebagamon
- One copy of this report, the data table, and all original questionnaire and survey forms
 - Five copies of this report and the data table only

