THE STATUS OF THE ON-SITE WASTEWATER INDUSTRY IN MICHIGAN YEAR 2001

A Synopsis of the Regulation of On-Site Wastewater Treatment and Disposal in Michigan

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Drinking Water and Radiological Protection Division
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INTRODUCTION

Individual on-site wastewater treatment systems ("septic systems") are now and will continue to be an integral option for treating and disposing of sewage from individual residences, small communities, small subdivisions, and businesses in Michigan. As used in the following synopsis, the term "on-site wastewater system" is used to refer to those utilizing subsurface disposal and ranging in size from individual single family systems to on-site systems serving businesses, commercial systems, or groups of homes with flows up to 10,000 gallons per day.

ESTIMATED NUMBER OF SYSTEMS

It is presently estimated that there are 1.2 million on-site wastewater systems in Michigan. This conservative estimate is based on 1990 United States census data and reporting by local health departments of the actual number of systems being permitted annually. At the time of the 1990 census, data suggests that over 30 percent of Michigan homes and businesses were served by on-site systems. At present, it is estimated that over 50 percent of building permits issued for new single family homes are for those with on-site systems. This higher percentage of new construction served by on-site systems is consistent with the higher rates of growth exhibited by nonmetropolitan areas in Michigan.

NUMBER OF ON-SITE SYSTEMS PERMITTED ANNUALLY

For the Fiscal Year ending October 2000, local health departments reported issuing an approximate total of 37,000 permits for new and repair/replacement systems serving individual homes. An additional 1,000 permits were issued for on-site systems serving commercial facilities or small groups of homes. Of the cumulative total of systems, it is estimated that two-thirds or 25,000+ permits were issued for new homes and businesses.

VOLUME OF ON-SITE SEWAGE TO BE DISPOSED OF ANNUALLY

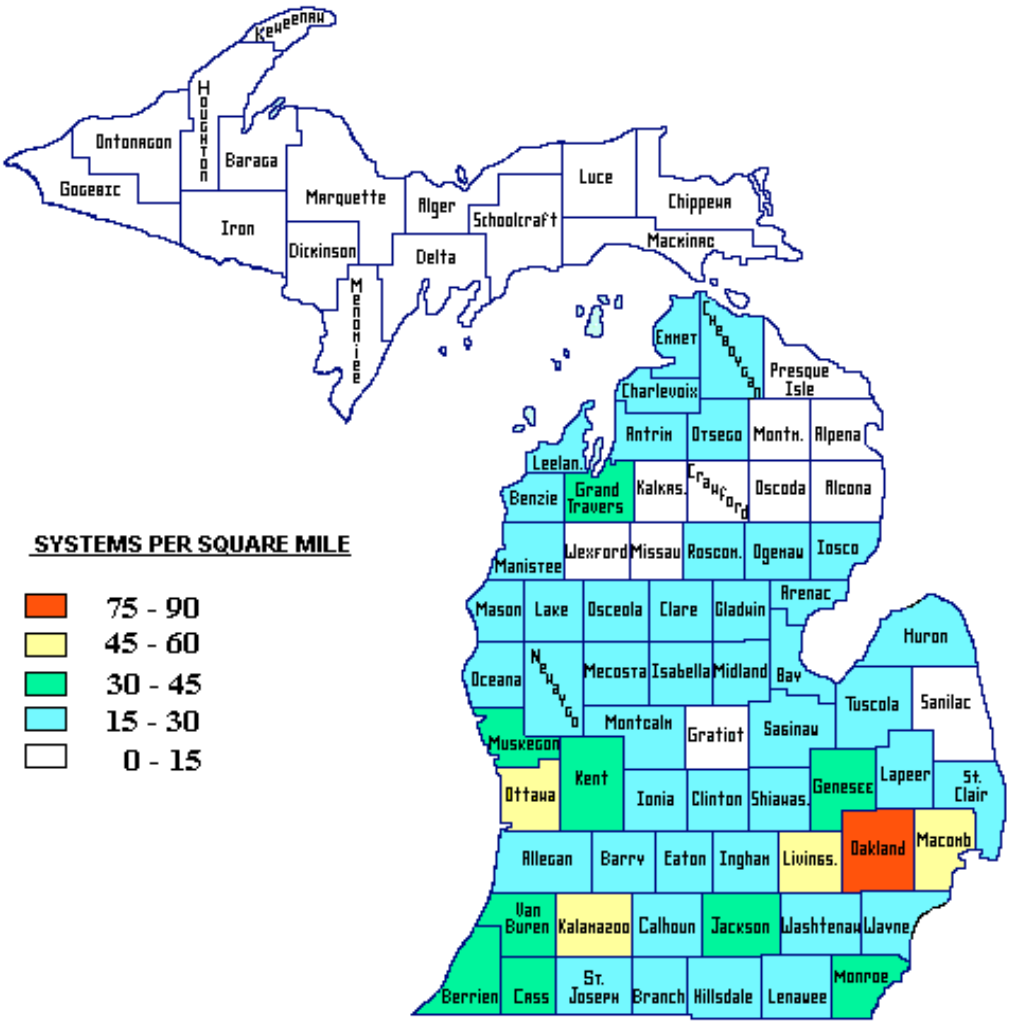
It is estimated that the annual volume of on-site sewage disposed of annually in Michigan is 96 billion gallons, or 264 million gallons per day. This is based on the current number of systems and a flow of 220 gallons of wastewater per system, which is believed to be a realistic figure supported by actual flow monitoring.

LOCATION OF ON-SITE SYSTEMS

The density of on-site sewage systems per square mile by county in Michigan is reflected on Figure 1.

FIGURE 1

ON-SITE WASTEWATER SYSTEM DENSITY
1990 CENSUS



INCIDENCE AND IMPACTS OF FAILURES

A soil absorption system is considered to have failed when it backs up into the home, discharges to the ground surface, or contaminates surface water or drinking water supplies. While there is a lack of specific data regarding the incidence of failures on a statewide basis, it is possible to speculate based on data currently being collected by local health departments. Local health departments, who are actively conducting a mortgage evaluation or an inspection at the time of a real estate transaction, report a wide variation in failure rates ranging up to 23 percent. The rather wide variation is explainable when considering differences in geology, age of the community, proportion of year-round homes, and stringency of regulations. For instance, areas with older homes having systems installed prior to permits being required by local health departments are more likely to have higher rates of failure. On a statewide basis it is presently speculated that less than 10 percent (i.e., 120,000) of all systems may be experiencing problems at any point in time, equating to an estimate of over 26 million gallons per day discharged into failing systems. Annually, local health departments issue repair/replacement permits for an estimated 12,000 systems, reflecting a significant number of unidentified systems which may be failing.

At present it is difficult, if not impossible, to numerically quantify the impacts of failing on-site systems statewide. Failure definitions cover a range of potential impacts, which may be different on a site by site basis. Rather, to better understand the extent of problems and potential impacts, the following discussion of failure types is offered:

- **Systems Which Back Up Into the Home -** Obviously, these types of systems have an immediate impact on the health of the residents of the dwelling. This kind of failure may also be experienced where the final disposal system has been installed below seasonal high ground water table and is periodically inundated. Discharge of inadequately treated waste water to the ground water would be expected in this case.

- **Systems Discharging to the Ground Surface -** Failed systems discharging to the ground surface are generally one of two types. There are systems where final disposal intentionally consists of a pipe, or overflow, which directly outlets to the ground surface. Due to age, system overload, improper siting, design, operation, and maintenance, systems may also have wastewater which discharges to the ground surface in the area of the original subsurface disposal system. In this situation, the amount of sewage coming to the surface may be only a small percentage of the total generated in the home, since the failing subsurface system continues to accept a majority of the load. In either case, there would be a public health concern for those coming in contact with the wastewater effluent. Where there was actual runoff of sewage to surface waters, there would be added public health and environmental concerns.

- **Systems With Direct Discharge to Surface Waters -** Failing systems with intentional direct discharge to surface water are generally one of two types. There

are existing homes where the final disposal system consists of nothing more than a direct discharge to a farm tile, storm drain, ditch, lake, river, or stream. Where reported by local health departments, such single pipe direct discharges can account for up to approximately 10 percent of failures. There are also situations where there may have been a subsurface disposal system with an overflow connected to an outlet to relieve a backup or discharge of wastewater to the ground surface. Such discharges would be expected to have immediate and continuous impacts to public health and surface waters as long as they occur.

- **Systems Impacting Ground Water Supplies -** Under certain geologic conditions, on-site systems may contaminate sources of ground water used for drinking water supply. Such contamination could be of a bacteriological and/or chemical nature. For instance, inadequately treated wastewater discharged from on-site systems over shallow, fractured bedrock may result in both bacteriological and chemical contamination of ground water supplies. Likewise, in areas with unprotected ground water supplies and high density of development, elevated nitrates in water supplies can be partially attributed to on-site wastewater systems.

- **Systems With Indirect Discharge to Surface Waters -** There are systems which, due to lack of adequate horizontal isolation from surface waters combined with inadequate vertical isolation above water table or lack of treatment prior to final disposal, impact the quality of surface waters. This may result in discharge of excess nutrients and potential bacteriological contamination.

In conjunction with the local health department accreditation program, local health departments have recently begun to compile data and generate reports summarizing the types and causes of failing systems where replacement permits have been issued. Unfortunately, this data is not currently available to be summarized on a statewide basis. Where reports have been received, the age of the dwelling and/or on-site system is routinely reported as the primary reason attributed to failure.

REGULATION OF ON-SITE WASTEWATER SYSTEMS

In Michigan, regulation of on-site wastewater systems is a cooperative endeavor involving the Department of Environmental Quality (DEQ) and local health departments. Local health departments, however, shoulder the bulk of the workload in carrying out the regulatory function.

At the present time, systems serving single and two family dwellings fall under the jurisdiction of local health department sanitary codes which have similarities, but which also vary significantly from jurisdiction to jurisdiction. Of the 44 local health jurisdictions, 39 operate under their own separate set of regulations. Five jurisdictions in the Upper Peninsula operate under a common regulation known as the Superior Environmental Health Code. Michigan remains the only state in the nation without some type of minimum statewide regulation for single and two family systems. State regulations across the country vary considerably, and in some cases are ineffective or outdated.

Regulation of on-site systems serving groups of homes, businesses, and other commercial establishments with flows up to 10,000 gallons per day falls under the jurisdiction of the Michigan Criteria for Subsurface Sewage Disposal, which is a statewide document. Local health departments carry out this program under certification from the DEQ and by policy are allowed the option to utilize their local sanitary code for flows less than 1,000 gallons per day. The DEQ provides oversight and consultation in the program.

Local health departments are also authorized by the DEQ to conduct the review and approval program for subdivisions and site condominiums that are proposed with individual on-site wastewater systems. This is a statewide program and is conducted in accord with the DEQ administrative rules. The DEQ provides oversight and consults with local health departments.

TRAINING AND CERTIFICATION

Under current regulatory programs, local health departments serve as the focus for site evaluations, designs, permitting, and inspections. With respect to training, there presently is not an established mandatory statewide program for training or certification of regulators. Training is accomplished "in-house" with limited training also provided by the DEQ staff and the Michigan On-Site Wastewater Training and Education Center.

While some local health departments include requirements for installer licensing and/or registration as part of their local codes, there presently is not a statewide mandatory requirement. Installer training is limited.

Several counties which have recently initiated inspection programs at the time of real estate transactions also provide for certification of inspectors to perform this work. Training of these individuals is coordinated by these local health departments. On a statewide basis there does not exist a mandatory program for certification of private sector inspectors.

With respect to private sector site evaluators, designers, and operators of on-site systems, there presently exists no mandatory requirements for training and certification, and in general, the private sector remains unskilled. This situation is not expected to improve without legislative mandate at the state or local level.

APPLICATION OF TECHNOLOGY AND ALTERNATIVES

Improvements in treatment and disposal technologies now offer options for developing on-site systems for site and soil conditions previously deemed unsuitable. Such technologies are viable, however, only if they are properly sited, designed, installed, operated, and maintained. At the present time in Michigan, and for that matter nationally, the capacity to properly apply such technologies, including secure

mechanisms to assure long-term operation and maintenance, is lacking both at the regulatory and private sector level.

With a high factor of safety, conventional systems operate quite successfully over a wide range of site and operating conditions. Conventional systems have, fortunately, operated with benign neglect on the part of many homeowners, even where misused. Factors of safety with many of the more technologically advanced alternatives, however, are reduced; and greater expertise is required in their siting, design, and installation. Mandatory routine operation and maintenance is essential to assure successful long-term function of alternatives, which in many cases are mechanically more complex. The management mechanism to assure long-term operation of these systems remains an unresolved issue at the state and local level.

From an industry standpoint, with 44 different local health department jurisdictions, it is frustrating for those attempting to gain approval for use of specific alternative technologies and/or proprietary products. Rather than having a central state agency to gain approval from, separate approval is required from each local health jurisdiction.

As part of the DEQ's amended administrative rules for subdivisions, promulgated under the Land Division Act, 1967 PA 288, as amended, technical guidance will be generated by the DEQ defining minimum site suitability, design, and long-term operation and maintenance requirements for alternative systems. It would, however, be required that the alternative system also then be specifically provided for in the regulations of the local health department having jurisdiction.

STATE FUNDING FOR ON-SITE WASTEWATER

The DEQ provides funding in excess of $5.5 million to local health departments to assist in the conduct of their on-site sewage program. On a statewide basis, this amounts to approximately $150 for each new or repair system permitted. All local health departments also support their programs with on-site system construction permit fees. Each local health department's on-site sewage program is evaluated by the DEQ staff on a three-year revolving basis as part of the Michigan Local Public Health Accreditation Program. The first three-year cycle is scheduled for completion in 2001.

The Michigan State Revolving Fund (SRF) is a potential source of loan funds to municipalities for construction of sewage treatment works to eliminate failing on-site wastewater systems. At the present time, however, the Michigan SRF does not specifically set aside funds to address correction of individual on-site wastewater systems. A number of states have established programs to loan homeowners funds to rehabilitate, improve, repair, or replace an existing on-site system. This is a viable option as part of the SRF program (see attachment). This situation will not change without a legislative mandate.

Under the Clean Water Fund, set up as part of the Clean Michigan Initiative, a total of $7 million has been set aside to fund projects to identify and correct failing on-site

sewage systems. Grant applications totaling approximately $10.5 million have been received with a priority for award to be given to small rural communities. In general, this request for funding suggests that there is an unmet demand to address the needs of small communities, many of which are served by on-site systems.

SEPTAGE DISPOSAL

Proper maintenance of on-site systems requires that septic tanks be periodically pumped. The DEQ, Surface Water Quality Division (SWQD), through Part 117, Septage Waste Servicers, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, oversees the licensing program for removal and transport of septic tank waste. Land application sites are also approved by the DEQ. Participating local health departments inspect pumping and transport vehicles and land application sites. Thirteen of 44 local health department jurisdictions (19 counties) currently do not participate in any portion of the program.

It is presently estimated by the SWQD that 120 million gallons of septage is pumped from home septic tanks every year. Of this total, the SWQD estimates that 50 percent is disposed into municipal wastewater treatment plants with the remaining 60 million gallons being land applied. In the future, with an expected increase in the total number of on-site systems and improved management, the total gallons of septage to be handled and disposed of will also increase. As development progresses, suitable land disposal sites are increasingly becoming more difficult to locate.

Operator fees and motor vehicle license fees support the regulatory program at the state and local health department level. Current fees are generally considered inadequate to provide for needed regulatory oversight.

SUMMARY

Increasingly, on-site wastewater treatment and disposal systems will be asked to successfully meet the needs for a significant portion of Michigan's population. This synopsis has attempted to summarize the current status of the on-site wastewater industry in Michigan in order to provide a framework from which decisions can be made in order to manage the on-site wastewater industry now and in the future.