EPA-5-MN-KANDIYOHI-GREEN LAKE SANITARY SEWER AND WASTE DISTRICT-LA-80

FINAL ENVIRONMENTAL IMPACT STATEMENT

ALTERNATIVE WASTEWATER TREATMENT SYSTEMS FOR RURAL LAKE PROJECTS

CASE STUDY No. 2: THE GREEN LAKE SANITARY SEWER AND WASTE DISTRICT

KANDIYOHI COUNTY, MINNESOTA

EIS810225F

Prepared by the

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION V, CHICAGO, ILLINOIS

AND

WAPORA, INCORPORATED

WASHINGTON, D.C.

Approved by:

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December 1980

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This Final Environmental Impact Statement was prepared by WAPORA, Inc., under the guidance of EPA Region V Project Officers, Messrs. Gregory Vanderlaan and Ted Rockwell. Mr. Eric M. Hediger and Mr. Gerald O. Peters, Jr., served as WAPORA's Project Manager and Project Advisor, respectively.

Significant input to the Draft EIS was provided by WAPORA employees and subcontractors, listed in that document.

EXECUTIVE SUMMARY

Draft EIS

This Final Environmental Impact Statement (EIS) has been prepared by the US Environmental Protection Agency, Region V (EPA). It addresses several issues raised by the wastewater management plant proposed by the Green Lake Sanitary Sewer and Water District (GLSSWD), the Applicant, for funding under EPA's Construction Grants Program. The Applicant's Facilities Plan proposed the construction of a centralized wastewater collection and treatment system to serve the sewered communities of New London and Spicer and the unsewered shoreline of Green Lake. A stabilization lagoon facility was proposed that would discharge treated effluent to the Middle Fork of the Crow River downstream from Green Lake. Issues that precipitated the preparation of this EIS were:

- The documentation of need for the proposed centralized sewerage facilities
- The high cost of centralized wastewater collection and treatment facilities in view of the availability of less expensive alternative technologies
- The potential for adverse economic impacts to area residents
- The potential for induced growth and adverse secondary impacts
- The potential for groundwater contamination from the proposed stabilization lagoon facility on farmland southeast of Green Lake.

In response to the first issue, EPA devoted a substantial effort to document existing water quality problems and potential public health hazards that are associated directly with malfunctioning on-site wastewater management systems in the vicinity of both Green Lake and Nest Lake. This effort included an aerial survey and field investigation of unsewered residential areas, a door-to-door sanitary survey of approximately 12% of shoreline on-site systems (Green Lake), a septic leachate survey of lake shorelines, and water quality modeling based on readily available data.

EPA concluded that most on-site systems around Green Lake and Nest Lake are operating satisfactorily, despite the fact that many of these systems are not in compliance with existing sanitary codes. Sewage backups and ponding, as well as septic leachate movement into Nest Lake and Green Lake via groundwater flows, are not widespread. Nutrient budget analyses indicate that on-site systems contribute insignificant amounts of phosphorus to Nest Lake and Green Lake under worst case conditions -- 1% and 8% of the total phosphorus loads to these lakes, respectively. These analyses further indicate that the largest contributions of phosphorus to Nest Lake originated from non-point sources and municipal sewage treatment plants upstream; the outflow from Nest Lake carries, in turn, the largest phosphorus load to Green Lake.

The results of the needs documentation effort were integral to the development of alternatives to the Facilities Plan Proposed Action. These alternatives ranged from highly centralized (the Modified Facilities Plan Proposed Action and variations of this plan) to largely decentralized (Limited Action and No-Action). Several intermediate alternatives proposed a mixture of technologies involving land application, the upgrading and expansion of existing sewage treatment plants, off-site community soil absorption systems (cluster systems), and installation or rehabilitation of individual septic tank/soil absorption systems. Present-worth costs were $8.41 million for the Modified Facilities Plan Proposed Action, to $4.51 million for Alternative 6 and $2.89 million for the Limited Action Alternative. The latter two alternatives, to varying degrees, proposed on-site treatment of wastewater along Nest Lake and Green Lake.

Public Participation

A Public Hearing on the Draft EIS was conducted on 4 August 1979, within two months of its publication, in New London, Minnesota. Many comments were voiced at the hearing and were submitted to EPA in writing through mid-August 1979. The majority of public comments addressed the following topics:

- Validity of EPA's data (field) collection efforts in view of sample size or collection period
- Non-point source pollution of Nest Lake
- Feasibility of continued use of on-site systems
- Implementation of decentralized wastewater management approaches
- Urgency of need for improved wastewater management at New London and Spicer.

Final EIS

The primary purposes of this Final EIS are to respond to all substantive public and agency comments on the Draft EIS and to clarify or modify information that was presented in the Draft EIS. Information requiring clarification includes the nutrient loading of Nest Lake and Green Lake, as well as wastewater management procedures and costs.

Conclusions

In general, the Final EIS confirms the conclusions of the Draft EIS. Major findings are listed below.

- The Facilities Plan Proposed Action does not represent an appropriate strategy to serve the wastewater management needs of sewered and unsewered communities in the Green Lake Study Area. This conclusion is based principally upon considerations of the need for sewerage facilities (as defined by the Construction Grants Program) and cost-effectiveness.

- Total elimination of on-site wastewater systems from the shorelines of Nest Lake and Green Lake will not change the trophic status of these fertile and moderately fertile water bodies. The continued influx of non-point source phosphorus loadings to Nest Lake via the Middle Fork of the Crow River will, in the absence of non-point source pollution control, offset the combined phosphorus reduction gained through upgrading sewage treatment plants and replacing or rehabilitating near-shore on-site systems. Nutrient loads to Nest Lake from non-point sources increase dramatically during periods of intense rainfall and high runoff (wet years). Non-point sources and sewage treatment plant discharges account for 56% and 40%, respectively, of the estimated total phosphorus load to Nest Lake under wet-year conditions. The outflow from nutrient-rich Nest Lake accounts for an estimated 73% of the total phosphorus load to Green Lake.

- Continued use of on-site systems, including new and upgraded systems, and provision of decentralized off-site systems (cluster systems) are appropriate solutions to the area's wastewater treatment needs.

- Key requirements for maximizing the reliability of on-site and cluster systems with regard to water quality protection include:

  --well-planned and well-executed site analysis
  --measurement of, and designing for the natural assimilative capacity of local soil and groundwater resources
  --provision of adequate community supervision of the installation, operation, and, most importantly, maintenance of the on-site and cluster systems.

Recommendations

The substance of the Final EIS Recommendations remains the same as proposed in the Draft EIS: the solution to existing wastewater management needs consists of a combination of off-site and on-site sewage treatment facilities.

- Spicer and New London will continue to use their existing collection systems with final treatment facilities to be determined by additional facilities planning (Step 1)

- The shorelines of Green Lake and Nest Lake will continue to be served by on-site systems except where feasibility or cost-effectiveness considerations support the need for decentralized, off-site facilities

- For these areas the following sequence is recommended for completion of the Construction Grants process:

	Spicer and New London	Shorelines of Green Lake and West Lake
Step 1	Conduct detailed site analysis, engineering and environmental analysis of joint rapid infiltration, joint spray irrigation, and separate upgrading to provide tertiary effluent for discharge.	In application for Step 2, provide certifications and plans regarding construction, operation, maintenance and access to on-site or decentralized off-site systems. Select and implement Sanitary Review Board.
Step 2	Design facilities	Conduct site analysis and select technology
Step 3	Construct facilities	Construct facilities

In proceeding to Step 2 for the detailed design and specification of decentralized wastewater management strategies, the Applicant will:

- Conduct a survey of all wells (to include homeowner interview and well inspection), and perform sequential environmental and engineering analyses of unsewered areas
- Begin site analysis on the west shore of Green Lake so that a decision on whether or not to sewer the segment can be made in time to reflect this decision in the design of Spicer's wastewater collection and treatment facilities
- Repair and replace on-site systems as required
- Continue and complete on-going site specific data collection.

In proceeding with these recommendations, EPA strongly suggests that the Applicant give careful consideration to the sections in this EIS on Management and Implementation which discuss the nature and advantages of many of the Applicant's choices. It is also important that the Applicant begin to develop the management structure that will operate in the future, so that citizens and local officials can themselves take part in the site analysis and technology selection. This will allow all concerned to become familiar with the procedures which will be needed to maintain and improve area water quality in the future.

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CHAPTER I

PURPOSE OF AND NEED FOR ACTION

A. THE APPLICANT'S FACILITIES PLAN AND ENVIRONMENTAL IMPACT STATEMENT ISSUES

The Green Lake Sanitary Sewer and Water District (GLSSWD), the Applicant, has requested the participation of the US Environmental Protection Agency, Region V (EPA) in the funding of proposed wastewater collection and treatment facilities for the Green Lake area of Kandiyohi County, Minnesota (see Figure 1). These facilities were recommended in the "Preliminary Feasibility Report on Water Pollution Control Facilities: Green Lake Vicinity, Kandiyohi County Minnesota" prepared by Noyes Engineering Service and Rieke Carroll Muller Associates, Inc. (RCM) in December 1974. The Applicant's centralized wastewater management plan was submitted to EPA in November 1975 for funding under the Construction Grants Program. Additional facilities planning information, as required by the provisions of this program and by the Minnesota Pollution Control Agency (MPCA), were completed by the Applicant in August 1976. The feasibility report and additional facilities planning data collectively constitute the Facilities Plan for the proposed GLSSWD Service Area (see Figure 2). The expanded Service Area addressed in this EIS, which includes a portion of the Nest Lake shoreline, is illustrated in Figure 3.

The Applicant's Facilities Plan concluded that centralized sewerage service was warranted for the Village of New London, the City of Spicer, and the residential area surrounding Green Lake. This conclusion was based on: 1) inadequate treatment performance at the New London and Spicer sewage treatment plants as well as infiltration/inflow problems in their respective collection systems, and 2) inadequate performance of on-site wastewater management systems around Green Lake due to poor soils, high water table, and small lot sizes. The Facilities Plan also linked these on-site system problems with deteriorating water quality in Green Lake.

Although the Facilities Plan addressed the implementation of both a centralized wastewater collection and treatment system and a water supply system to serve Green Lake area residents, this EIS evaluates only the construction and operation of wastewater management facilities. The EPA Construction Grants Program serves to partially fund wastewater collection and treatment systems, but not water distribution systems.

The primary purposes of the EIS are to review and analyze the GLSSWD's application for EPA funding of the Facilities Plan Proposed Action and to develop and evaluate alternative wastewater management approaches in view of the five public issues surrounding the project. These issues are described fully below.

1. NEEDS DOCUMENTATION

Federal participation in the funding of the Facilities Plan Proposed Action or of any alternative to this action is contingent upon the documentation of need for improved wastewater management facilities. Analysis of need is necessary to establish the nature of wastewater disposal/treatment problems and to develop reasonable alternatives for their solution. The extent and distribution of on-site system problems is a leading issue in this

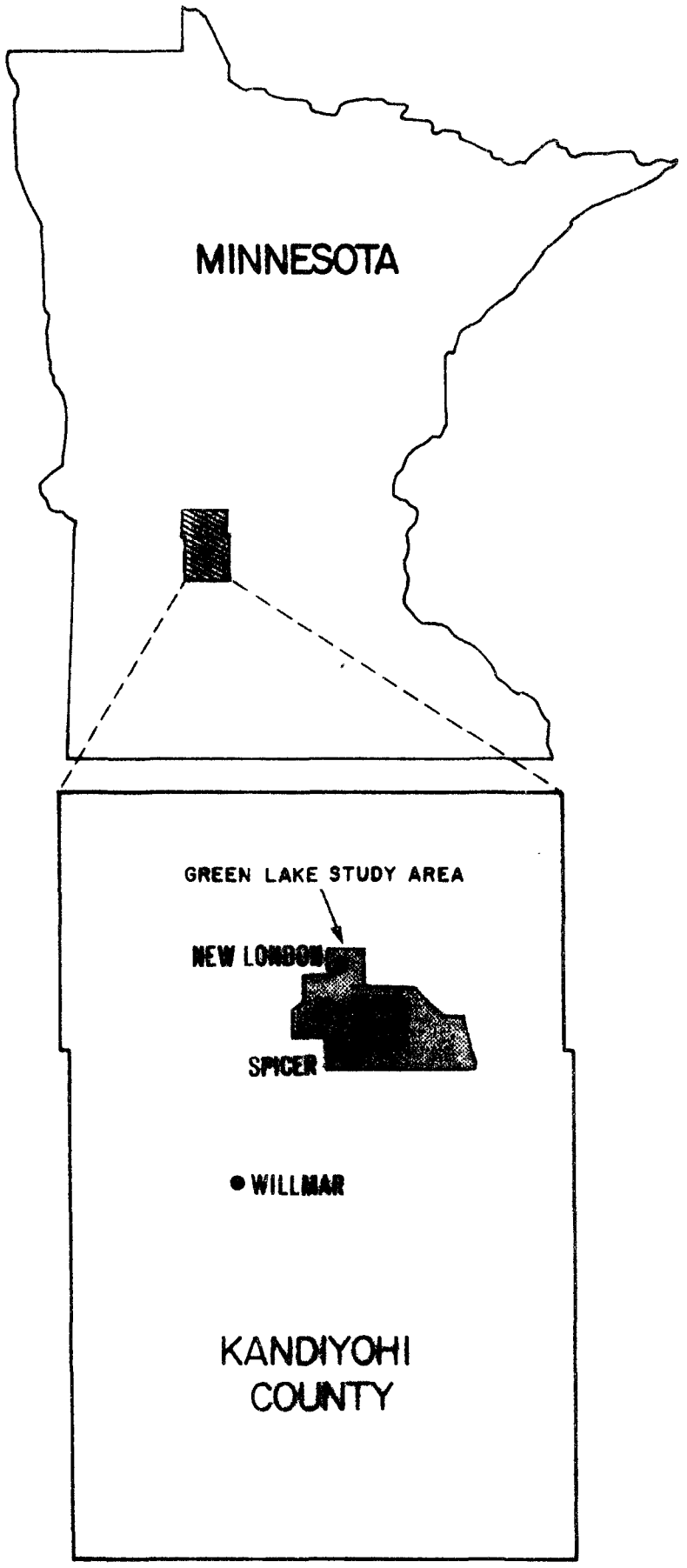


FIGURE 1 LOCATION OF THE GREEN LAKE STUDY AREA

FIGURE 2 FACILITIES PLAN PROPOSED SERVICE AREA

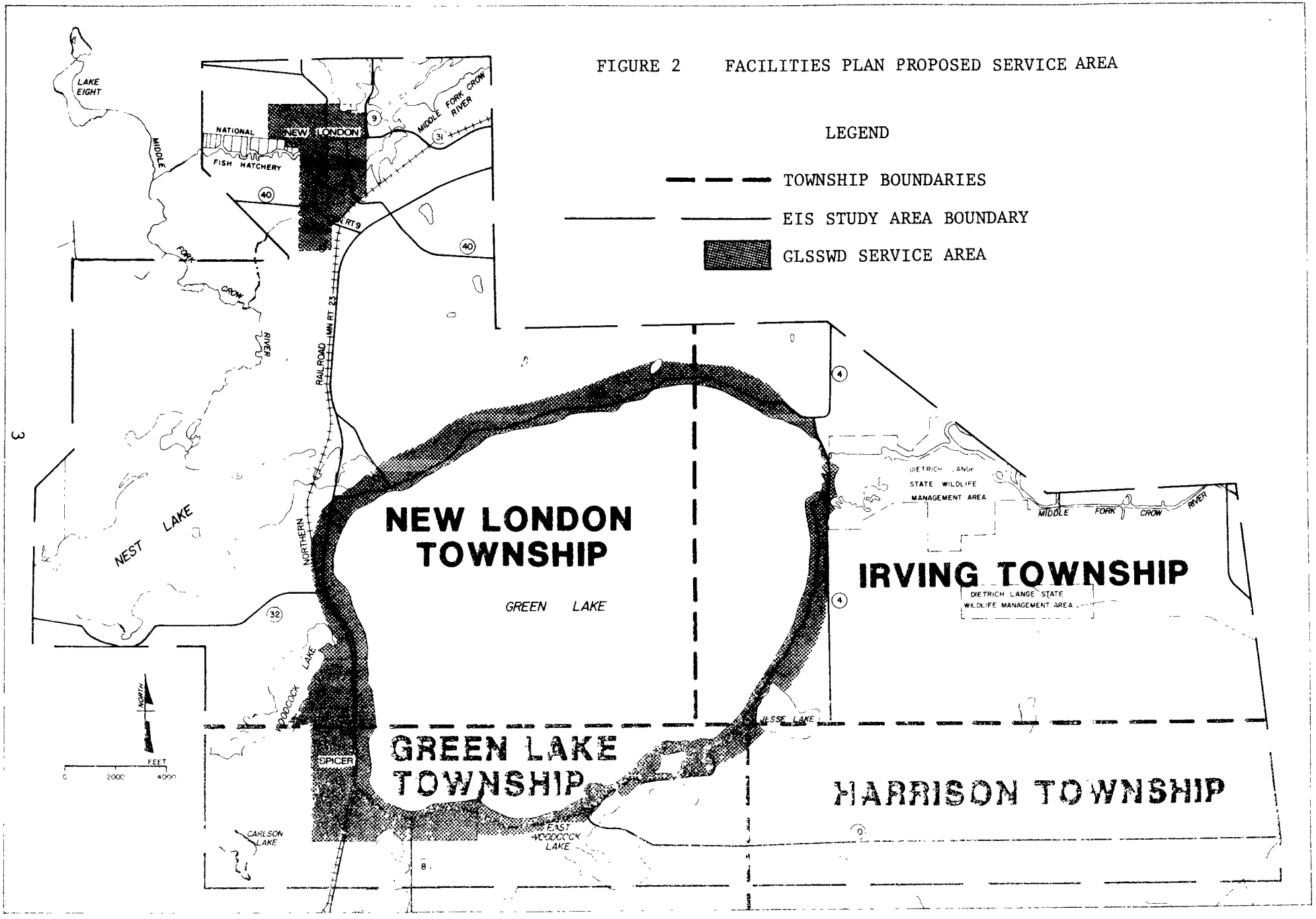
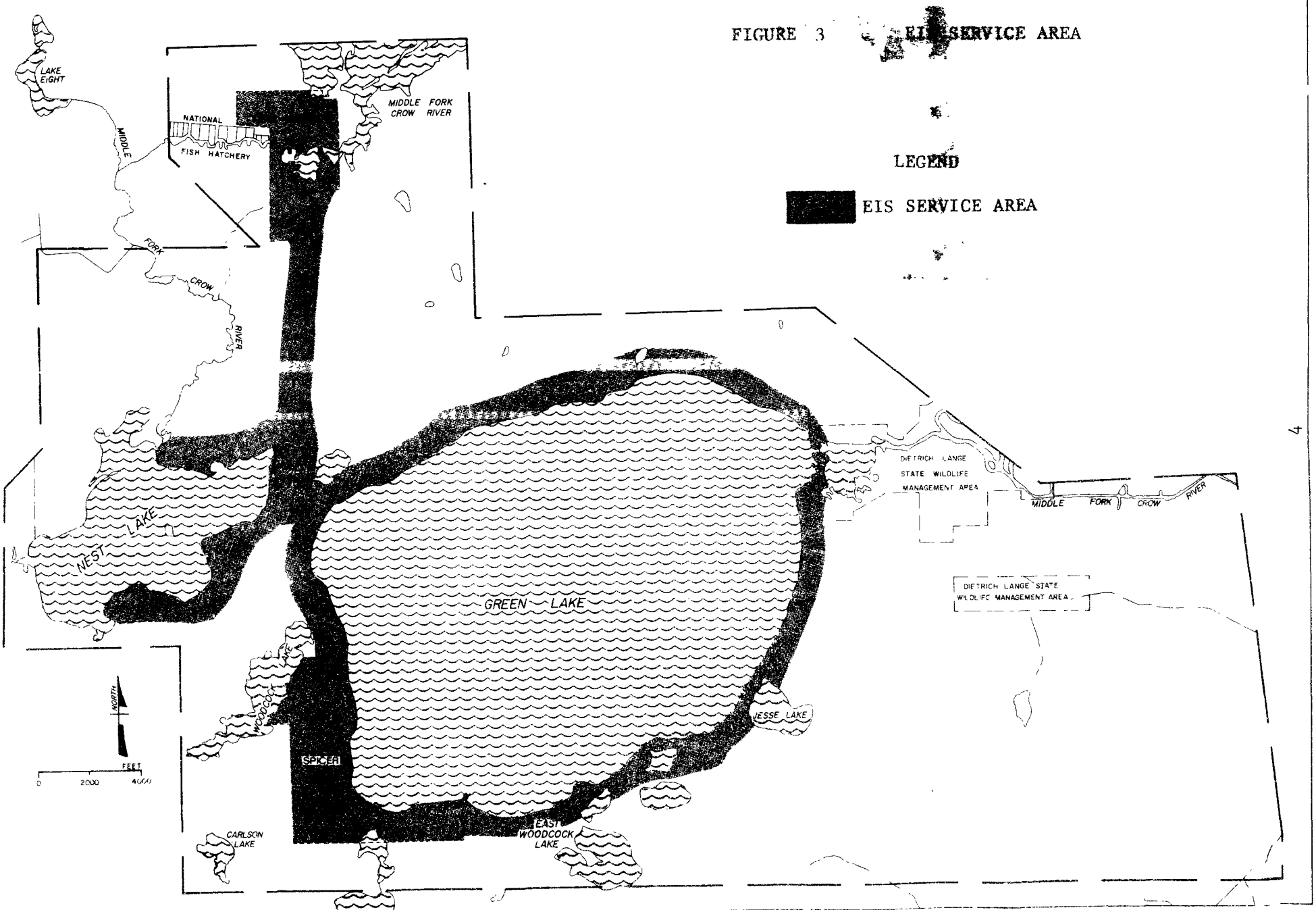


FIGURE 3 EIS SERVICE AREA



project. If the need for improved on- and off-site wastewater management facilities is better substantiated in the Green Lake Study Area, then their costs will be better understood and, consequently, more likely to be accepted by local citizens.

Although indirect evidence was presented in the Facilities Plan indicating that there may be a water quality problem attributable to malfunctioning lakeshore septic systems, the relationship between deteriorating water quality and inadequately functioning septic systems was not documented. With the exception of two isolated cases involving high nitrate-nitrogen levels (greater than 10 milligrams per liter (mg/l) in domestic wells along the south shore of Green Lake (by letter, William Hendrickson, RCM, to James Roth, MPCA, 17 December 1976), claims of possible hazards to the public health were unsubstantiated.

2. COST-EFFECTIVENESS

The total capital cost for the Facilities Plan Proposed Action was estimated in the Plan (August 1976) to be $4.4 million. This represents an investment in 1976 dollars of approximately $875 per person and $3,709 per existing dwelling unit within the proposed GLSSWD Service Area (see Figure 3).

The availability of alternative collection and treatment technologies, including on-site and small scale off-site facilities, offers the potential for less expensive solutions to wastewater management problems. In the absence of needs documentation data, it has not been demonstrated that the level of resource commitments proposed for large-scale, centralized facilities (on an area-wide basis) is necessary.

3. ECONOMIC IMPACT

The average local share per residence of the total capital costs for the Facilities Plan Proposed Action is approximately $2,180*. The Plan estimates the annual user charge per resident to be $194, which includes annual debt retirement of the amortized local share of the project cost and annual operation and maintenance costs. The user charge represents approximately 1.4% of the average annual income for year-round residents. Seasonal residents, particularly those in smaller, less expensive homes, may come under considerable pressure to sell their property.

4. INDUCED GROWTH AND SECONDARY IMPACTS

Although the high costs of new wastewater collection and treatment facilities might compel some residents to sell their property, the availability of sewers in the Green Lake watershed would facilitate the construction of new dwelling units around Green Lake at greater density than is now the case. Residential development induced by a centralized sewerage system in the Proposed Service Area could have undesirable impacts on water quality and sensitive environmental areas. For example, housing construction on steep slopes

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* This figure is based on RCM's estimate of local share of project capital costs (17 December 1976) and the estimated number of residences in the Facilities Plan Proposed Service Area in 1976.

could accelerate soil erosion and, therefore, sedimentation of Green Lake and adjacent wetland areas. Sustained sedimentation of these water bodies could increase nutrient loadings and severely affect, if not eliminate, the ability of wetlands to purify water* and support wildlife. Development induced by the provision of sewers also may over-tax existing local public services and fiscal resources.

Based upon their experience with previous wastewater management projects in rural lake areas, the Minnesota Pollution Control Agency has concluded that sewering of Green Lake may cause the following:

- Increased development of lakeside areas;
- Increased development of adjacent non-lakeside areas; and
- A shift from seasonal to permanent occupancy.

5. PUBLIC CONTROVERSY OVER WATER QUALITY

Residents of Harrison Township and Irving Township have expressed concern over the wastewater stabilization lagoon system, proposed in the Facilities Plan, and its potentially adverse effects upon local groundwater quality. Farmers and other citizens who live in the vicinity of the proposed treatment site focus their concern on the potential for contamination of domestic water supply wells through lagoon seepage into sandy soils. This concern persists despite the fact that the Plan recommended installation of an impermeable bentonite liner for the lagoon.

B. THE NEED FOR IMPROVED WASTEWATER MANAGEMENT

In determining the need for improved wastewater management in the Green Lake Study Area, it is appropriate to examine both presently sewered communities, including the Village of New London and the City of Spicer, as well as unsewered areas, which include the corridor between New London and the northwest corner of Green Lake, the eastern shoreline of Nest Lake, and the entire shoreline of Green Lake. The extent to which the wastewater improvement needs of sewered and unsewered areas were addressed by the Facilities Plan and the Draft EIS is discussed below. The conclusions of the Facilities Plan reviewed here are not necessarily those of the EIS.

1. SEWERED AREAS

The need for replacing or upgrading and expanding the wastewater management systems presently serving the Village of New London and the City of Spicer was addressed in the Facilities Plan and the Draft EIS. The Facilities Plan cited excessive infiltration/inflow problems associated with the sanitary sewer systems serving these two communities, and the inability of the New London and Spicer sewage treatment plants to comply with 1974 MPCA effluent discharge requirements as justification for replacement of these two wastewater management systems per the Applicant's Proposed Action. New London's sewage treatment plant (STP) discharges primary effluent at an average rate of 129,000 gallons per day (gpd) to a point in the Middle Fork of the Crow River approximately 4 miles above Nest Lake. The Spicer STP discharges a secondary effluent (114,000 gpd) to Woodcock Lake.

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* Wetlands are natural sediment and nutrient traps.

On the basis of nutrient budgets prepared by the National Eutrophication Survey, the Draft EIS reports that approximately 10% of the phosphorus load to Nest Lake and 93% of the phosphorus load to Woodcock Lake are attributed to the effluent discharges from the New London and Spicer STPs, respectively. Removal of or reduction in the phosphorus load generated by the New London STP will not improve the trophic status of Nest Lake, suggesting the significance of the non-point source phosphorus load carried by the Middle Fork of the Crow River (see Figure 4). The Draft EIS indicated that improvements in the water quality of Nest Lake, as a result of phosphorus reduction at the New London STP, would be insignificant, given the Nest Lake drainage basin-to-surface area ratio of 82 to 1. On the other hand, elimination or upgrading and expanding of the Spicer STP would improve significantly the water quality of Woodcock Lake. As indicated in Figure 4, 92% of the phosphorus load to this lake is contributed by the Spicer STP.

2. UNSEWERED AREAS

In the Facilities Plan, the addressed need for wastewater management in presently unsewered areas focused on the individual sewage treatment systems surrounding Green Lake. Reported problems with these on-site systems included:

- An estimated 55% of the on-site wastewater disposal systems around Green Lake cannot comply with the 4 foot separation parameter* specified in the Minnesota Shoreland Management Act;

- The same 55% of the individual disposal systems cannot be upgraded to comply with the Shoreland Management Act because of the small size of the platted lots around Green Lake;

- Based upon EPA National Eutrophication Survey data (1974), individual disposal systems around Green Lake are contributing to the nutrient loading of this basin. The Facilities Plan indicated that the amount of wastewater discharged to Green Lake from septic tank drainfields along its shoreline was approximately 23% greater than the total discharge loading from Spicer and New London (by letter, William Hendrickson, RCM, to James Roth, MPCA, 17 December 1976); and

- Many of the older individual on-site systems installed approximately 20 years ago may be cesspools, which are prohibited under current sanitation codes.

The Facilities Plan also reported that glacial fill on the northern and southern shores of Green Lake and sand and gravel soils on the eastern and northwestern shores of Green Lake are not suited to the successful use of on-site systems.

A series of studies has been performed by EPA during preparation of the EIS to evaluate in detail the wastewater management needs of the unsewered portions of the Green Lake Study Area. These efforts were undertaken to determine the extent and distribution of water quality and public health problems associated with on-site problems around Nest Lake as well as Green Lake.

* The Act stipulates that there be a vertical distance of 4 feet between the septic tank drainfield and the highest known groundwater elevation.

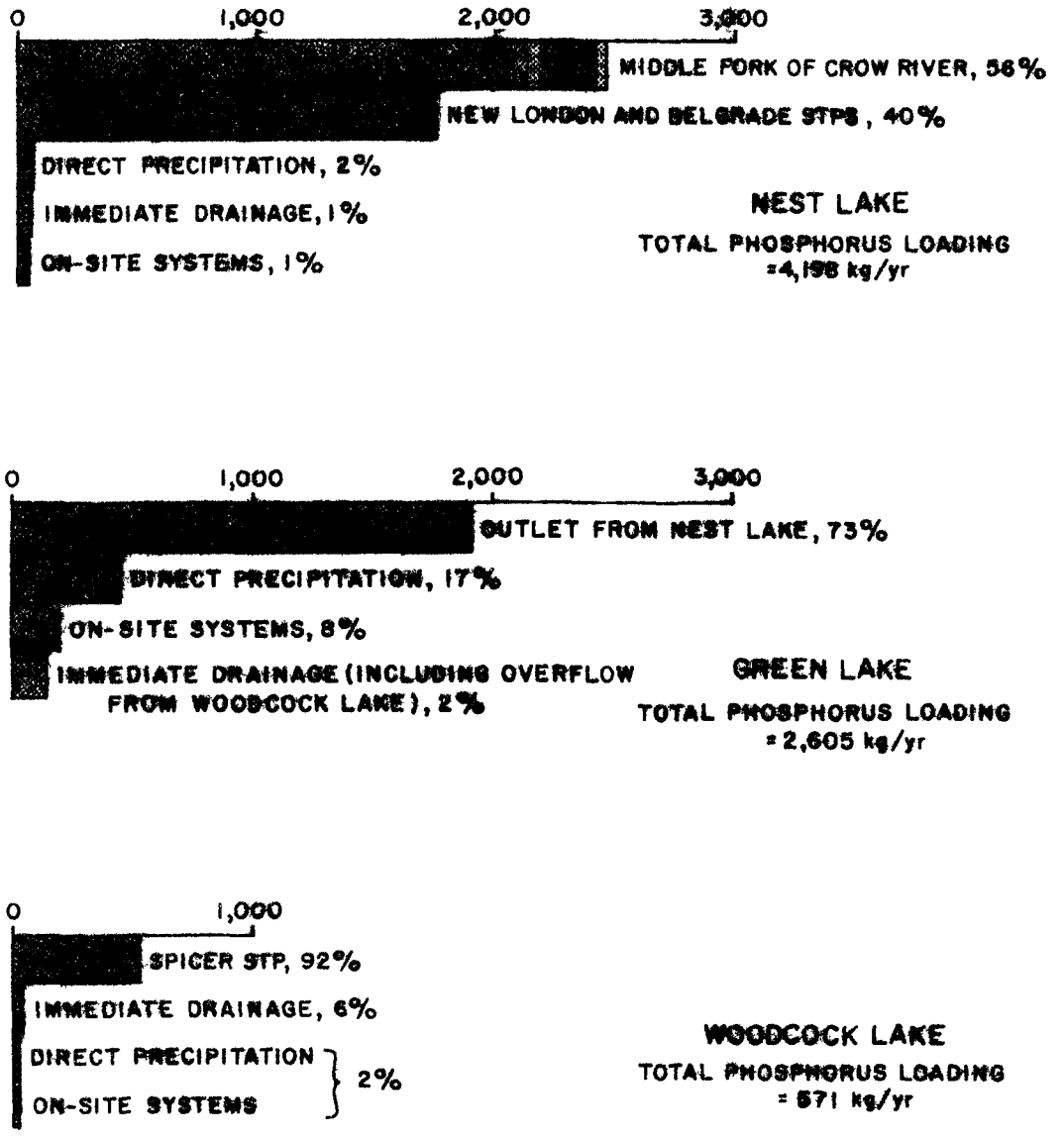


FIGURE 4 TOTAL PHOSPHORUS LOADING (KG/YR) TO NEST LAKE, GREEN LAKE, AND WOODCOCK LAKE IN 1972 - 1973 (NATIONAL EUTROPHICATION SURVEY 1974)

A distinction has been made in this EIS between water quality and public health problems on the one hand and nuisance or community improvement problems on the other hand. On-site systems known to contribute to violations of water quality standards or changes in lake trophic status pose water quality problems. Public health problems may result from ponding of effluent on the soil surface or contamination of groundwater supplies in excess of drinking water standards. Water quality and public health problems are the bases upon which improved wastewater management needs determination is made under the EPA Construction Grants Program. Where lakes are used for contact recreation, violation of the fecal coliform standard also constitutes a public health hazard. Community improvement problems, which include odors, restrictions on water use, and restrictions on building expansion, do not constitute need for improved wastewater management facilities under the Construction Grants Program.

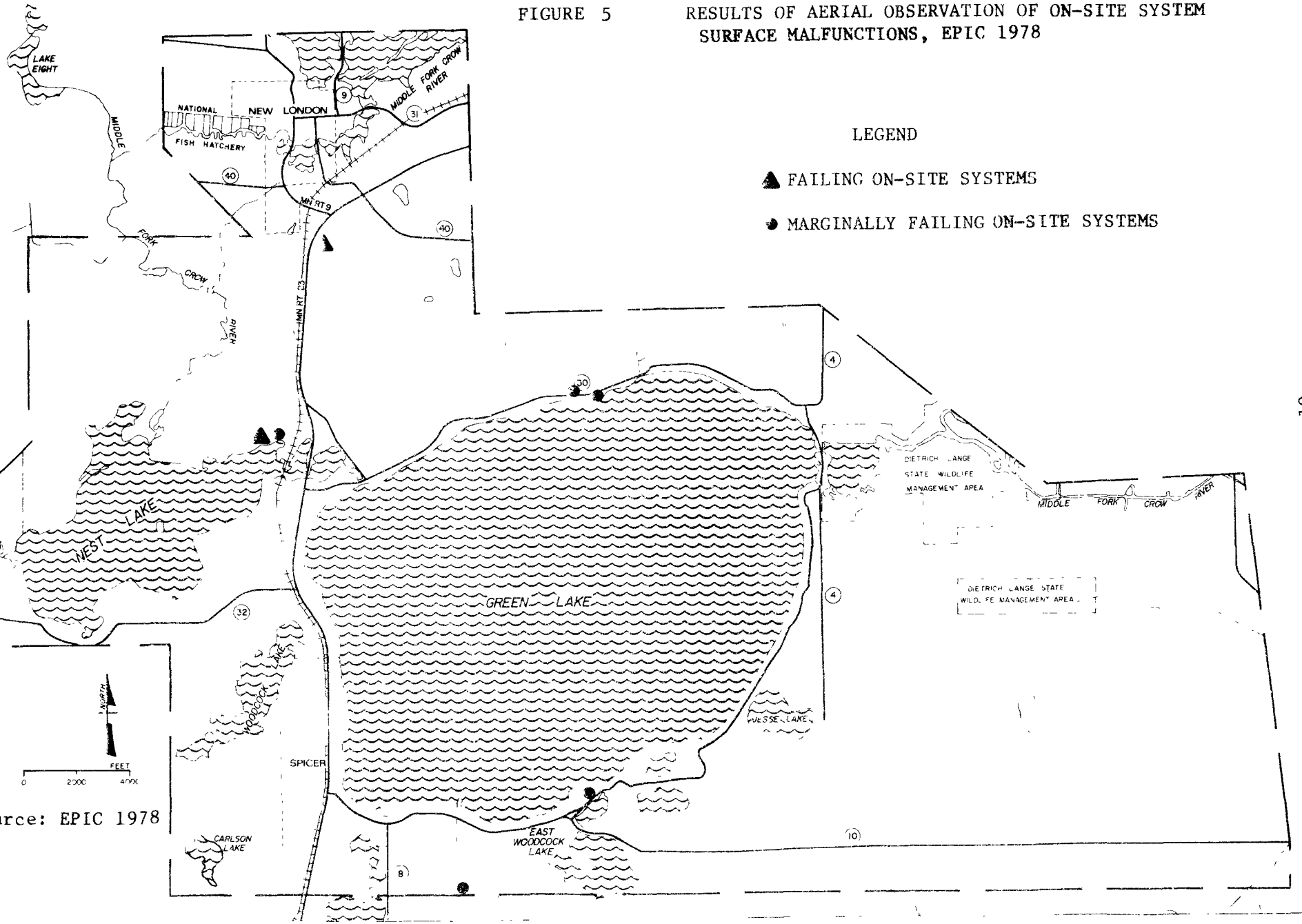
The studies undertaken by EPA to evaluate on-site system problems around Green Lake and Nest Lake are described below:

a. Nutrient budget analyses performed by EPA during preparation of the EIS have indicated that on-site systems contribute an estimated 1% of the phosphorus load to Nest Lake and 8% of the phosphorus load to Green Lake. As seen in Figure 4, septic tanks are insignificant sources of phosphorus compared to non-point source nutrient loadings. Removal of on-site systems would not improve the trophic status of either lake.

b. An aerial photographic survey was conducted by EPA's Environmental Photographic Interpretation Center (EPIC) in order to detect any on-site system surface malfunctions within the Study Area. The survey was made on 20 August 1978. Results of the EPIC survey, shown in Figure 5 indicate that surface malfunctions were not widespread. Only three marginally failing on-site systems were found along the Green Lake shoreline. Two of these failures were located on the north shore. One currently failing and one marginally failing system were detected along the north shore of Nest Lake. Any on-site system that gave an indication of previous failure or exhibited potential for failure was considered a marginally failing system. Since many of the systems are poorly maintained, however, these surface malfunctions cannot without further investigation be attributed to site limitations.

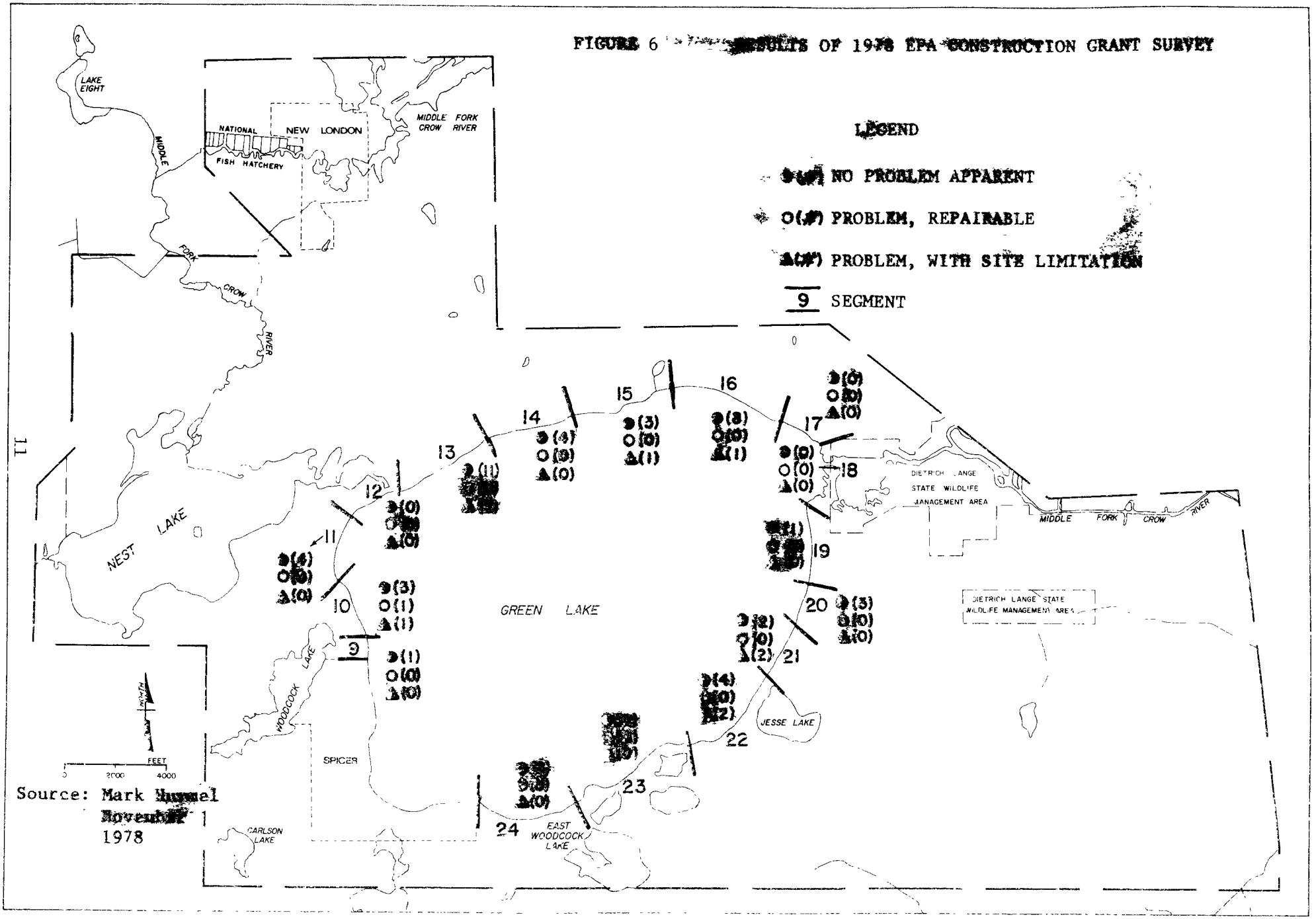
c. An on-site sanitary survey of the Green Lake Shoreline was conducted from 6 November through 26 November 1978. This survey consisted of a sample of 74 (12%) residences around Green Lake. The purpose of this study was to identify the extent, nature, and distribution of problems associated with on-site systems, including violations of the local sanitary code. The study showed that, despite widespread violations of construction standards for septic tank/soil absorption systems (ST/SAS), very few systems experienced recurring backups or ponding. The condition of the systems surveyed between 6 November and 29 November is described in Figure 6. The problems noted by the residents included occasional backups (3), recurring backups (6), occasional ponding (2) and one full pit privy. These represent 16% of the 75 systems surveyed. The problem systems are listed in Table 1, by type of problem, survey code number, notes on the type of system and relevant site conditions, and obvious repairs suggested by the surveyor or the resident. Remedies for those five systems where the solution was not obvious could include rerouting the surface drainage, flow reduction, dosed mounds for lots with high groundwater and/or hydrogen peroxide treatment of the soil absorption areas.

FIGURE 5 RESULTS OF AERIAL OBSERVATION OF ON-SITE SYSTEM SURFACE MALFUNCTIONS, EPIC 1978



Source: EPIC 1978

FIGURE 6 RESULTS OF 1978 EPA CONSTRUCTION GRANT SURVEY



Source: Mark Hummel
November 1
1978

Table 1

Problem Systems Found in the November 1978 Sanitary Survey

Problem	System	Type of System and Site Conditions	Possible Repairs
Occasional Backup	6	Surface drainage onto drainfield area	Not obvious
	17	Old, small septic tank and drainfield	New system on own property planned
	48	Trench in high groundwater	Not obvious
Occasional Ponding	42	Large septic tank and trench but high groundwater	Not obvious
	45	Trench in high groundwater	Not obvious
Recurring Backup	5	Possible holding tanks	New system on own property planned
	12B	Possible holding tank	New system on own property planned
	28	Old septic tank/drainfield with surface drainage onto drainfield and in high groundwater	Room on property for new drainfield at higher elevation
	37	Old system with surface drainage onto drainfield area	Not obvious
	55	Obstruction in house sewer	Remove obstruction
	56	Relatively new system with low water usage well above lake level	New drainfield on own property planned
Full pit privy	53	Full pit privy	Relocated pit privy

The survey covered 22, or 6%, of the seasonal residences (non-resort) and 45, or 30%, of the permanent residences. All were lakeside properties. Thus, while the survey is heavily biased toward residences that are most likely to have problems, the seasonal population was represented. In fact, three of the 12 problems recognized were reported by seasonal residents: two with occasional backup problems and one recurrent backup problem.

d. A through-the-ice septic leachate survey was conducted along the shorelines of Green Lake and Nest Lake during March 1979. This study was undertaken to determine whether groundwater plumes from nearby septic tanks were emerging along the lakeshore causing elevated concentrations of nutrients. Septic tank leachate plumes were detected with an instrument referred to as a Septic Leachate Detector ("Septic Snooper"). The instrument is equipped with analyzers to detect both organic and inorganic chemicals in domestic wastewater. Sampling for nutrients in surface and groundwaters and for bacteria in surface water were coordinated with the septic leachate profile to clearly identify the source of the leachate.

The following observations were obtained from the shoreline profiles, analyses of groundwater and surface water samples, and evaluation of groundwater flow rates and patterns:

- A total of 64 locations exhibited effluent plume characteristics. Of these, 26 originated from surface water discharges and 38 from groundwater leachate. The locations of these effluent plumes is shown in Figure 7.

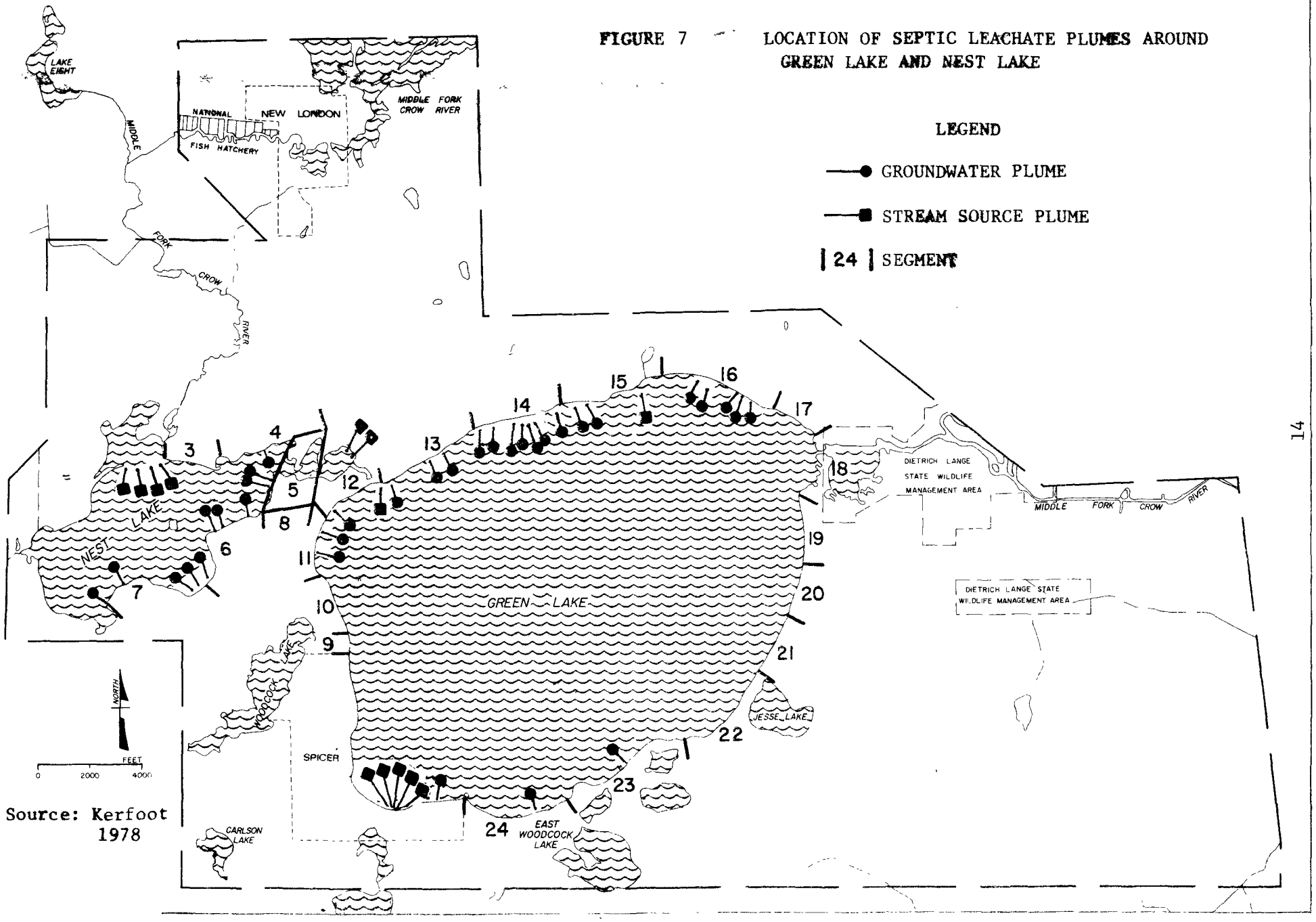
- The most pronounced source of effluent was inflow from the Middle Fork of the Crow River into Nest Lake. The daily winter loading of phosphorus from the river was estimated at 8.6 kg/day compared to total loading from all groundwater plumes around the lake of .15 kg/day.

- A noticeable undocumented source of phosphorus loading was observed originating from the discharge stream of an unnamed lake near the sewered town of Spicer.

- The observed pattern of plumes on Green Lake correlated with projected groundwater inflow for the surficial deposits. Most plumes were found on the north and west shorelines, and few were observed in the south and east segments.

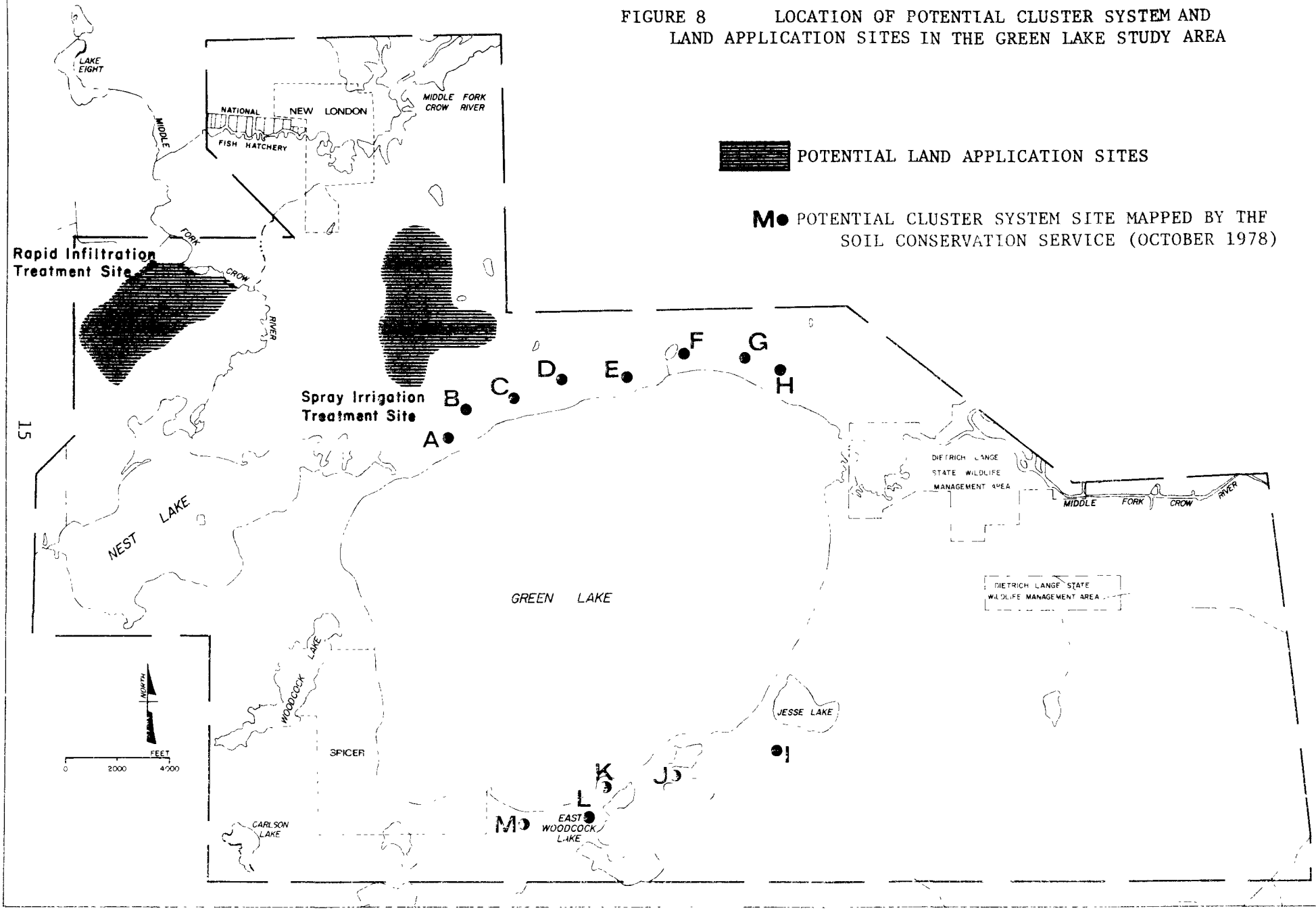
e. In conjunction with the assessment of water quality and public health problems associated with on-site wastewater management systems, EPA sponsored a US Department of Agriculture, Soil Conservation Service (SCS) field investigation of potential land application (rapid infiltration and spray irrigation), and cluster (community treatment) system sites in the Green Lake Study Area during 1978. These sites are illustrated in Figure 8. Soils data collected by SCS during these investigations point to the conclusion that wastewater management approaches involving land application by the rapid infiltration, spray irrigation, and cluster systems are feasible for the Green Lake Study Area. More detailed investigation of feasibility is warranted.

FIGURE 7 LOCATION OF SEPTIC LEACHATE PLUMES AROUND GREEN LAKE AND NEST LAKE



Source: Kerfoot 1978

FIGURE 8 LOCATION OF POTENTIAL CLUSTER SYSTEM AND LAND APPLICATION SITES IN THE GREEN LAKE STUDY AREA



3. CONCLUSION

The need for improved wastewater management in sewered areas has long been established. The infiltration/inflow and treatment efficiency problems associated with the New London and Spicer wastewater management systems as reported by the Applicant, warrant the immediate replacement or upgrading and expansion of these systems. Most on-site systems around Green Lake and Nest Lake are, however, operating satisfactorily.

Many of the on-site systems presently in use within the Green Lake Study Area are poorly maintained, and many are inadequately designed. Routine maintenance for all on-site systems and upgrading of inadequately designed systems will substantially reduce the number of problems. Where problems cannot be solved by routine maintenance or upgrading alone, alternatives to the conventional ST/SAS are feasible in the Study Area which will minimize or eliminate the problems.

CHAPTER II

ALTERNATIVES

Solutions to wastewater management problems in the sewered and unsewered portions of the Green Lake Study Area, as recommended by the Facilities Plan and the EIS, are described in this chapter. The discussion of the EIS Recommendations (Section II.B) focuses on septic tank system installation, operation, and maintenance considerations surrounding the implementation of a decentralized wastewater management approach.

A. THE FACILITIES PLAN PROPOSED ACTION

The Facilities Plan proposed the construction of a centralized wastewater management system to serve the residents of New London, Spicer, and Green Lake (see Figure 2). Sewage flows [0.55 million gallons per day (mgd), average daily flow] from these areas would be conveyed by a combined system of gravity sewers, force main, and approximately fifteen pump stations, to a wastewater stabilization lagoon facility southeast of Green Lake for treatment. The Applicant has proposed that the existing sanitary sewer systems serving New London and Spicer be rehabilitated following the completion of a Phase II sewer system evaluation survey.

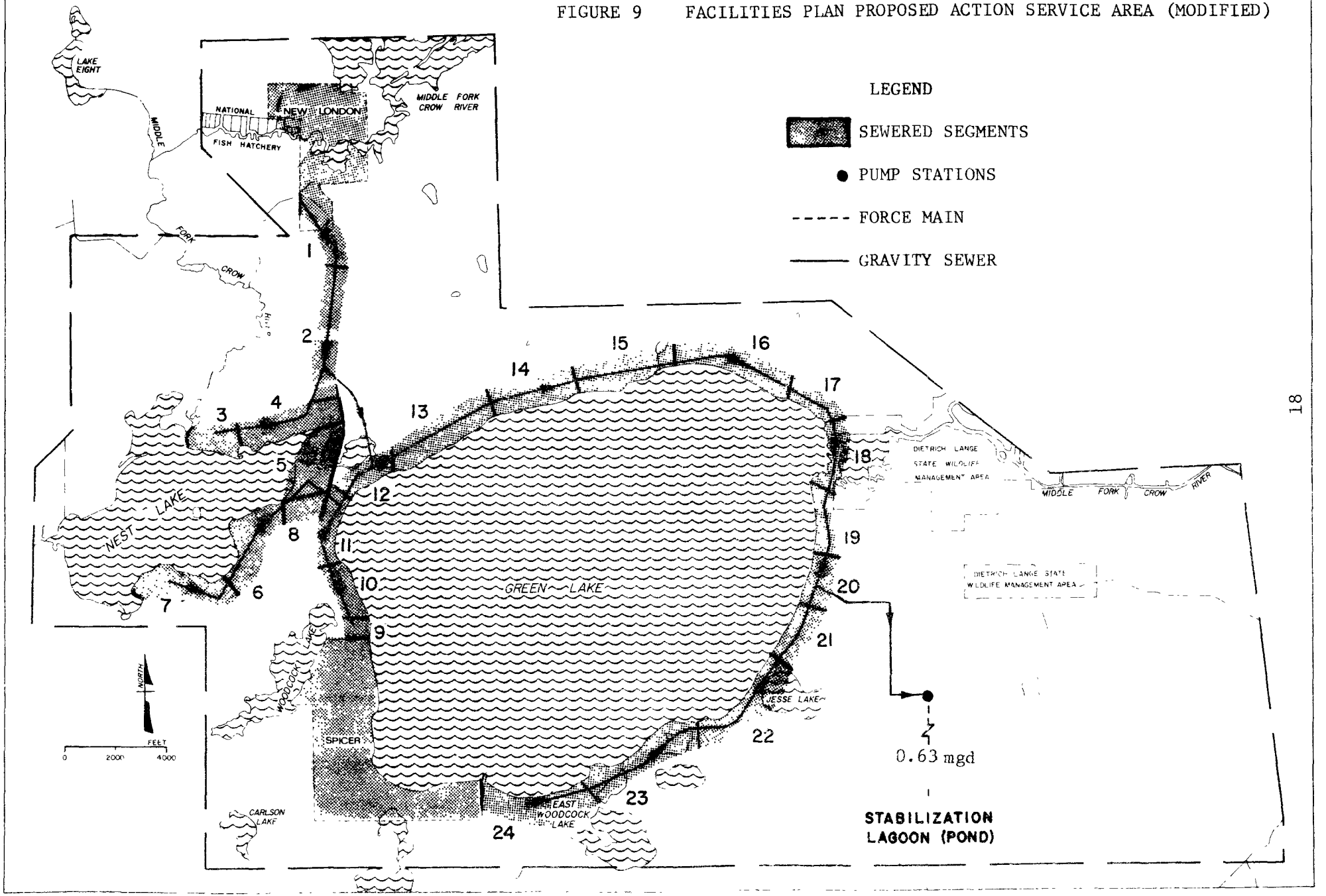
The treatment facility, which would require an area of about 76 acres, involves a dual or parallel system of ponds operating in series which allow for the shutting down of one side during the winter when flows are low. The ponds have a storage capacity of 180 days. Effluent discharge to the Middle Fork of the Crow River would be "controlled", that is, limited to approximately a two-week discharge period twice a year. The degree of treatment achieved by the Applicant's proposed lagoon facility would be secondary and would comply with the following MPCA standards for controlled effluent discharge during periods of adequate streamflow: 25 mg/l BOD_5, 30 mg/l total suspended solids, and 200 MPN/100 ml fecal coliform bacteria.

The Facilities Plan Service Area shown previously in Figure 2 has been modified to be comparable with the service areas of the EIS alternatives. The modified Facilities Plan Service Area, which includes the eastern half of Nest Lake and the corridor between New London and the northwest corner of Green Lake, is illustrated in Figure 9.

Costs developed in the Draft EIS for the Facilities Plan Proposed Action have been upgraded to ensure further comparability with the EIS alternatives. They include:

Construction and engineering, legal, and contingency costs (1978 $)	$8,156,100
Future construction and engineering, legal, and contingency costs	$ 38,000
Annual operation and maintenance costs	$ 85,800/year

FIGURE 9 FACILITIES PLAN PROPOSED ACTION SERVICE AREA (MODIFIED)



Local share of construction and engineering, legal, and contingency costs	$1,066,820	
1980 (first year) average annual user charge	$ 160	(Spicer and New London)
	$ 170	(currently unsewered areas)

The 1980 average annual user charge includes all initial operation and maintenance costs plus annual payment on the debt of privately as well as publicly financed construction costs. The calculation of the user charge is based on the assumption that local construction, engineering, legal, and contingency costs will be paid through the use of a 30-year bond at an interest rate of 6-7/8%.

Implementation of the Facilities Plan Proposed Action would include conventional procedures that are adequately described in the Facilities Plan.

B. EIS RECOMMENDATIONS

Spicer and New London will continue to use their existing collection systems. Their final treatment facilities will be determined by additional facilities planning.

The shorelines of Green Lake and Nest Lake will continue to be served by on-site systems except in localized areas where feasibility or cost-effectiveness considerations support the need for decentralized, off-site facilities.

The following sequence is recommended for completion of the Construction Grants process:

	Spicer and New London	Shorelines of Green Lake and Nest Lake
Step 1	Conduct detailed site analysis, engineering and environmental analysis of joint rapid infiltration, joint spray irrigation, and separate upgrading to provide tertiary effluent for discharge.	In application for Step 2 provide certifications and plans regarding construction, operation, maintenance and access to on-site or decentralized off-site systems. Select and implement Sanitary Review Board
Step 2	Design facilities	Conduct site analysis Technology Selection
Step 3	Construct facilities	Construct facilities

1. SPICER AND NEW LONDON

EIS Alternatives 4, 5, and 6 can all be considered cost-effective wastewater management approaches. They differ only in their proposed methods for

treating and disposing of wastewater generated in the sewered areas: EIS Alternative 4 features a rapid infiltration treatment facility to handle New London and Spicer sewage flows; fully-treated effluent is recovered and discharged to the Middle Fork of the Crow River above Nest Lake. EIS Alternative 5 substitutes a spray irrigation treatment facility for Alternative 4's rapid infiltration plant with no surface water discharge of treated effluent is required. EIS Alternative 6 employs new tertiary (advanced) New London and Spicer treatment facilities to serve the needs of the existing sewered areas.

The EIS recommends that the Applicant conduct additional Step 1 analyses, funded by EPA, of these centralized treatment alternatives. EPA encourages the use of land application and will require an evaluation, including detailed site analyses, of the rapid infiltration and spray irrigation methods discussed in this EIS. The evaluation of these methods will include determinations of physical and chemical properties of soils at the potential land application sites, water-table measurements, and groundwater quality analyses. Detailed investigation of potential land application sites should also include an archaeological survey to identify prehistoric archaeological sites that may be disturbed. The Applicant's evaluation of separate wastewater management options for New London and Spicer, as proposed under EIS Alternative 6, should include the following:

- Applicant's own analysis of the feasibility and costs of treatment plant upgrading;
- Engineering, cost, and environmental analysis of sludge management options; and
- Engineering, cost, and environmental analysis of effluent disinfection options.

2. SHORELINES OF NEST LAKE AND GREEN LAKE

The EIS recommends that the unsewered portions of Nest Lake (eastern half only) and Green Lake continue to be served by on-site systems wherever feasible. Where use of existing or upgraded on-site systems is not feasible, residents could be served by community treatment (cluster) systems. The community's role in managing on-site systems would be expanded to include, at least, supervision of system maintenance, monitoring of present or potential underground potable water sources, and collection of user charges to recover the costs involved.

Many elements of this approach, including likely maximum costs can be sketched now, but the final details will not be known until: 1) house-by-house analysis allows a selection of treatment methods for each house and 2) the Applicant and community decide on the method and degree of management to be provided. The two considerations are discussed below.

a. Technology Selection

Identification of on-site systems' problems and the causes of their problems is the first step to be taken specifying technologies for individual residences. Site specific analysis is necessary to accomplish this. The analysis should be sequential, beginning with accessing available health department records, interviewing residents on the use and maintenance of their

systems, inspecting the site for obvious malfunctions and inspecting the location and condition of any on-site wells or springs. Based on the information gathered, additional investigations may be warranted to identify the cause and possible remedies for recognized problems. Examples of additional investigations, keyed to problems, include:

Problem	Investigations in Sequential Order
Recurrent backup in house or surface malfunction	Install and monitor water meter
	Uncover pump and inspect septic tank for obstruction and groundwater inflow
	Rod house sewer and effluent line
	Excavate and inspect drainfield distribution lines, if present
	Determine soil absorption system size and degree of clogging by probing and sample pit excavation. Note soil texture and depth to groundwater.
Inadequate separation distance from septic tank or soil absorption system to well	Inspect well for proper seal, vent, drainage, and grouting
	Sample well and analyze for fecal coliform bacteria, nitrates, and fluorescence
	Monitor groundwater flow if aquifer is shallow or unconfined
Inadequate separation distance from septic tank/soil absorption system to lakeshore, or inadequate separation distance from soil absorption system to groundwater or evidence of increased plant growth	Monitor groundwater flow direction and rate
	Locate effluent plume vicinity of lakeshore using groundwater probe and fluorescent analysis
	Sample groundwater in leachate plume at lakeshore. Analyze for total phosphorus, total Kjeldahl nitrogen, nitrate, nitrogen, and fecal coliform bacteria
Septic tank or soil absorption system size or design suspected of being less than code requires	Inspect property to assess feasibility of replacement or upgrading

Problem	Investigations in Sequential Order
	If feasible, document system inadequacies by probing and sample pit excavation.
Septic tank or soil absorption system size or design known to be less than code requires	Inspect property to assess feasibility of replacement or upgrading

In the selection of technologies for individual sites, it is strongly recommended that:

- Alternatives other than those covered by existing codes be considered
- State and local officials legally responsible for permitting on-site systems be involved in selections
- The availability and cost of skilled manpower for maintaining and monitoring innovative or subcode systems be weighed against the feasibility and cost of requiring conventional on-site systems or off-site systems
- That there be a multidisciplinary team, consisting of the sanitarian-administrator and available specialists in a number of fields (see Management Section) to advise an organized Sanitary Review Board on a case-by-case basis
- That the individual homeowner should be informed of the different options being considered (and their costs) when technology selections are being made. His/her opinion and advice should be solicited.

Feasible problem-solving approaches based on information gained from the site analysis should be discussed with the owner. Primary criteria for identifying the appropriate technology should be cost, benefits, and risk of failure. Undoubtedly, eligibility for Construction Grants funding will be considered also. General guidelines for eligibility of on-site technologies are presented below:

- Replacement of facilities of obviously inadequate design will be eligible if feasible. Cesspools are an example of obviously inadequate facilities. Septic tanks in very poor repair or substantially smaller than required by state codes are another example. Small drainfields, dry wells, or unusually designed systems are not necessarily "obviously inadequate".
- Parts of systems that cause recurrent surface failures, backups or contamination of potential drinking water aquifers are eligible for repair or replacement. This does not apply to water using fixtures. Systems that fail because they are abused will not be eligible unless the abuse is terminated, the usage of the system is documented by water meter readings and/or reinspection of the system, and the problems persist.

- Facilities not currently causing public health or water quality problems may be eligible for repair or replacement if similar systems in the area are failing. "Similarity of systems" will be determined by design and site characteristics that are shown to be contributing to failures.

- Compliance with state and local on-site design regulations in design or repairs and replacements is desired where feasible and effective. Compliance is not a condition of eligibility if subcode design or alternative processes can reasonably be expected to eliminate or substantially mitigate public health and water resources problems. Innovative designs will similarly be eligible, with the added condition that inspection and monitoring commensurate with the degree of risk be assured. For subcode, alternative, or innovative systems, it is expected that water conservation devices commensurate with the degree of risk for hydraulic overloading will be installed at owner or applicant's expense.

- For the Green Lake Study Area, methods will be eligible that modify the flow or chemical characteristics of effluent plumes entering Green Lake and Nest Lake if the modification might reduce the nearshore plant growth. Such methods will be considered innovative. Monitoring of their effectiveness will be required.

- On-site systems built after December 1977 are not eligible for repair or replacement but will be eligible for site analysis. Accommodation of new facilities that increase wastewater flow (garbage disposals, dishwashers, etc.) will not be a justification for eligibility. Systems adequately designed for the building they serve but malfunctioning because of hydraulic or organic overloading or other abuse will not be eligible except as explained above.

It is recognized that some developed lots may never be serviceable by on-site technologies; therefore, off-site treatment (including cluster systems) will be required. Off-site treatment and disposal will be eligible for Federal funding if:

1) a public health or water resource contamination problem is documented that cannot be abated by any combination of on-site conventional, innovative, subcode, flow reduction, or waste restriction methods, or

2) the life cycle costs of off-site treatment and disposal for an individual building or group of buildings is less than costs for appropriate on-site technologies for the same buildings.

The recommendations apply only to existing systems. EPA is recommending and funding the decentralized wastewater management approach to meet the needs of residents around Nest Lake and Green Lake in order to help the community and system owners protect water quality and the public health. For systems to be built for new housing, EPA makes no recommendations on the permitting process, since the Agency does not fund their construction or repair.

Should it be determined by the Applicant during Step 2 that decentralized off-site treatment facilities are required, the subsequent detailed investigation of potential cluster system sites will include a hydrogeological study as well as an archaeological survey of each site.

b. Community Management

In regard to funding privately-owned on-site systems, current EPA regulations (40 CFR 35.918-1) require that

> ...the grant applicant shall:...Certify that such treatment works will be properly installed, operated, and maintained and that the public body will be responsible for such actions.

This requirement also applies to publicly owned on-site systems.

Within this limitation, communities have a wide range of options available. Many of these options are discussed in the Draft EIS, Section III.D.2. Three additional topics and their interrelationships are discussed here. They are: risk, liability, and scope of the Applicant's responsibilities.

"Risk" as used here refers to the probability that wastewater facilities will not operate as intended, thereby causing water quality or public health problems, or inconvenience for the user. Whether centralized, small-scale, or on-site, all wastewater facilities have inherent risks, the degree of which is dependent on skill in facilities design, construction, operation, and maintenance.

"Liability" as used here refers to the responsibility of various parties to minimize risk and to accept the consequences of facility failure. In the past, the county has accepted liability for facilities around Green Lake and Nest Lake only insofar as permitting and inspection activities minimized risk. The consequences of facility failure rest with system owners. In building a sewer around Green Lake, the Applicant essentially would have accepted liability for all failure except plumbing and house sewer blockages. Under EIS Alternatives 4, 5, or 6, the community still has the opportunity to assume increased liability in whatever manner it sees fit; the only limitation is that the Applicant will be responsible for actively identifying failures of interest to the community (inconvenience for the user not included) and attempting to remedy the failures. Strictly speaking, the Applicant's responsibility under 40 CFR 35.918-1 applies only to those individual systems funded by EPA.

Many of the assumptions made in describing and costing EIS Alternatives 4, 5, and 6 were based on the Applicant's active role in improving, monitoring, and maintaining all wastewater facilities around Green Lake and Nest Lake. EPA encourages but does not require such a role. The scope of the Applicant's responsibilities depends on how much liability for wastewater facilities it wants, and is legally capable, to assume. EPA will, by funding facilities planning, design and construction, assist the Applicant in meeting those liabilities it assumes that reduce the risk of water quality and public health problems.

To illustrate the range of approaches the Applicant may take, three management scenarios are described below:

Minimum Management Requirements

The Applicant would act as the recipient and distributor of Construction Grant funds. Homeowners who wished to improve their on-site facilities would apply to the Applicant for assistance. After documenting that minimum requirements for on-site system eligibility are met, the Applicant would receive the funding and distribute it to homeowners who show proof of satisfactory installation. These homeowners would be assessed an annual fee thereafter to cover the cost of a site inspection perhaps every 3 to 5 years, and would be required to show proof of appropriate maintenance activities as part of the site inspection. A groundwater monitoring program would include taking well water samples during the site inspection.

With this approach, the municipalities would not incur any long-term debt. The Applicant would not necessarily have any responsibility for, or interest in, permitting future on-site systems. Without a comprehensive site inspection and evaluation program, it is unlikely that all water quality and public health problems would be identified or abated. Liability for facility malfunctions would remain wholly with the owners.

Comprehensive Wastewater Management

This is the approach recommended for adoption by the Applicant. It involves instituting the small waste flows district concept discussed in the Draft EIS (see particularly pages 125-130, 177-178, and Appendix K.) All buildings within the district's service area boundaries would be included. At a minimum, each building's wastewater system would be covered in the site-specific analysis, and would be inspected at intervals. Owners or residents of each building would be responsible for a user charge to repay their share of necessary operating costs. The local debt for construction of each system can be directly assessed to individual homeowners, as in the Minimum Management scenario, or they could be funded as long-term debt.

This approach should identify all wastewater generation, treatment, and disposal problems in the service area, and should insure that future problems are minor or short-lived. In contrast to the Minimum Management scenario, the higher level of responsibility resulting from this approach would allow the authority greater discretion in sharing liability for facility operation with the resident or building owner.

Watershed Management

The Applicant's concern with prevention and control of water pollution need not be restricted to wastewater management facilities. During the public comment period on the Draft EIS, several citizens recognized the significant role of the Middle Fork of the Crow River in determining the water quality of Nest Lake and Green Lake. Many expressed an interest in controlling non-point source pollution generated upstream of Nest Lake and New London. If that interest is expressed in the form of willingness to pay for additional governmental services, the Comprehensive Wastewater Management scenario could be augmented by the following functions:

- Monitor non-point sources

- Control non-point sources
- Educate residents and visitors about individual pollution control practices, costs, and benefits
- Inventory the biological resources and tributaries of the lakes
- Research the chemical, hydrological and biological dynamics of the lakes
- Coordinate with other local, state, and Federal agencies on pollution control activities and funding.

c. Cost Estimate

The costs associated with EPA's recommended wastewater management approaches, including total present worth, capital costs, and estimated user charges, are presented in Table 2. The costs have been disaggregated by sewered areas (New London and Spicer) and unsewered areas (Nest Lake and Green Lake). Back-up data for these costs are presented in Appendix B.

d. Implementation

Specific aspects of implementing an EPA-funded wastewater management plan in the Green Lake area were discussed in Section VI.E of the Draft EIS. Modifications of those discussions are:

- Ownership of On-Site Systems Serving Seasonal Residents - The statement was made on page 178 of the Draft EIS that privately owned systems serving seasonally occupied residences are not eligible for Federally funded renovation and replacement. EPA Program Requirements Memorandum 79-8, issued very shortly before the Draft EIS went to print, modified this policy to allow eligibility of seasonally used, privately owned on-site systems as long as the responsible public agency is given "complete access to and control of" the system. See Comments and Responses under the "Implementation" heading.

- Completion of Step 1 Requirements for the Small Waste Flows District - The Minnesota Pollution Control Agency (MPCA) has favored the completion of sufficient site analysis to support preliminary technology selection during Step 1 for all buildings in the Proposed Service Area. The question of whether detailed site analysis should be considered necessary for cost-effectiveness analysis in Step 1 or be defined as design work fundable in Step 2 has also been raised by other state agencies. In response, EPA Region V developed a new memorandum clarifying project needs documentation (see Appendix A). It provides that, at most, a representative sampling (15 to 30%) of on-site systems needs to be developed in Step 1 for a site-specific data base. The remaining 70 to 85% should be done in Step 2. Other remaining Step 1 requirements remain as stated in the Draft EIS.

Table 2. Revised Cost Estimates for EIS Alternatives 4, 5, 6, and Limited Action.

		Alternative 4		Alternative 5		Alternative 6		Limited Action Alternative	
		Sewered Areas	Unsewered Areas [1]	Sewered Areas	Unsewered Areas [1]	Sewered Areas	Unsewered Areas [1]	Sewered Areas	Unsewered Areas [2]
Cost Effectiveness Analysis	Total present worth	$3,076,200	$2,350,400	$3,402,500	$2,350,400	$2,525,600	$2,350,400	$1,576,700	$1,786,100
Capital Costs	Construction and engineering, legal, contingency costs as of 1980	2,584,600	1,780,700	2,849,600	1,780,700	1,460,100	1,780,700	717,300	1,010,800
Capital Costs	Future annual construction and engineering, legal, contingency costs	36,200 (per year)	1,770 (per year)	36,200 (per year)	1,770 (per year)	36,200 (per year)	1,770 (per year)	29,200 (per year)	8,830 (per year)
1980 O&M Cost	Annual operation and maintenance costs as of 1980	48,100 (per year)	63,000 (per year)	53,500 (per year)	63,000 (per year)	84,520 (per year)	63,000 (per year)	62,600 (per year)	63,680 (per year)
1980 Local Cost	Local share of 1980 construction and engineering, legal, contingency costs	470,500	190,500	488,200	190,500	380,400	190,500	76,400	108,100
1980 User Charge	1980 (first year) average annual user charge	140	100	150	100	180	100	130	80

[1] Unsewered areas (Nest Lake and Green Lake) to be served by a combination of cluster systems, @ 25% of homes, and upgraded or new septic tank systems.

[2] Unsewered areas (Nest Lake and Green Lake) to be served by upgraded or new septic tank systems only.

For the purposes of technology selection and organization development in Step 2 and construction supervision in Step 3, the grantee should establish a Sanitary Review Board. This board can be made up of members of the Lake Shore Property Owners Association or an independently elected body. The board's responsibilities will be to:

- Supervise the direction and progress of the site-specific analysis
- Ensure homeowner input to technology selection
- Encourage community participation in the management and technology decisions to be made
- Review and act on any proposed facilities designs that are not in conformance with present regulations
- Provide an appeal process for owners who object to the technology selected for their property
- Ensure that site analysis and technology selection is conducted by a multidisciplinary team consisting of persons with knowledge and experience in soil science; water chemistry; geohydrology; wastewater characteristics; innovative, alternative and conventional decentralized treatment technologies; and practical aspects of decentralized system construction and maintenance.

Description of the grantee's organization of this review board and the qualifications of individuals proposed for the Step 2 site analysis and technology selection should be included in the application for Step 2 funds. The Step 2 grant will be contingent upon review and approval of the application by the Technology Section of EPA Region V's Water Division.

It is recommended that the necessary technical expertise be sought from several sources, such as:

- Kandiyohi County Tax Assessment Office, existing staff or new hires
- US Department of Agriculture, Soil Conservation Service (Willmar)
- Corporate consultants
- Individual consultants
- University of Minnesota and other institutions of higher learning
- Kandiyohi County Planning Commission.

Similarly, if assistance in developing the organizational structure of the review board and supporting activities is needed, legal and management consulting services should be sought. Within reason, the costs for these services will be grant-eligible.

For the purpose of long-term continuity, it is recommended that at least one person be hired by the Applicant to have an active role in Steps 2 and 3 work, to act as the review board's staff, and to provide technical expertise in the future.

C. THE NO-ACTION ALTERNATIVE

The No-Action Alternative is broadly defined as an EPA rejection of Construction Grants applications for the Study Area. More specifically, the implication of this is that the sewers and treatment plants in New London and Spicer would not be rehabilitated, replaced, or upgraded. In the unsewered parts of the Study Area, the Kandiyohi County Tax Assessment Office would continue to issue permits for new septic tank systems on suitable lots and to require correction of surface malfunctions.

With the No-Action Alternative, the Village of New London and the City of Spicer would continue to violate state and Federal effluent discharge requirements. The water quality of Woodcock Lake would not improve. Additional flows to the Spicer STP would be prohibited because it is already overloaded.

The need for improved wastewater management around Green Lake is less clear. The number of on-site systems experiencing serious or recurrent malfunctions is small, less than 10%. The impacts of individual on-site systems on Green Lake water quality are variable but, taken together, the systems have not been shown to adversely affect the lake.

With the No-Action Alternative, health authorities will continue to have inadequate information with which to design on-site system repairs appropriate to the problems and their causes. They are unlikely to have the time, personnel, or monitoring capabilities to be able to specify innovative attempts to solve the problems. The result will be increasing numbers of holding tanks on small lots and on lots with high groundwater.

No-Action does not mean "no cost." Assuming that existing systems will fail at a rate of 2% per year and be replaced by a mix of holding tanks, conventional drainfields or dry wells, or mound systems, the cost associated with the No-Action Alternative for the unsewered areas (Green Lake and Nest Lake) only are shown below. Back-up data for these costs are included in Appendix B.

Total Present Worth	$1,576,700
Construction and engineering, legal, and contingency costs (1978 $)	$ 717,300/yr.
Future construction and engineering, legal, and contingency costs	$ 29,200/yr.
Annual operation and maintenance costs	$ 62,600/yr.
1980 (first year) average annual user charge	$ 250

D. OTHER ALTERNATIVES

Many other alternative wastewater management approaches have been considered in the Applicant's Facilities Plan and in EPA's Draft EIS. Alternatives considered are listed below along with reasons for their rejection:

FACILITIES PLAN ALTERNATIVES

Alternatives	Finding
Centralized wastewater collection	Accepted as a feasible alternative. Proposed Action consisted of centralized collection and treatment by lagoons
Decentralized treatment by individual on-site systems, cluster systems, and mound systems	Rejected on basis of soil and groundwater conditions around Green Lake
Combinations of centralized and decentralized collection/treatment options	Rejected on the basis of cost-effectiveness
Land application	Rejected on the basis of cost-effectiveness
Direct reuse of treated wastewater	Rejected on basis of prohibitive costs and lack of need for reused water
Discharge of the District's waste water to the Willmar treatment facility (9 miles southwest of the Study Area)	Rejected on the basis of cost-effectiveness
Upgrade or expand existing treatment plants at New London and Spicer	Rejected because phosphorus removal would be required; Phosphorus removal not required for central treatment facility east of Green Lake
Install holding tanks in lots where groundwater is too high for compliance with the provisions of the Shoreland Management Act	Rejected
No-Action	Rejected because of overwhelming need for improved wastewater management

EIS TECHNOLOGIES NOT ALREADY CONSIDERED IN FACILITIES PLAN

Alternatives	Finding
Residential flow reduction by various devices	Expected to be effective in reducing homeowners' costs for water supply, water heating, and wastewater treatment
Laundry detergent phosphorus ban	Expected to result in an unquantifiable (at present time) reduction in phosphorus entering surface waters through septic tank tank leachate
Pressure sewers	Rejected on basis of cost-effectiveness comparison with gravity sewers. Could be advantageous in the design of small waste flows systems
Vacuum sewers	Rejected (on basis of cost) in preference to pressure sewers for comparison with gravity sewers. Could be advantageous in the design of small waste flows systems
On-site treatment and disposal, various designs	Incorporated in EIS recommendation for Green Lake and Nest Lake portions of Service Area
Off-site treatment and disposal, various designs (cluster systems)	Incorporated in EIS recommendations for Green Lake and Nest Lake portions of Service Area

CHAPTER III

AFFECTED ENVIRONMENT AND IMPACTS OF NO-ACTION

This chapter describes those components of the natural and human environment that were either integral to discussion of the EIS issues (see Section I.A) or essential to the understanding of decisions reached in this EIS.

A. SOILS

Soils in the Green Lake Study Area were developed by weathering and erosion from underlying glacial deposits. The decomposition of vegetation over time has created a surface layer of rich, dark soils 1 to 3 feet thick. These soils are underlain by glacial till and sand and gravel deposits several hundred feet thick. Soils around Nest Lake and northwest of Green Lake consist of well-drained sand and gravel intermixed with loam; their limitations for development include rapid permeability, steep slopes, and high groundwater levels. Soils on Green Lake's south and northeast shore are well- to poorly drained loamy soils with marshes; slow permeability and a seasonal high water table are development limitations in these soils. Steep, well-drained loams, intermixed with sandy soils, are found on Green Lake's north central shore; steep slopes are limiting factors for development. To the east of Green Lake, soils are characterized typically by a seasonal high water table; they consist of poorly drained, loamy glacial outwash underlain by sand and gravel.

Major factors restricting the use of some soils for on-site wastewater management systems in the Study Area include permeability and high water table elevations. In view of these restrictions, it is expected that surface malfunctions and backups of existing onsite systems will continue to occur at a low rate under the No-Action Alternative. Rapid permeability of sand and gravel mixtures in the Study Area suggests that septic tank effluents may not be treated adequately before emerging into Nest Lake or Green Lake. Survey data and detailed site investigations indicate that treatment, particularly nutrient removal, is variable. Under the No-Action Alternative, on-site systems that provide notably poor treatment would not be located and modified to provide adequate treatment.

Construction of new dwellings and on-site systems will continue under the No-Action Alternative. Some erosion will occur as a result of this activity.

B. SURFACE WATER RESOURCES

The surface areas of Nest Lake and Green Lake are approximately 945 acres and 5,406 acres, respectively. The Middle Fork of the Crow River flows through both of these lakes. Woodcock Lake, occupying an area of approximately 125 acres, is land-locked; it is reported to flow occasionally into Green Lake (EPA 1974).

As indicated in Figure 4, the combination of tributary inflow and wastewater treatment plant discharges contributes a significant amount of phosphorus to Nest Lake (96% and 80% of total phosphorus loads in 1972 through 1973). It is important to note that non-point phosphorus loading from the Middle Fork of the Crow River accounts for about one-half of the total load to

Nest Lake. Outflow from Nest Lake, in turn, accounts for approximately three-quarters of the phosphorus load to Green Lake. The load from the Middle Fork of the Crow River is classified as non-point because it originates from nutrient sources upstream of Nest Lake that cannot be pinpointed. These upstream non-point sources are typical of an intensively agricultural watershed. In contrast, the septic tank systems contribute only a small portion (1% to 8%) of the phosphorus to these two lakes. Kerfoot (1978) calculated that the daily winter loading of phosphorus into Nest Lake from the Middle Fork of the Crow River (8.6 kg/day) was approximately 57 times greater than the loading from all groundwater plumes around the lake (0.15 kg/day). These groundwater plumes are assumed to be septic tank effluents. Because of the limited data base available for Green Lake and Nest Lake, the phosphorus budget derived and presented is considered to be the best estimation from available data and standard loading methodologies used by EPA.

The Draft EIS indicated (Table II-5, page 52) that Nest Lake and Green Lake retain over 50% of the phosphorus loaded into them from various sources. Nitrogen retention differs considerably between the two lakes, with Nest Lake retaining 23% of its nitrogen load and Green Lake retaining 56% of its nitrogen load. The relatively long hydraulic retention time* of Green Lake (3.7 years versus 0.5 years for Nest Lake) allows for greater accumulation of nitrogen in sediments and organic materials and also allows for transformation of nitrogen to nitrogen gas.

Evaluation of four key water quality parameters, including total phosphorus, chlorophyll a, secchi depth, and hypolimnetic dissolved oxygen saturation suggests no measurable trend with regard to the water quality of Green Lake and Nest Lake over the period from 1972 through 1978. The variation in water quality over this period is no more than annual fluctuations inherent in the lake system. The parameters listed above are the bases on which trophic classifications for lakes are made. According to the simple trophic classification system, Nest Lake and Woodcock Lake are eutrophic; these lakes contain an abundant supply of nutrients and organic matter. According to the same system, Green Lake is mesotrophic; it contains a moderate supply of nutrients, and, compared to eutrophic lakes, produces less organic matter.

Under the No-Action Alternative, Nest Lake and Woodcock Lake will remain eutrophic and Green Lake will remain mesotrophic. Data in Table 3 indicate that, under the No-Action Alternative, phosphorus inputs to Nest Lake and Green Lake will be less than 1% greater than those occurring under normalized existing (flow) conditions.

* The time required for natural processes in a lake to replace the entire volume of the lake.

TABLE 3. Total Phosphorus Loading (kg/yr) to Nest Lake and Green Lake Under No-Action Alternative

Condition	Nest Lake	Green Lake
1972-1973 conditions (wet year)	4,330	2,605
Normalized existing conditions	3,029	1,963
No-Action	3,029	1,969

The 1972 through 1973 conditions are presented to illustrate phosphorus loadings during a relatively wet year (significant amount of rainfall and runoff) as compared with an average year. Under the No-Action Alternative, phosphorus inputs to Nest Lake and Green Lake in a wet year could increase by 43% and 32%, respectively. The buildup of nutrients in landlocked Woodcock Lake would continue unabated without Federal, state and local action. The water quality of this lake would not improve if hydraulic conditions or the Spicer STP discharges were unaltered.

C. GROUNDWATER RESOURCES

Groundwater provides all of the potable water in the EIS Service Area. The communities of New London and Spicer have two wells, which serve as the sources of municipal water supply. Lindholm et al. (1974) has reported that the buried outwash aquifer underlying the area will generally yield adequate water quantities for municipal, industrial, rural domestic, and irrigation uses. Water is generally of good quality, although hard.

The results of a July 1977 survey of 97 private wells around Green lake, sponsored by the Green Lake Property Owners Association, indicated that approximately 29% of the wells tested were contaminated with coliform bacteria. Nitrate nitrogen was observed in 28 of the 97 wells tested. Of these, only two exceeded the 10 mg/l nitrate nitrogen limit permitted by the US Public Health Service, with levels of 12 mg/l and 48 mg/l. Other wells showed the presence of orthophosphates. These data indicate that a number of wells have been contaminated, but they are insufficient to implicate human wastes as the source of contamination. It is important to note that information on specific well construction and maintenance would be required to identify the sources of the well pollution. This information was not reported with the water sample analysis.

Under the No-Action Alternative, no comprehensive survey of private wells (construction, maintenance, water quality, etc.) and on-site systems will be funded by EPA, and therefore, is not likely to be undertaken. Consequently, the source of groundwater contamination that may occur will probably never be identified.

D. POPULATION AND LAND USE

Approximately 65% of the EIS Service Area population are seasonal residents, with homes located primarily in the unsewered areas surrounding Nest Lake and Green Lake.

The total summer population of the proposed EIS Service Area in the year 2000 is projected to be approximately 8,400, a 22% increase over the 1976 figure. However, the future ratio of seasonal to permanent residents is expected to decline (42% seasonal to 58% permanent in 2000 versus 65% seasonal to 35% permanent in 1976) Implicit in this assumption is the understanding that the conversion of seasonal residences to permanent residences will outnumber new seasonal residential construction. A drop of 20% in seasonal population is projected to occur by the design year 2000. New London and Spicer will continue to have predominantly permanent populations in the design year.

Summary estimates of permanent and seasonal population and average annual growth rates for the period from 1976 to 2000 in the proposed EIS Service Area are presented in Table 4.

TABLE 4. Population Projections and Average Annual Growth Rates for Proposed EIS Service Area

Population Component	1976	2000	Average Annual Growth/Decline Rate (1976-2000)	Absolute change (1976-2000)
Seasonal	4500	3600	3% decline	-900
Permanent	2401	4807	4% growth	+2406
Total	6901	8407	1% growth	+1506

Growth in the EIS Service Area, under the No-Action Alternative, would be limited to sites suitable for on-site systems or to cases where residents can afford to install and maintain holding tanks. Because of these restrictions, population may not grow at the rate projected.

Land use in the EIS Service Area consists of: commercial, residential, and institutional uses in the Village of New London and City of Spicer; permanent and seasonal single family residences adjacent to Nest Lake and Green Lake; agricultural land; and open land consisting of woodlands, wetlands, and lakes. The aesthetic and recreation appeal of the area has resulted in substantial residential development around Green Lake.

With the No-Action Alternative, the types of development found in the Study Area are unlikely to change from what is present now. Some agricultural and open land (principally woodlands) will be converted to residential and small commercial uses. The distribution and amount of residential and small commercial development will be strongly influenced by the availability of soils suitable for on-site sewage disposal. In lakeshore areas, housing densities are unlikely to increase substantially. An increasing amount of future development would occur in areas not adjacent to the lakes.

E. ECONOMICS

In 1970, the mean average family (permanent residents only) income in the Green Lake Study Area was $9,285. Although the Study Area's mean family income was slightly greater than the county mean, it was substantially less

than the national and state figures of $10,999 and $11,048. Significant variation in mean incomes of the individual communities within the Study Area were evident, ranging from a low of $6,626 in Irving Township to a high of $14,385 in Harrison Township. Thus, it appears that while aggregate figures for the Study Area were indicative of a moderate income area, pockets of low income households are present.

The costs of No-Action in the EIS Service Area will fall most heavily on homeowners who must install holding tanks. A homeowner with four residents generating 45 gallons per person per day and paying $60 per 1,000 gallons pumped would be paying almost $4,000 per year for sewage disposal. Although this could be reduced substantially by installation of effective flow reduction devices and by negotiation with the hauler, the cost would still be substantial. The high cost would be an incentive for the homeowner to find other, perhaps dangerous, means of disposing of wastewater.

As long as their systems do not fail, other homeowners could maintain them with very minimal expense, perhaps $60 every 10 years for pumping of their septic tanks. Residents whose systems fail but who can make a standard repair would incur a one-time expense of perhaps $1,300. If dosed mound systems were necessary, costs could be as high as $8,800.

CHAPTER IV

ENVIRONMENTAL IMPACTS OF THE ACTION ALTERNATIVES

This chapter presents the environmental impacts of the conceptual or system alternatives incorporated in the Facilities Plan Proposed Action and in EIS Alternatives 4, 5, and 6. The EIS recommendation that the Applicant proceed immediately with detailed investigative and design efforts in the unsewered areas proposed for decentralized wastewater treatment, it is noted, is not presently a set of explicit construction proposals for each building in the EIS Service Area. Rather, it is an approach, based on the assimilative capacity as well as the environmental sensitivity of the local natural resources, that relies on environmental management in the form of continuing attention to the use and effects of small-scale systems. This approach also involves the ability to make balanced decisions about small-scale systems, including exceptions to standard procedures, in the best interests of the local environment.

The action alternatives evaluated in this chapter include those described in Chapter II. To summarize:

Action	Description
Facilities Plan Proposed Action	Centralized collection of wastewater from New London, Spicer (and corridor between), Nest Lake, and Green Lake for treatment at a 0.55 mgd stabilization lagoon facility southeast of Green Lake; effluent discharge to Middle Fork of Crow River downstream from Green Lake.
EIS Recommendations	EIS Service Area to be segmented; New London and Spicer (and corridor between) to evaluate (under additional Step 1 funds) wastewater management options for sewered areas included in EIS Alternatives 4, 5, and 6: land application by rapid infiltration and spray irrigation methods, and upgrading/expanding existing sewage treatment plants (STPs); unsewered areas including eastern half of Nest Lake shoreline and entire shoreline of Green Lake to proceed with detailed design (including site analyses) of decentralized wastewater management approach under a Step 2 EPA grant.

A. SURFACE WATER

No changes in the trophic status of Nest Lake and Green Lake are anticipated as a result of phosphorus loadings associated with the implementation of any action alternative. This assessment is based on an estimate of major phosphorus inputs from several sources:

- Tributaries (Middle Fork of Crow River to Nest Lake and outflow from Nest Lake to Green Lake);

- Wastewater treatment plants (Belgrade and New London STPs to Nest Lake via Middle Fork of Crow River and Spicer STP to Woodcock Lake);
- On-site (septic tank) systems;
- Direct precipitation; and
- Immediate drainage around the lakes.

Other sources known to contribute to nutrient loading, such as groundwater, detritus, waterfowl, and sediments, are less significant than those listed above.

Future phosphorus loads from STPs and septic tank leachate were calculated according to the specific conditions associated with each action alternative. The immediate drainage contribution is usually relatively insignificant in this Study Area and was assumed to be constant until the year 2000. Direct phosphorus loading was derived from average rainfall and concentration figures.

The total phosphorus inputs to Nest Lake and Green Lake that are associated with the action alternatives are indicated in Table 5 and differ insignificantly under normal flow conditions. Phosphorus loads to Nest Lake under EIS Alternatives 4 and 6 are estimated to be 1% and 5% higher, respectively, than those under the Facilities Plan Proposed Action. Phosphorus loads to Green Lake are less than 1% and 3% higher under EIS Alternatives 4 and 6, respectively, than those under the Facilities Plan Proposed Action; phosphorus inputs to Green Lake under EIS Alternative 5 would be insignificantly less than those under the Facilities Plan Proposed Action. The action alternatives reduce, by as much as 22% for Nest Lake and 15% for Green Lake, the amount of phosphorus received annually by these lakes under normal existing conditions. The reductions are not sufficient to improve Nest Lake's fertile (eutrophic) status or Green Lake's moderately fertile (mesotrophic) status.

Table 5. Phosphorus Inputs (kg/yr) to Nest Lake and Green Lake under Action Alternatives (year 2000)

Condition	Nest Lake	Green Lake
Facilities Plan Proposed Action	2,356	1,680
EIS Alternative 4	2,386	1,686
EIS Alternative 5	2,356	1,673
EIS Alternative 6	2,474	1,725
Normalized existing conditions	3,020	1,963
1972-1973 conditions	4,330	2,605

The 1972 through 1973 loadings are included in Table 5 for comparison to the existing normalized loadings. It is emphasized that the major difference in loading between the 1972 through 1973 level and the so-called normalized level is due to the year-to-year flow fluctuation in the Middle Fork of Crow River. The period from 1972 to 1973 was a relatively wet year, with a significant amount of rainfall and runoff compared with the average year. In addition, the year-to-year loading fluctuation, which could be over 1,000

kg/yr for Nest Lake and over 500 kg/yr for Green Lake between the 1972 and 1973 level and the normalized level, is much more significant than the reduction of phosphorus loading resulting from combined effort of upgrading the STPs and eliminating septic tanks. This means that water quality improvements (i.e., fertility reduction), gained through implementation of an improved wastewater management approach, could be eliminated during a wet year. Therefore, caution must be exercised in assessing potential improvement of the trophic status of Nest Lake and Green Lake through the implementation of any action alternative. These results do not imply that the elimination of septic tanks is a poor approach to severe eutrophication in Nest Lake and Green Lake. On the contrary, eliminating septic tanks is the first step necessary to reverse the trend toward further degradation of water quality in Nest Lake and Green Lake.

Phosphorus input to Woodcock Lake will decrease dramatically (more than 50%) under any of the action alternatives evaluated in this EIS. This reduction would result from either the discontinuation of the present Spicer STP discharge or from the proposed upgrading of the plant to provide effluent phosphorus concentrations of 1.0 mg/l or less.

Under the Facilities Plan Proposed Action, pumping station malfunctions could result in substantial bacterial contamination of the lakes. Rigorous inspection and maintenance of pumping stations, back-up electrical power supplies, standby pumps, and an overflow alarm would minimize this possibility. Similar measures should be taken with pumping stations for cluster systems.

Primary impacts on surface water quality related to the construction of ST/SAS and the replacement of old systems is likely to result in increased soil erosion. Similarly, installation of sewers, especially those that pass under the many small drainage ways leading to the lakes, will increase erosion. Compliance with state and local soil erosion control requirements could substantially reduce the erosion problem and the subsequent impact on water quality.

B. GROUNDWATER

The Facilities Plan Proposed Action would eliminate the discharge of on-site system effluents to the groundwaters around Nest Lake and Green Lake. The threat of well water contamination from wastewater effluents would be removed. The elimination of on-site systems from around these lakes and the attendant loss of groundwater recharge is judged to have a negligible impact on water levels, since these levels are recharged outside of the Green Lake Study Area.

Land treatment of wastewaters generated in the existing sewered areas involve the infiltration of suspended solids, organic matter, and pathogens into the soil. These pollutants are very unlikely to reach the buried outwash aquifer because the overlying impermeable confining layer provides an adequate barrier to their entry into potable water supply sources. Depth to this aquifer is generally more than 20 feet; such pollutants are normally removed by infiltration through approximately 5 feet of soil.

The decentralized wastewater management approach for unsewered areas would detect and reduce or eliminate plumes in the shallow groundwater around Nest Lake and Green Lake. The plumes can change, with time, in size, shape, and strength, depending on wastewater or groundwater characteristics. At present, wells penetrating these plumes, particularly ungrouted wells, could receive nitrate and other chemical loads.

The decentralized approach would eliminate the hazard to drinking water through 1) inspection of existing wells and filter fields, 2) sampling of wells that are down-gradient or within 50 feet of septic tanks or soil absorption systems, and 3) selection of on-site or off-site measures to stop actual or possible drinking water contamination.

These repair measures might include elimination of dry wells and filter field repair or relocation. Cluster system sites would receive geohydrologic surveys, and well water would be monitored at regular intervals. In all cases except for new construction on lots with more than 5 feet to groundwater, costs for these measures are included among the analysis or maintenance costs of the decentralized approaches Alternative (see Appendix B). Also, actual repair (grouting, etc.) of wells may often prove less expensive than treatment modifications.

C. POPULATION AND LAND USE

Population projections used for the design of alternatives in the EIS were based on recent growth trends and data from a variety of sources. The projections did not incorporate any constraints or inducements related to the amount of developable land or other complex economic, demographic or land use factors.

Examination of development potential as an impact of centralized sewage treatment, however, suggests that the amount of developable land and the density of development will both be greater with sewers than without. The EIS estimates that the Facilities Plan Proposed Action centralized wastewater facility could have the impact of inducing 5 to 10% more population growth, and development of 30 to 40 more acres than would occur under baseline conditions. This is a modest amount of induced growth and reflects the limited amount of vacant developable land in the EIS Service Area. As illustrated in Figure II-14 of the Draft EIS, the vast majority of lakeshore lots are developed. This fact, coupled with the limited amount of public lakeshore access (2.3%), development limitations of wetlands, steep slopes, seasonal high water table, and a limited market demand, will significantly limit second tier development. These limitations account for the low development potential of the decentralized wastewater management approach for the presently unsewered areas.

Under the decentralized approach for Nest Lake and Green Lake, developers might wish to acquire unbuildable shoreline lots as multifamily access and recreation sites.

D. ECONOMIC IMPACTS

Under the assumption used in the Draft EIS that collector sewers would be 80% eligible for Federal and State Construction Grants, the residents of

Spicer and New London would pay approximately the same for their share of the Facilities Plan Proposed Action ($160) as they would for their part of EIS Alternatives 4, 5, or 6 ($180-190). As shown in Table 6, the economic impact of these homeowners' costs for these communities are nearly the same regardless of alternatives.

For the shoreline communities, the decentralized alternatives have estimated homeowners' costs that are 40 to 50% less than the Facilities Plan Proposed Action.

The difference in economic impacts between the Facilities Plans Proposed Action and the EIS recommended alternatives are relatively small as can be seen in Table 6. However, the assumptions of 80% sewer eligibility underlying these user charges and economic impact figures is not valid because insufficient need for sewers has been found for the shoreline communities. The relatively low level of problems can be solved by more cost-effective means.

Table 6. Financial Burden and Displacement Pressure of the Facilities Plan Proposed Action and Remaining EIS Alternatives.

Location	1980 Average Annual Homeowners' Cost	Displacement Pressure	Financial Burden
Spicer and New London			
Alternative 4 - Rapid Infiltration	140	4-6%	12-20%
Alternative 5 - Spray Irrigation	150	4-6%	12-20%
Alternative 6 - Treat and Discharge	180	4-6%	20-25%
Limited Action - Alternative 6 without sewers for the West Shore of Green Lake	130	4-6%	12-20%
Green and Nest Lake Shorelines			
25% Cluster, 37.5% ST/SAS Replacement	100	<4%	6-12%
50% ST/SAS Replacement	80	<4%	6-12%
Facilities Plan Proposed Action			
Spicer and New London	160	4-6%	12-20%
Shorelines	170	4-6%	12-20%

CHAPTER V

PUBLIC AND AGENCY COMMENTS

Substantive public and agency comments were received on the Draft EIS. They have been compiled and summarized in this chapter. Comments offered through testimony at the public hearing on the Draft EIS (4 August 1979) and through written correspondence, and that are essential to the EIS decision-making process, are addressed herein. The comments and appropriate responses are organized by Draft EIS subject areas, including:

- Documentation of need for improved wastewater management facilities (including field collection efforts)
- Water quality
- Development of the alternatives
- Implementation
- Cultural resources
- Economic impacts
- Recreation
- Population and land use
- Implementation

All substantive written comments on the Draft EIS are included in Appendix D. Citizens who offered substantive comments on the Draft EIS at the public hearing are listed below; numbers which follow the citizens' names identify the comments addressed in this chapter.

Name	Agency	Comment
William Bigler	Seasonal resident, Green Lake	3
Samuel Claassen	Rieke Carroll Muller Associates, Inc.	1, 3, 4, 5, 11, 13, 24, 30, 31
Russell Dykema	Board Member, Green Lake Association	32, 33
W. A. Fischer, Chairman	Green Lake Sanitary Sewer and Water District	3
Roger Machmeier	University of Minnesota Extension Agent	25, 26

Name	Agency	Comment
Douglas Noyes	Noyes Engineering Service	3
James Tiede	Resident, Willmar	25

Individuals offering substantive written comments on the Draft EIS are listed below:

Name	Agency	Comment
Craig Affeldt	Minnesota Pollution Control Agency	13, 14, 15, 16, 17, 18, 19, 20, 28
W. G. Emrich	US Department of Transportation, Federal Highway Administration	34
Russell Fridley	Minnesota Historical Society	22
David Jervis	U.S. Department of Interior	22, 37
Charles Kenow	Minnesota State Planning Agency	21
Rodney Massey	Minnesota Pollution Control Agency	9
Virgil Olson	Kandiyohi County Board of Commissioners	6, 7, 8, 27

A number of other people commented finally on the EIS or participated in the question and answer period following formal comments. This participation and interest is appreciated. Comments not addressed in this chapter either involved support for one alternative or another, or reflected differences of opinion between commentors. While interesting, such comments are not substantive. Copies of the public hearing transcript can be reviewed at EPA's office in Chicago, Illinois.

NEEDS DOCUMENTATION

C. 1 The 1977 well water analysis sponsored by the Green Lake Property Owners Association was indicated by the Draft EIS to be inconclusive in terms of documenting pollution caused by human waste. Did EPA sample these wells to determine if human wastes were the cause of any contamination? If not, why not? [Claassen]

R. 1 Serious consideration was given to performing a well sampling program for residences on Green and Nest Lakes. Obviously, such a study would have increased Draft EIS preparation time significantly. In light of GLSSWD's expressed urgency for completion and publication of the Draft EIS, the decision was made to recommend the well sampling program a part of the Step 2 work. We believe that this study is necessary for detailed systems design.

C. 2 A lot of EPA conclusions rest on the scientific validity of phosphorus measurements that have been made during preparation of the Draft EIS. The report ought to contain some reasonable range into which the validity of this study should fall. Is it a factor of 3 or 5 or 10%? Is the Septic Leachate Detector a new device or an old one with a well established record in measuring phosphorus flows into the lake? [W. Johnson]

R. 2 The Septic Leachate Detector (SLD) used during the preparation of this EIS does not measure phosphorus. It locates on-site system leachate, or "plumes", by detecting the organic and inorganic constituents normally found in wastewater effluents. Groundwater samples taken from the sediments in the vicinity of plumes detected by the septic snooper were subsequently sampled for phosphorus by conventional methods. The SLD was not used in the EIS process in any other way than to locate individual plumes.

The use of SLDs such as ENDECO's Septic Leachate Detector is still experimental. Technical questions have yet to be fully resolved concerning the universal presence of brighteners and whiteners in wastewater from individual homes, the effects on plume strength of fluorescent compound absorption by different soils, the effects of plume configuration on plume detectability and correlations between plume strength and nutrient breakthrough. EPA is conducting additional research on these topics to improve both the applicability of the equipment and interpretation of the data it generates.

Because it is possible that the groundwater samples taken from the sediments could have missed actual plumes, thereby giving low phosphorus values, EPA did not apply SLD nutrient data in the calculation of phosphorus loads from septic tank systems. The calculation of septic tank loadings was based on assumptions developed by the National Eutrophication Survey (EPA 1972). The NES assumes that the phosphorus load to lakes from septic tank systems within 300 feet of the shoreline is 0.25 pounds (0.11 kilograms) phosphorus per person per year. By this assumption, and accounting for both permanent and seasonal residents, the estimated annual phosphorus load to Nest Lake from septic tank systems is 42 kg/yr. (1% of total phosphorus load). Similarly, the annual phosphorus load to Green Lake from septic tank systems is 208 kg/yr. (8% of the 1972-1973 total phosphorus load or 10.6% of the average year load). Estimated total phosphorus loadings to these lakes are shown in Figure 4 of this Final EIS. Kerfoot (1978) estimated total annual phosphorus loading from plumes identified by the SLD to be approximately 22 kg/yr. for Nest Lake and 33 kg/yr. for Green Lake. Phosphorus loads from on-site systems, based on observed plumes, reported by Kerfoot are less than 1% of the total phosphorus load to Nest Lake and 1.7% of the average year total phosphorus load to Green Lake.

In response to the comment, an appropriate range in which actual phosphorus loadings from on-site systems may fall would be derived from both SLD and NES data. This range is: less than 1% to 1.5% for Nest Lake, and 1.7% to 10.6% for Green Lake. Nutrient data estimated

by Kerfoot would represent the low end of the range, while nutrient loading data based on the NES assumption cited above would represent the high end of the range. The latter data are believed to be conservatively high because it is assumed that phosphorus in wastewater effluents from all on-site systems (within 300 feet of the shoreline) moves into the lake. This assumed phenomenon is not confirmed by soil and groundwater data collected or reviewed during the EIS process.

EPA's detailed investigations of 17 on-site systems in three midwestern states, reported elsewhere[1], indicates that phosphorus loads lakes from individual septic tank systems along shorelines is highly variable, depending on soil and groundwater conditions, proximity to the lake, size of the soil absorption system, and amount of sewage generated. In conjunction with a Generic EIS for Wastewater Management in Rural Lake Areas, EPA is developing methods for rapid detection and analysis of groundwater plumes before they enter lakes. It is hoped that these methods will provide an affordable means to make better, site-specific estimates of nutrient input to lakes from septic tank systems.

C.3 November was a poor time of year to conduct a sanitary survey. The ground was frozen, seasonal residents were not there, and this is not the time of year that systems pond. [Fischer, Noyes, Claassen]

R.3 November is not the optimal time. For lake areas with high seasonal populations, the best time would be in late spring and early summer. At the time EPA made the decision to do the survey, it was considered more important to get data quickly than to wait eight to ten months.

Besides the Green Lake survey, EPA has conducted four other sanitary surveys in rural lake communities. In all cases, most of the information collected regarding system performance comes only from the residents. In general, most residents are concerned with good sanitation and are willing to offer whatever knowledge they have. It matters little what time of year this most valuable source of information is sought. A reticent resident will be as unhelpful in November as in July.

With the exceptions of intermittent direct discharges and seasonal surface ponding, information collection during site inspections is not hampered by cold weather. Lot size, elevation above a lake, locations of wells and septic systems, proximity of neighbors, and surface drainage patterns all contribute to the surveyor's interpretations. This type of information is available upon inspection year round.

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[1]Final Environmental Impact Statements, Case Study No. 1 - Crystal Lake Area Sewage Disposal Authority, Benzie County, Michigan; Case Study No. 4 - Steuben Lakes Regional Waste District, Steuben County, Indiana; and Case Study No. 5 - Otter Tail County Board of Commissioners, Otter Tail County, Minnesota.

It was erroneously stated in the Draft EIS that only permanent (year-round) residents were interviewed. The sanitary survey covered 75 septic systems in 63 interviews. Of the 75 systems, 30 were used seasonally, including 8 systems in resorts. The surveyor made every effort to find seasonal residents on weekends while they were closing up their cabins or pulling docks out of the lake.

The survey covered 22, or 6% of the seasonal residences (non-resort) and 45, or 30%, of the permanent residences. All were lakeside properties. Thus, while the survey is heavily biased toward residences that are most likely to have problems, the seasonal population was represented. In fact, 3 of the 12 problems recognized were reported by seasonal residents: two systems with occasional back ups and one with recurrent back ups.

C. 4 The surveyor was a stranger to the area and probably did not get full cooperation from the residents. [Claassen]

R. 4 This is possible, but it is interesting to note that the surveyor found 12 "problems" representing 16% of the homes surveyed around Green Lake. Information presented by Mr. W. A. Fischer at the August 1979 public hearing shows that his questionnaire to people around the lake found problems with 14% of those surveyed. Mr. Fischer lives on Green Lake and is known by most residents. This indicates that EPA's surveyor did get reasonable cooperation.

C. 5 The Septic Snooper survey was conducted at a very poor time, in March. There was 3 feet of ice cover. Only permanent residences would be contributing any kind of pollution. Cold temperatures would inhibit bacteria growth or even kill them. Even if the effluent plumes persist for 4 to 6 months after summer residents leave as predicted by EPA, March is 7 months after Labor Day, and summer plumes were probably gone. [Noyes, Claassen, Tiede]

R 5 As with the sanitary survey, the decision to proceed with the Snooper survey put more emphasis on trying to get the field work done and acquiring some information than to wait for the optimum time for the most defensible information.

We have learned some very interesting things from both the winter and summer Septic Snooper surveys and related studies at Green and Nest Lakes and in the six other communities where EIS's are being done. For instance, at Otter Tail Lake, Minnesota EPA performed a winter Snooper survey right after the Green Lake Snooper survey. Because nearly all of the permanent residences showed evidence of plumes under the ice, EPA surveyed again in the summer to see if the summer residents also generated plumes in the lake. There were far fewer plumes in the summer than in the winter. The difference points out the dynamic nature of effluent plumes. It also reflects the results of several interacting factors:

- During snow melt, groundwater inflow to lakes is at its highest rate of the year. This carries effluent plumes into the lake that otherwise may not flow directly to the lake.

- The direction and rate of groundwater, and therefore plumes, can be altered by the level of a lake. At a high lake level, the groundwater flow will not be as fast and can even be reversed.

- Seasonal or year-to-year variations in groundwater flow in the nearshore areas can result in the disappearance, then reappearance, of some effluent plumes.

- The strength of a plume that is entering a lake, and therefore its detectability, is strongly determined by mixing with the lake water. EPA has observed plumes during a morning calm that were not detectable when afternoon breezes make waves on the windward shore. During the winter, ice cover reduces mixing, thereby magnifying plumes relative to their summer strength.

As to the 4 to 6 month duration of plumes, it is now believed that too many variables affect the detectability of effluent plumes to justify use of this estimate. The actual duration period for a given system, or the average for all systems around a lake, may vary substantially from this original estimate. It may well be that we detected only plumes from permanent residences. The pattern of effluent plumes, and the presence of effluent or effluent-like substances in surface runoff remain highly significant and should be used to guide future site analysis.

In regard to the effect of cold weather on viability of bacteria, EPA feels that the cold may have prevented regrowth of bacteria from surface or runoff sources. These concentrations may well be lower than what would be found in the summer. All of the "stream source" plumes found by the Snooper survey should be scrutinized for the sources of contamination, and any significant sources should be controlled.

Based on sampling of "groundwater" plumes here and in many other locations, and based on many studies reported in the literature, EPA believes that effluents moving through most soils, even saturated soils, contain very few bacteria or viruses after 10 to 20 feet of travel. The fecal coliform counts in surface water samples collected in the immediate vicinity of "groundwater" plumes probably represent background conditions.

C. 6 Will EPA be making another investigation of increased algal growth in Green Lake? We have noticed considerable increase on the lake bed along our shore since 1972. [Olson]

R. 6 EPA will not conduct any future investigation of algal growth in Green Lake. The increase in algal growth along the lakefront property noted in the comment may or may not be associated with on-site wastewater management systems. Several investigations of algal growth in lakes, conducted by EPA over the past three years, indicate that such growth may be caused by the movement of nutrient-rich on-site system effluents into surface water. Selection of off-site treatment (holding tanks or cluster systems and other small-scale measures) would achieve decreases in the occurrence and density of these growths. Improvement would also occur where repair of on-site

facilities (elimination of dry wells or relocation of filter fields) reduce or eliminate effluent plumes reaching the lake. Research on measures to change the flow and quality of effluent plumes could lead to additional mitigation of these growths. Examples of such measures include, but are not limited to, removing garbage grinders, flow reduction, aerobic treatment, non-discharging toilets, capture of effluent plumes for lawn irrigation, and Minnesota's laundry detergent phosphate ban (already in effect).

C. 7 Will the lot-by-lot survey (conducted after the EIS process) include a careful investigation of septic tanks, drainfields, wells, and soils on each lot (not just samples) in order to detect problems which the Septic Leachate Detector did not identify? [Olson]

R. 7 Every existing developed, unsewered lot around Green Lake and Nest Lake (eastern half only) will be subject to the Step 2 site analysis procedure described in Section II.B.2 of the Final EIS. This analysis involves a sequential investigation of problems associated with on-site wastewater management systems, including back-ups, surface malfunctions, inadequate separation distance to wells and lakeshore, and suspected or known inadequacy of septic tank or drainfield size. Not all developed lots will be subject to the same range of tests, since some problems will be solved sooner (on the basis of fewer tests) than others. In Appendix A of the Final EIS, EPA estimates the frequency of need to conduct various tasks in the detailed site analysis and presents costs associated with these tasks.

C. 8 Does EIS Alternative 6 address the problem of nitrate-nitrogen in private wells along the east shore of Green Lake? Private tests have indicated high contents of nitrate-nitrogen (figures for SSU numbers 55 and 73) which should alert EPA to potentially serious problems. [Olson]

R. 8 All of the decentralized wastewater management approaches for Green Lake, including EIS Alternatives 4, 5, and 6, will address the problems of elevated and excessive nitrate-nitrogen levels in private water supplies around the lake, which were identified in the 1977 well survey sponsored by the Green Lake Property Owners Association. Ninety-seven of the approximately 600 wells (16%) were sampled during the survey. During Step 2 of this project, the Applicant will conduct a survey of 100% of the wells around Green Lake that will include an interview with homeowners to determine the suitability of individual wells, and an inspection of each well for proper seal, vent, drainage, and grouting to determine the extent to which groundwater quality is protected by proper well construction. The costs associated with this survey have been included in the site analysis costs (Appendix B, Final EIS), which are themselves included in the revised costs for the decentralized wastewater management approach for Nest Lake and Green Lake. As noted in Section II.B.2 of the Final EIS, detailed site investigations around these lakes will also include analyses of well water samples for fecal coliform bacteria, nitrates, and fluorescence (indicates presence of detergents in groundwater).

In requiring a survey of all wells around Green Lake, EPA has recognized the need to find solutions to groundwater quality problems that may or may not be caused by inadequate on-site wastewater treatment. EPA's inclusion of resident interviews in the comprehensive Step 2 well survey is based on the Agency's observation that valuable information regarding well construction comes only from residents. As noted in an earlier response, most residents are concerned with good sanitation and are willing to offer whatever knowledge they have about their wells. The requirement that all wells be inspected is based on the fact, confirmed by sanitarians across the nation, that groundwater contamination can be caused as easily by improper well construction (no grouting, malfunctioning vent, etc.) as by wastewater infiltration. This does not imply that the elevated nitrate nitrogen levels found in 2 of the 97 wells sampled in 1977 are no cause for concern or that they are not caused in fact by malfunctioning on-site systems. Rather, EPA's comprehensive approach here focuses on a step-by-step determination of the cause(s) and degree of groundwater contamination. This information will enable citizens to avoid future groundwater quality problems by providing information on the suitability of their wells, and will be useful in the design of site-specific, cost-effective solutions to existing problems.

C. 9 The Minnesota Pollution Control Agency and EPA have different definitions of "need" for wastewater treatment. EPA is using performance standards that require positive, physical evidence of failure of a system. MPCA feels that a second group of inferred-failure criteria should be added which include the same design factors used in permitting new systems. If a system does not satisfy these design factors, specifically:

- Soil percolation rates
- Slope
- Setback distances from wells, property lines, waterfront
- Depth to groundwater table or bedrock
- Sizing of septic tanks and drainfield,

it can be determined that a particular on-site system will probably fail in the near future, or that it is now failing without any obvious evidence of failure. [Massey]

R. 9 EPA began this EIS and six similar EISs using the construction-oriented approach that MPCA suggests. Because of a lack of information concerning on-site conditions, we used available soils data and average lot sizes to designate segments where off-site treatment would be needed. Groups of houses on lots averaging less than one-third acre average or on soils with high groundwater or slow permeability were assumed to require off-site treatment. This was provided in our initial EIS alternatives either by various conventional or alternative sewers in the "centralized" alternatives, or by cluster systems in the "decentralized" alternatives, such as Alternatives 4, 5, and 6 in this EIS.

Selection of any centralized alternatives over the decentralized still required some proof that existing on-site systems were causing public health or water quality problems. The aerial photography surveys failed to give us this proof. In August of 1978 the decision was made to get this proof through field studies. The field studies, although not perfectly timed, also failed to show justification for sewers and, indeed, brought into question the "need" for any off-site treatment at all. Hence, the Limited Action Alternative, which assumes no need for off-site treatment, was developed.

In all of the communities studied, the discrepancy was great between construction violations and detectable public health and water quality problems. This brings into serious question the validity of construction standards as a means for predicting on-site system failure, particularly when the systems are already in place where their actual conditions and effects can be measured.

What then is the use of construction standards if they do not predict system failure? EPA is not refuting the utility of construction standards for the following purposes:

- Permitting new systems
- Designing system repairs or replacements where the standards can be met on an existing property
- Focusing field studies on those sites with the highest probability of failure
- Predicting future failures when a high proportion of other systems in similar site conditions or with similar nonconforming designs are failing.

EPA does not agree with the use of the current design standards to designate "need" in lieu of actual local performance data that are directly correlated with design factors that the state and local authorities believe to be significant.

MPCA and EPA have worked closely to develop policy on determining wastewater management needs for rural communities. The policy statement, "EPA Region V Guidance, Site Specific Needs Determination and Alternative Planning for Unsewered Areas", is included as Appendix A.

C. 10 I have been a resident on Green Lake for 25 years. When I bought my lot, I spent $950 for fill and filled my lot 4-1/2 feet. I did this because I was not sure my septic tank system would work on the existing lot level. Since then, I have had no problem with my septic tank. The water from my 67-foot well, which was just tested two weeks ago, is pure. I think a lot of problems exist because lots are not filled to the proper level for suitable septic tank usage. [Dahl]

R. 10 Comment noted.

ECONOMIC IMPACTS

C. 11 On page 163 of the Draft EIS, EPA calculated user charges are said to include reserve funding equal to 20% of capital costs. Isn't this high? Is it included in the cost-effectiveness analysis? [Claassen]

R. 11 The reserve fund was calculated as 20% of the local share of capital costs. This was not clearly stated in the Draft EIS. The reserve fund is not included in the cost-effectiveness analysis. If it were included, it would make the centralized alternatives, which are more capital intensive, even less cost-effective compared to the decentralized alternatives.

WATER QUALITY

C. 12 Where is the phosphorus in the upstream portion of the Middle Fork of the Crow River (above Nest Lake) coming from? [W. Johnson]

R. 12 Phosphorus loads upstream of Nest Lake originate from point sources and non-point sources. In the Draft EIS, the combined phosphorus load from these sources was estimated to be 96% of the total phosphorus input to Nest Lake from a variety of sources (see Figure V-1, Draft EIS). In the Final EIS (Figure 4), this nutrient load has been disaggregated into its point source and non-point source constituents: 56% of total phosphorus load (2,351 kg/yr.) to Nest Lake from the Middle Fork of the Crow River and 40% (1,679 kg/yr.) from effluents discharged at the Belgrade and New London sewage treatment plants.

On the basis of available data, it is not possible to disaggregate further the phosphorus contribution (56%) from non-point sources into specific constituents. In view of the fact that the major land use throughout Nest Lake's 122 square-mile drainage area is agricultural, it is safe to assume that the majority of these non-point sources are associated with farming operations.

C. 13 The executive summary of the Draft EIS asserts that none of the alternatives would affect the water quality of Green Lake or Nest Lake. This is incorrect. [Affeldt]

R. 13 The statement should have referred specifically to the trophic status of these lakes, not to the more comprehensive term, "water quality." Upgrading the New London and Belgrade treatment plants or applying this wastewater to the land will reduce organic, bacterial, and nutrient inputs to Nest Lake and, indirectly, to Green Lake. Finding and upgrading the sources of surface or runoff effluent plumes around the lakes will abate localized water quality problems.

C. 14 It should be clearly stated that the tributary nutrient loads to Nest Lake and Green Lake include contributions from municipal wastewater discharges in Spicer, New London, and Belgrade as well as non-point source contributions. [Affeldt]

R. 14 This has been clarified in Figure 4 of this Final EIS.

C. 15 Appendix C-10, referred to on page 53 of the Draft EIS, is missing. [Affeldt]

R. 15 The information in C-10 was presented in Figure V-1 on page 150 and the appendix was eliminated because it would be redundant. However, reference to the appendix was mistakenly not taken out.

C. 16 In the discussion of lake water quality on page 53, was a trend in water quality expected to be seen in the data reported? Available data do not appear adequate to detect a trend. [Affeldt, Tiede]

R. 16 Residents have made statements that the water quality in Green Lake has deteriorated. Available data were presented and analyzed to see if the subjective information, such as residents claims, could be supported by objective data. The conclusion, as stated on page 53, is that there is no definite trend and that the variations seen for the parameter listed are within the range expected from seasonal and annual fluctuations.

It may well be that a more extensive data base would prove or disprove that water quality is changing. To the contrary, we concluded that there is no detectable change.

C. 17 In the Chapter II description of water resources, normalized stream flow data are confused with the 1972-1973 average daily flow derived from measurements reported in the National Eutrophication Survey reports for Green Lake and Nest Lake. [Affeldt]

R. 17 Table II-3 on page 48 and the discussion of tributary flow on page 49 present average flow data for the periods of record of several gauging stations along the Middle Fork of the Crow River. Reference to the 1972-1973 data was unnecessary and confusing at this point.

The sampling period for the NES study was wetter and had higher runoff than average. The EIS uses actual daily flows and nutrient concentrations from the NES report to calculate observed conditions in a wet year, as shown in Table V-1 on page 152 of the Draft. This was done to illustrate the possible range in annual variation due to climatic conditions. This gives the expected improvement (based on average or "normalized" conditions) for various alternatives some perspective, as shown in Table V-1 and the accompanying Figure V-2.

C. 18 The ranking of nutrient sources presented on page 149 was not supported in earlier portions of the Draft and is in conflict with the results of the National Eutrophication Survey. [Affeldt]

R. 18 Some confusion has been caused by equating tributary sources of nutrients with non-point sources. The tributary sources (primarily the Middle Fork of the Crow River as it enters Nest Lake) contain nutrients from both point and non-point sources. Green Lake receives the majority of its nutrient loads from Nest Lake via the outlet

channel of Nest Lake. Because of the complex physical, chemical, and biological processes involved in Nest Lake, the exact breakdown of phosphorus sources in the loading from Nest Lake to Green cannot be determined. As a result, the loading is labeled as "outlet from Nest Lake" instead of "non-point sources" in Figure 4. In order to demonstrate the significance of non-point sources, a composite phosphorus loading to the three lakes as a whole observed in 1972 through 1973 is presented in the ranking as follows:

Nonpoint sources (except immediate drainage) =2,447 kg/yr (44%)

Point sources (New London, Spicer, and Belgrade STPs) =2,274 kg/yr (40%)

Direct precipitation = 514 kg/yr (9%)

Septic Tanks (adjacent to Nest and Green Lakes) = 237 kg/yr (4%)

Immediate drainage = 155 kg/yr (3%)

The ranking for individual lakes can be seen in Figure 4 which shows that the ranking varies among the three lakes.

These figures represent a composite, or total, phosphorus budget for Nest Lake, Green Lake, and Woodcock Lake. Therefore, non-point source loading of these lakes via the Middle Fork of the Crow River is counted only once--for Nest Lake (Woodcock Lake is landlocked). The influx of phosphorus to Green Lake via the outlet of Nest Lake is considered to be an internal loading in the estimates listed above.

C. 19 Mean flows presented in the reports of the National Eutrophication Survey are for a "normalized" or average year, not the period from October 1972 to October 1973. Subsequent references to these streamflows should be corrected. [Affeldt]

R. 19 Figure V-1 of the Draft EIS is our estimate of observed conditions based on 1972 through 1973 NES data. It uses actual flow data for the tributaries, not normalized data.

C. 20 There are apparent errors in Table V-1 listing the phosphorus inputs to Nest Lake and Green Lake. [Affeldt]

R. 20 We have checked the calculations and they are not in error. Please note that the 1972 through 1973 loads are based on observed tributary flow data and the rest are based on normalized flow data.

The differences between our No-Action Alternative and NES estimates of loads for an average year (normalized data) are slight. The difference amounts to 3.6% for Green Lake and 0.2% for Nest Lake. This difference for Green Lake is due to the indirect phosphorus contribution from the Spicer sewage treatment plant, which was not included in our phosphorus budget because the overflow from Woodcock

Lake to Green Lake has not been well documented on a long-term basis. As to Nest Lake, the 0.2% difference is insignificantly small for any concern.

C. 21 It makes little sense to pursue the selection of a wastewater collection and treatment system that will encourage growth beyond existing services and do little to enhance the water quality within Green and Nest Lakes without first developing a management plan to limit non-point source pollution from the Crow River. This issue must be addressed before additional Step 1 studies are commenced. [Kenow]

R. 21 Wastewater management approaches recommended by EPA for the sewered and unsewered communities in the Green Lake Study Area do not induce growth that will overtax existing services. They are considered to be cost-effective solutions to identified wastewater management problems. EPA agrees that the development of a management plan to limit non-point source pollution from the Middle Fork of the Crow River is appropriate. Phosphorus loadings to Nest Lake from the river are recognized in this EIS to be considerable. However, the management of non-point source pollution cannot be funded under provisions of EPA's Construction Grants Program.

CULTURAL RESOURCES

C. 22 An archaeological survey should be conducted by a qualified archaeologist on areas likely to be disturbed by the construction of new wastewater management facilities to determine the existence of prehistoric archaeological sites which are not yet identified. [Fridley, Jervis] Surveys should be conducted during facilities planning, rather than merely prior to construction, so that results can be input to facilities planning. [Massey]

R. 22 Comment noted. As described in Section II.B of the Final EIS, the Applicant will be required to complete an archaeological survey, along with a detailed hydrogeological investigation of potential land application sites and any required community (cluster) treatment sites. This requirement is made in recognition of the Green Lake area's high archaeological value, which has been determined through previous inventories of cultural resources. The archaeological survey requested by the commentor is recommended by EPA only after: 1) it is determined by the Applicant (during additional Step 1 efforts) that land application is preferable to upgrading and/or expanding the New London and Spicer STPs; and/or 2) the need for and location of cluster systems around Green Lake and Nest Lake has been determined by the Applicant during Step 2.

DEVELOPMENT OF ALTERNATIVES

C. 23 I am familiar with a cluster system serving residents on Lake Wawasee, Indiana. This lake is approximately the same size as Green Lake, but must have 10 times the population. Lots are approximately 25 to 50 feet wide. The cluster system is working fine. Individual water wells are not polluted. I just wanted to pass on this information to describe a system that involves less exorbitant costs than a large sewer system around our lake. [Bigler]

R. 23 Comment noted.

C. 24 Alfalfa is a poor crop to use for removal of nutrients in a spray irrigation system. Flood irrigation of reeds, canary grass, or brome-grass would be preferable for nutrient uptake, energy requirements, land required, and avoidance of wastewater aerosols. Costs for the land application facility seem very high as estimated in the EIS. [Machmeier] The design assumptions for land application in EIS Alternatives are not stated [Classen].

R. 24 Many design decisions would have to be made regarding land application systems based upon soils, geohydrologic and other more detailed evaluation of design parameters than was attempted for the EIS. The two land application alternatives were developed to see if land application is feasible in the Study Area and to estimate the cost differential between these application methods and other wastewater treatment techniques. This was accomplished to the level of accuracy intended. Design assumptions are available from EPA in a separate, unpublished contractor's report.

Flood irrigation is a viable land application method where topography permits. While there might be suitable sites within a reasonable distance of Spicer and New London, most of the topography is too rolling; grading costs for flood irrigation may be prohibitive. Again, detailed evaluations should answer concerns such as this.

C. 25 The cluster systems seem to be considerably over-designed. The prices are quite high. [Machmeier]

R. 25 The designs are conservative as a response to the limited amount of site information collected. Site information was collected to develop a conclusion on feasibility of cluster systems. We have concluded they are feasible around most of Green Lake. The actual design of cluster systems should be preceded first by the establishment of need for off-site treatment during the house-to-house site analysis and secondly by geohydraulic analysis of appropriate cluster system sites.

C. 26 It is incorrectly stated on page 43 that the Department of Health regulates on-site sewage disposal systems. [Machmeier]

R. 26 The Kandiyohi County Zoning Administrator's Office issues permits for on-site systems and inspects them during construction.

C. 27 Do EPA calculations of cost-effectiveness for EIS Alternative 6 allow for:

- The willingness of farmers to allow their land to be used at all for cluster drainfields
- The price farmers are likely to ask for such land, if they are willing

- The price of long-term easements which take the land out of production, and

- The length of time farmers may take to negotiate the use of such contracts? [Olson]

R. 27 Calculations of cost-effectiveness for all wastewater management plans evaluated in the EIS were made on the basis of the "Cost-Effectiveness Analysis Guidelines", authorized under Section 212(2) (c) of the Federal Water Pollution Control Act, Public Law 92-500. The prices for land used in this analysis are those prevailing during preparation of this EIS as estimated by locally knowledgeable people. There is no way that the effects of land owner's unwillingness to sell can be predicted or meaningfully quantified.

However, EPA is keenly aware of land owners' fears regarding waste disposal and the taking of property for public purposes. It is for these reasons, as well as others, that this EIS requires a showing by the responsible wastewater management authorities that off-site treatment is necessary before it will be considered eligible for Federal Construction Grants funds.

C. 28 In 1976, the Minnesota Pollution Control Agency (MPCA) limited the amount of phosphorus contained in household laundry and cleaning supplies sold in the state to 0.5%. Lawsuits and a temporary injunction prevented enforcement of the rule until September 1979. Before then, most laundry products sold within Minnesota were no-phosphate due to voluntary compliance. [Affeldt]

R. 28 Comment noted.

C. 29 Incorrect information contained in the Draft EIS, Appendix A regarding soil suitability for cluster systems and land application systems in the Green Lake Study Area could result in poor decisionmaking. [Conner]

R. 29 See Appendix C, Final EIS.

C. 30 The Draft EIS (page 120) assumes that the frequency of septic tank pump-outs should be once every three years. This frequency should be increased which would, in turn, increase costs of the decentralized alternatives. [Claassen]

R. 30 Sanitarians across the nation recommend that septic tanks be pumped out every three to five years. More frequent pumping would be required only for undersized septic tanks. The approach recommended here would replace most undersized septic tanks.

C. 31 On page 165, the Draft EIS reports that EPA grant funding of on-site and cluster systems would be 85% of 95% of their capital costs. Why was the 95% not used? [Claassen]

R. 31 Ninety-five percent was used--it represents that portion of the capital costs associated with on-site and cluster systems that is eligible for 85% Federal funding. EPA funds 85% of the eligible-for-grant money costs (in this case, 95% of the total, based on considerations of need and age of housing) for "alternative" or "innova-tive" systems.

POPULATION AND LAND USE

C. 32 Population and socioeconomic data as presented in the Draft EIS are inaccurate. Seasonal population living on Green Lake should be 75% of the total. [Dykema]

R. 32 Our seasonal population estimate for the portion of the Green Lake shoreline in New London Township is 73%; that for the entire Green Lake shoreline is 80%. These estimates do not appear to be incongruous with the seasonal population estimate offered above. Note that our seasonal population estimate for the Proposed Service Area, of 65%, is influenced by the inclusion of New London and Spicer, both of which are concentrated permanent population centers.

C. 33 EIS claims that 40% of the New London Township residents (along Green Lake) 65 years or older are subsisting at a poverty level, and that 64% of the Study Area population have an annual income of less than $10,000, are erroneous. [Dykema]

R. 33 Commented noted. The EIS poverty figures derive from available data on New London Township as a whole. No effort was made to break these figures down to the shoreline residents only. In order to break these Township figures down to segment level, a field socioeconomic survey would be required.

LAND USE

C. 34 Will the EIS Recommendations have effects upon existing or proposed highways in the Green Lake Study Area? [Emrich]

R. 34 Existing highways and roads, including Minnesota Route 23 and County Roads 4, 10, 30, and 88 will not be severely affected by the EIS Recommendations. Adverse impacts that may occur can be minimized. Routes 30 and 10 would be affected by the provision of cluster system treatment to homes around Green Lake, should it be determined by the Applicant during Step 2 that decentralized off-site treatment is required. These impacts result from the construction of sewers that convey wastewater from individual septic tanks on the lakeside of these two routes to multifamily soil absorption systems in outlying areas beyond the roads. This construction may require excavation of Routes 10, 30, and 98 in several locations for sewer pipe installation. Adverse excavation impacts can be minimized through the construction of multiple house-to-cluster treatment system connections and through boring or tunneling house-to-cluster treatment system connections beneath the roadway to eliminate roadcuts.

IMPLEMENTATION

C. 35 How do publicly-owned on-site wastewater management systems work? [Tiede]

R. 35 See Sections II.B.2.a. and II.B.2.c. of the Final EIS.

C. 36 Administration and management of the EIS Recommendations mean more government intrusion in peoples' personal lives.

R. 36 The issue of privacy was not addressed in the Draft EIS but is certain to be of interest to homeowners and tenants. A discussion of privacy is presented here to stimulate consideration of means to maximize privacy while still meeting the environmental goals of the Recommendations.

The amount of money citizens must pay for wastewater treatment, in whatever form, could be considered one measure of intrusion into peoples' lives. On this basis, the EIS Recommendations are less of intrusion than any alternative except No-Action.

For the resident whose on-site system is causing no problems and meets current design standards, short-term intrusions will include a one or two hour interview and site inspection during the site-specific evaluation and possibly a return visit for well water sampling. Continuing intrusions would include periodic (one to three weeks) site inspections by a surveyor, routine septic tank pumping every two to five years and, for lakeshore dwellings, possible groundwater and surface water monitoring activities along their beaches. Some of these residents may be requested to allow well sampling at the same time as the site inspection. As with other intrusions discussed below, notifying the resident in some way, such as by newspaper notices, citizen's group activities, or mail can minimize the effect of these intrusions.

For certain of the systems needing repair, replacement, or upgrading, continuing intrusions would also be greater than with properly designed and operating systems. On-site pumping units need inspection and maintenance perhaps once or twice per year. If water flows must be metered for hydraulically limited systems, meter readers would enter the premises perhaps once per quarter. However, the effect would in these few cases be no worse than construction of the house sewer and gravity sewer required for a centralized sewerage system. In general, continuing intrusions will be related to the complexity of the facilities necessary to deal with site limitations; the more complex the facilities, the more maintenance would be required.

Intrusions will be greatest for residences required to install holding tanks. Visits by the pump truck can be embarrassing as well as disturbing. This (as well as nuisances and costs) can be minimized by constructing holding tanks with hopper bottoms and riser pipes with quick-lock fittings and by installing flow reduction devices in the home.

RECREATION

C. 37 Current regulations [CFR Part 35.917.1(j)] require that facility planning begun after 30 September 1978 must include an analysis of the recreation/open space potential of the project. [Jervis]

R. 37 The EIS does not represent a facilities plan. The primary objectives of the EIS process are to review and analyze the Applicant's Proposed Action and to develop and evaluate alternative wastewater management approaches in view of the public issues surrounding the GLSSWD project that were discussed in Chapter I (Final EIS). Recreation and open space were not at issue when this EIS was undertaken in October 1977. The importance of future recreation opportunities to the citizens of the Green Lake Study Area became increasingly apparent during preparation of the EIS. Based upon the public interest in maintaining recreation opportunities in the wake of improving wastewater management in this and other EPA study areas throughout Region V, EPA has decided to address the interaction of wastewater facilities planning and potential recreation/open space opportunities in its "Generic EIS for Wastewater Management in Rural Lake Areas." The significance of recreation as an issue in this EIS did not warrant EPA's quantitative assessment of recreation impacts associated with the project. It is noted that the EIS was begun approximately one year pior to the date noted in the comment.

APPENDIX A

Region V Guidance - Site-Specific Needs Determination and Alternative Planning for Unsewered Areas

REGION V GUIDANCE

SITE SPECIFIC NEEDS DETERMINATION AND ALTERNATIVE PLANNING FOR UNSEWERED AREAS

I. Objective

The objective of this guidance is to simplify fulfillment of the requirements regarding the demonstration of need for sewage treatment associated with the application of Program Requirements Memorandum (PRM) 78-9, "Funding of Sewage Collection System Projects," and PRM 79-8, "Small Wastewater Systems." This guidance is written particularly with respect to the needs of small, rural communities and the consideration of individual on-site and small alternative technology. It suggests procedures which may be utilized to reduce the time, effort, and expense necessary to demonstrate facilities needs. It is also intended to provide guidance pertaining to the selection of alternatives for a cost-effectiveness comparison. It is not intended to allow indiscriminate definition of need based upon "broad brush" use of a single criterion.

The procedure recommended herein may not be the optimum procedure for all projects. Compliance with this analysis will be prima facie evidence for the acceptability of the "needs" portion of a proposed plan of study. If another method is proposed for obtaining and documenting the needs justification, it is recommended that the grant applicant discuss the proposed approach with reviewing authorities prior to the submission of the plan of study and the Step 1 grant application.

This guidance is predicated on the premise that planning expenditures should be commensurate with the cost and risk of implementing feasible alternatives for a specific planning area. The guidance further recognizes the complexity of planning alternative technology. It presents procedures for, and rationally limits, the amount of detailed site investigation necessary to determine the suitability of alternative technology for site specific areas within the community, and allows for a degree of risk inherent to limited data gathering.

II. Goal

The goal of this guidance is to enable the community to categorize the residences into three groups. The three groups are those residences experiencing: (a) <u>obvious</u> sewage treatment problems with clearly defined solutions, (b) <u>no problem</u>, and (c) <u>exposure to potential problems</u> representing a planning risk that requires resolution by the acquisition of original data.

III. Criteria for site-specific needs determination

A. Direct evidence that demonstrates obvious need due to malfunctioning systems includes:

1. Failure by surface (breakout) ponding of filter field discharges can be identified through direct observations, mailed questionnaires, and remote imagery (infrared photography).

2. Sewage backup in residences can be identified through response to mailed questionnaires, knowledge of local septage haulers, or knowledge of local health or zoning officials.

3. Detected sewage effluent or tracer dye in surface water, by means of site visit or various site effluent detection systems.

4. Flowing effluent pipe detected by remote infrared photography, site visits, knowledge of local officials, or results of mailed questionnaires.

5. Contamination of water supply wells (groundwater) can be demonstrated by sampling and analyses for whiteners, chlorides, nitrates, fecal coliform bacteria, or other indicators, and a finding of their presence in concentrations which significantly exceed background levels in groundwaters of the area or primary drinking water quality standards. Demonstration of trends toward groundwater pollution due to malfunctioning systems could aid in concluding a problem exists.

B. Indirect evidence that may demonstrate inferred need due to limitations of treatment systems includes:

1. Seasonal or year-round high water table considering possible water table mounding by residential use. Seasonal or annual water table can be determined by taking transit sightings from a known lake level, if the dwelling in question is adjacent to a lake or other surface waters. Elsewhere, Soil Conservation Service maps may indicate depth to groundwater. If these data are unavailable, soil borings may be employed during an on-site investigation described below.

2. Water well isolation distances (depending on depth of well and presence or absence of impermeable soils). Isolation distances may be addressed in part by lot size. In cases where a community water system is installed or is concurrently planned, this criterion will not be considered. Lots, including consolidated lots, which are less than 10,000 square feet in area, will be assumed to have insufficient isolation distances. However, before this criterion may be used as areawide evidence, a correlation with results of limited representative sampling which substantiate water well contamination must be made.

3. Documented groundwater flow from a filter field toward a water supply well can often override seemingly adequate separation distances.

4. Bedrock proximity (within three feet of filter field pipe) can be assessed by utilizing existing SCS soils maps. If reasonable suspicion exists that bedrock will be a site limitation and it cannot be quantified, an on-site investigation may include representative soil borings as appropriate.

5. Slowly permeable soils with greater than 60 minutes/inch percolation rate.

6. Rapidly permeable soil with less than 0.1 minutes/inch percolation rate. Soil permeability will be assessed by evaluting existing SCS soils maps and related use limitations data. Should the data be unavailable, and should other data indicate strong possibility of permeability-related lot limitations, appropriate numbers of soils borings may be made during the on-site investigation.

7. While holding tanks, in certain cases, can be a cost-effective alternative, for purposes of site-specific needs determination, a residence equipped for a holding tank for domestic sewage should be considered as indirect evidence of need for sewage treatment facilities. Location of holding tanks will be identified through records of local permitting officials, septage haulers, and results of mailed questionnaires.

8. On-site treatment systems which do not conform to accepted practices or current sanitary codes may be documented by owners, installers, or local permitting officials. This category would include cesspools, inadequately sized system components (the proverbial "55 gallon drum" septic tank), and systems which feature direct discharge of septic tank effluent to surface water.

9. On-site systems: (a) incorporating components, (b) installed on individual lots, or (c) of an age, that local data indicate are characterized by excessive defect and failure rates, or non-cost-effective maintenance requirements.

IV. Needs determination for unsewered communities

For projects in which the scope of work is difficult to assess during the Step 1 application, it is recommended that Step 1 be divided into 2 phases to more effectively allow estimation of the planning scope and associated costs. Phase I will consist of a review of existing or easily obtainable data. Phase II will consist of on-site investigation and representative sampling necessary to confirm assumptions based on indirect evidence identified in Phase I. Alternatives development for those lots determined to have need may be completed and incorporated

into the facilities plan. Both phases should be addressed in the plan of study and grant application. This is discussed in greater detail below.

A. Phase I

The review of existing or easily obtainable data may include the following as appropriate:

1. A mailed questionnaire regarding each resident's knowledge of on-site system and its performance

2. Review of soils maps

3. Review of local permit records

4. Lot evaluations to estimate depth to water table (lakeshore areas)

5. Calculation of lot sizes

6. Remote photographic imagery (e.g., infrared)

7. Leachate detection sensing of ground or surface water in the area.

This preliminary data will be used to categorize each lot within the planning area into one of three groups:

1. Obvious-problem
2. No-problem
3. Inconlusive.

The "obvious-problem" group consists of those lots where at least one criterion of direct evidence of a need (specified on page 2 of this guidance) is satisfied or where, by summarizing indirect evidence validated with limited sampling, there exists a high potential that a problem does exist. (See Phase II Work, On-Site Investigation, as outlined below.)

The "no-problem" group consists of those lots where there is evidence that the present system is adequate and functioning properly and likely to continue to do so with proper cost-effective operation and maintenance, based upon the review of available information.

The "inconclusive" group consists of the remaining lots where available information does not substantiate their placement into either the "obvious-problem" or "no-problem" category.

The next step is to attempt to recategorize the "inconclusive" group into either group (a) or (b) by making reasonable assumptions based

upon the inferred evidence criteria noted in Section III.B. The on-site investigation would also be the source of information on those lots where information was not previously available.

For example, on-site systems located on lots with apparent continuous high groundwater and very tight soils could be placed in the "obvious-problem" category, even though there is no direct evidence of failure. The on-site investigation, however, should validate the assumption by representative sampling to confirm that indeed there is high groundwater and tight soils in this area and obtain further information that this is causing a problem with on-site systems.

In addition, it may be necessary to gather field data on a minimum number of lots where the evidence is not available to substantiate the placement of these lots into either the "no-problem" or "obvious-problem" group.

Indirect evidence, which is based primarily on construction standards, generally identifies lots which probably do not have adequate on-site systems. This probability is verified by a small amount of on-site investigation as explained in Phase II. Indirect evidence does not identify lots which have no site limitations but which in fact do not have an adequate operating system. The use of indirect evidence, alone, may result in the erroneous conclusion that the on-site system is adequately operating. This situation is especially prevalent in areas with high percolation rates, where system failure is not evident to the observer. Thus, a sampling program should consider, to some extent, lots that exhibit no indirect evidence of need.

B. Mid-Course Review

At the end of Phase I, the results of the Phase I effort should be presented for review and concurrence before proceeding to Phase II. The Mid-Course Meeting facilities plan review is an appropriate time for the presentation and discussion of the Phase I results. Phase II will consist of on-site investigation and sampling, alternative development for specific need areas and completion of the facilities plan.

The following should be considered at the Mid-Course Meeting:

1. It may become apparent during Phase I that on-site alternative technology systems will not approach the cost-effective solution for the substantially defined obvious used area. In this case, a preliminary cost estimate for conventional collection and treatment should be compared to that for the innovative/alternative treatment solution. If cost estimates and technical analysis indicate that the use of alternative technology is not cost-effective, the analysis may be terminated and a cost-effective collection and treatment solution developed without proceeding into the on-site investigation of Phase II. This would also apply in areas where a substantial obvious need has been

justified, where a high concentration of dwellings occur in a municipality, and where on-site systems would not be a viable solution because of site limitations. Any such exclusion of on-site treatment should be clearly quantified and supported by documentation in accordance with PRM 78-0 and PRM 79-8.

2. The number of lots to be investigated during the on-site evaluation should be reasonably estimated. If the original estimation of on-site work included in the Step 1 Grant Agreement is found to be in error at the end of the preliminary evaluation (Phase I), a request to amend the grant amount, if necessary, may be submitted and a grant amendment expeditiously processed provided there is concurrence at the Mid-Course Meeting.

3. The manner of presenting this data in the Facilities Plan is discretionary, although it should be clearly apparent to anyone reading the Facilities Plan upon what basis a given residence was determined to have or not have a need for wastewater treatment. Should need be demonstrated for a given residence, sufficient information should be acquired to determine potential treatment alternatives. (For example, if a residence is determined to need treatment facilities on the basis of an illegal discharge of septic tank effluent, additional information will be required to determine if any limitations to on-site treatment exist.)

C. Phase II work

Indirect evidence requires reasonable verification in order that a lot be placed into the "obvious-need" category. This is accomplished by identifying combinations of indirect evidence criteria that indicate an increased risk or potential of a problem, and representative sampling. Sampling results supporting a significantly increased risk justify placement of a lot into the "obvious-need" category.

For example, an on-site system located on a lot with marginal soils (i.e., a percolation rate of about 60 minutes/inch) would be considered a low risk situation. If, however, this same lot has adjacent lots with direct evidence of malfunctioning systems and has a short-duration of seasonal high groundwater, for example, the combining of low risk factors elevates the net risk to a high risk situation. After representative sampling of these parameters during the on-site investigation to confirm these assumptions, placement of all similar lots into the "obvious-need" category can be made.

Representative Sampling Method

The planning of representative sampling should address the following considerations on the basis of Phase I results:

1. Delineate areas that exhibit indirect evidence and/or inconclusive need.

2. Delineate areas, if possible, that exhibit one or more common limiting physical parameters that may be associated with a type of indirect evidence of need.

3. Sample to confirm the assumed physical constraint for on-site sewage treatment or the indirect evidence of need and correlate with actual occurrence of wastewater treatment deficiencies. The number of lots, public areas, or rights of way adjacent to private lots exhibiting inconclusive or indirect evidence of need that are to be further analyzed normally should not exceed 30% but should be at least 15% of the total lots within a discrete area assumed as exhibiting an inconclusive need or indirect evidence of need. Measurable constraints to sewage treatment may be: high groundwater and its depth, predicted duration and recurrence interval, groundwater flow direction and velocity, depth to bedrock, highly permeable or impermeable soils that do not allow for treatment, and the physical condition of existing on-site systems. Sampling may be random or stratified according to the requriements of the analytical design selected as appropriate to test the strength of an assumption. In any event, decisions about what is to be sampled, the sampling design, and the size of the sample should meet the test of cost-effectiveness.

4. Water quality parameters that can be evaluted and utilized as pollution indicators include, but are not limited to: chlorides, nitrates, phosphate, fecal coliform, surfactants, whiteners, and other synthetic organics inherent to domestic wastewater.

5. The analysis should be completed and study areas classified as exhibiting direct evidence of pollution problems, indirect evidence of pollution problems, the combination of direct and indirect evidence, and no need. If, after the Phase II analysis is completed, discrete areas of the Plan of Study Area (POSA) remain inconclusive as to evidence of need, no need may be construed for those areas.

V. Planning for treatment alternatives

Based upon data assembled during Phase I and Phase II, residence should be categorized as follows:

A. Residences having adequate treatment facilities (no-problem).

If a conveyance system determined to be cost-effective to transport wastewater passes a lot that has no need for sewage treatment, there will be no limitations on hookups to the sewer. However, a sewer will not be funded by EPA if the sewer is purposely routed to areas exhibiting no need.

B. Residences not having adequate treatment facilities.

1. Capable of on-site upgrading of septic tank and filter field (standard system).

2. Capable of on-site upgrading with non-standard on-site treatment.

3. Not capable of on-site upgrading (treatment must be off-site).

Preliminary alternatives to be compared for cost-effectiveness should include a combination of selective no-action, on-site upgrading, and off-site treatment alternatives. For each discrete area, the generally determined generic alternative should reflect the specific need defined by the common physical limitation of the discrete area.

Standard system ypgrading is defined as expansion of an existing filter field, construction of a filter field, repair or replacement of defective components or construction of an entire on-site system in compliance with approved specifications. This alternative is viable where lot limitations such as small size or slow percolation would not preclude it.

Non-standard on-site system upgrading may include a mounded filter field, alternating beds, pressure distribution systems, aerobic systems, sand filters, and other alternatives permissible under the State and local code. These should be considered where lot size and water well isolation distances are adequate, and where other limitations such as high groundwater and slow percolation preclude standard systems. Off-site treatment such as cluster systems should also be considered in such cases, and possibly graywater/blackwater separation.

Septic tank replacement should be considered only as necessary. For purposes of cost-effectiveness calculations, the number of septic tanks requiring replacement should be estimated on the basis of permits issued and knowledge of local septic tank pumpers and installers regarding the type, life, age, and condition of existing installations. Information on the size and condition of the current treatment systems, gathered during home-to-home interview surveys, sampling, and inspections, should also be used. For those systems for which information pertaining to septic tank conditions cannot be obtained, cost-effectiveness calculations should should assume 100% replacement.

When a system is found to be malfunctioning on the basis of direct evidence, information pertaining to lot limitations must also be obtained. This information should be sufficient to allow for alternatives planning, and should include all relevant parameters listed under Item III.B of this memorandum.

Limitations on Planning

Estimation of the cost-effectiveness of on-site treatment in general, and of particular types of on-site treatment, should be based on information acquired during Phase I and Phase II, including any representative

sampling. Only the limited amount of on-site investigation, normally less than 30% of the total lots that exhibit inconclusive need and/or indirect evidence of need, should be conducted in the Phase II portion of the Step 1 grant.

When generic on-site solutions are generally determined for discrete areas, it is contemplated that it will normally be cost-effective to specify construction requirements through the use of generic component designs; plans; performance, quality, and workmanship specifications; and unit price/estimated quantity procurement.

Field work necessary to select the design of individual drainfields including on-site soil borings, percolation tests, surveying, work to specifically identify present septic tank and soil absorption field location and inspection is generally to be viewed as Step 3 work. For practical purposes, site specific design and construction should normally proceed in tandem on a lot-by-lot and area-by-area basis. The establishment of a management district's authority must be completed before a Step 2 or 2+3 award. The development of a management district's program must be completed before a Step 3 grant award or before authorization to proceed with construction procurement is granted under a Step 2+3 grant.

VI. Public participation

The following comments are intended to demonstrate how this guidance relates to the standard requirements for public participation. It is not all inclusive.

A. A useful "mailing list" may include all owners of residences within unsewered areas in the planning area and other interested and affected parties.

   The requirement for consulting with the public set forth in 40 CFR 35.917-5(b)(5) will be considered satisfied if questionnaires are submitted by individuals on the "mailing list."

B. The public meeting required by 40 CFR 35.917-5(b)(6) provides an opportunity for property owners to be informed of whether or not they have been found to need wastewater treatment facilities. During the meeting they can respond to the consultant's determination of their need status. A map with each lot designated as no-need, obvious-problem, or inconclusive would be helpful for public understanding. This meeting could be conveniently scheduled at the end of Phase I.

C. The final public hearing required by 40 CFR 35.917-5 should be scheduled at the end of facilities planning.

APPENDIX B

Costs

EXISTING ON-SITE SYSTEMS
SITE ANALYSIS COSTS

Description of Work to Be Done

The first step in adopting alternatives recommending on-site systems will be a site analysis of existing wastewater disposal units and wells in the Study Area. This site analysis will consist of a sanitary survey, sampling and metering of wells, soil sampling, inspection and excavation of on-site systems, and shallow groundwater sampling near lake shores.

A survey team will conduct a sanitary survey of each home, resort, and business in the Study Area. The team will ask residents to complete a questionnaire regarding their wastewater systems and wells, will inspect wastewater system sites and wells, and will take samples of well water from all homes or businesses surveyed. The well samples will be analyzed for fecal coliform bacteria and for nitrates, and the results of the survey will be used to plan work to be done for the remainder of the site analysis.

When the survey has been completed, septic tanks reported or likely to be undersized will be inspected. The inspection team will locate tanks to be inspected, will uncover and pump them, and will inspect them for construction, size, leaks, condition, and types of sanitary tees and baffles. The team will also rod influent lines (noting roots, other obstructions, and collapsed pipe) and effluent lines (noting these items plus distances to headers, distribution boxes, bends, and obstructions).

Next, soil samples will be taken for lots with: (a) past or present sewage system malfunctions not explained by the sanitary survey or septic tank inspections, (b) substandard soil disposal units, and (c) soil disposal units for which there are no records. The samples will be examined to determine soil texture and color, depth to the seasonal high groundwater level, and water table depths at suspected areas of soil disposal units and at alternative disposal sites on or near the lots. The soil sampling team also will probe the suspected part of the soil disposal unit for depth, size, and type.

After soil samples have been taken, a sanitarian will inspect subsurface disposal units of those on-site systems having recurrent backups or past surface malfunctions not explained in prior steps. Where appropriate, the sanitarian with the assistance of laborers will hand-excavate effluent lines, hand-excavate test pits (to examine size, depth, and type of soil disposal unit), and evaluate soil hydraulics (soil crusting, decomposition and silting in of aggregate, soil distribution) as reasons for on-site system failures.

Then well water meters will be installed to monitor flows to those on-site systems with limited hydraulic capacity as determined by the sanitary survey, soil sampling, and excavation of the soil disposal unit.

Finally, the impact of wastewater disposal on lake water will be investigated by examining shoreline groundwater. The direction of groundwater

flow along lake shores will be determined at ½-mile intervals four times over a one-year period. Also, emergent plumes from on-site systems will be detected by scanning the lake shore with a septic leachate detector; sites having plumes will be further analyzed using a shoreline transect and five samples per plume (to be analyzed for bacteria and nutrient levels).

The results of the site analyses described above will be used to identify specific measures than can be taken to correct malfunctioning on-site systems and polluted wells in the Study Area.

Assumptions

Numbers + types of systems + problems	972 equivalent dwelling units (EDUs) (30% permanent, 70% seasonal)* 96% ST/SASs, 3% outhouses, 1% holding tanks (HTs) 50% possibly having undersized septic tanks 60% requiring soil sampling 10% periodically backing up or ponding.
Step 1 - sanitary survey and well sampling	100% (972 EDUs) ÷ (4/person/day) = 243 person-days Sanitarian 22 days Sr. Engineer 22 days Soil Scientist 12 days Jr. Engineer 22 days Surveyors 153 days W. Q. Scientist 12 days 243 days Well sample tests - $15/sample x 972
Step 2 - septic tank inspection	50% (972 EDUs) ÷ (6/person/day) = 81 person days Jr. Engineer 81 days 3-man crew - $450/day x 81 days waste disposal - $10/tank x 486
Step 3 - soil sampling	60% (972 EDUs) ÷ (4/2 persons/day) = 292 person-days Soil Scientist 151 days Surveyor 141 days 292 days
Step 4 - soil disposal unit inspection	10% (972 EDUs) ÷ 3/supervisor/day = 32 person-days 10% (972 EDUs) ÷ 1/2 person/day = 195 person-days 227 person-days Sanitarian 32 days Laborers 195 days 227 days
Step 5 - well water meters	10% (972 EDUs) x 6 inspections ÷ 24/person/day = 25 Surveyor 25 days

*3 persons/permanent EDU, 6 persons/seasonal EDU.

Step 6 - shallow groundwater sampling	16 miles ÷ 4 miles/day x 2 persons =	8 person-days
	40 plumes ÷ 2 plumes/day x 2 persons =	40 person-days
		48 person-days

Sanitarian	12 days
W. Q. Scientist	24 days
Surveyor	12 days
	48 days

Nutrient analyses - $45/series x 5/plume x 40 plumes

Step 7 - shoreline hydrology surveys	2 days/survey x 2 persons x 2 surveys =	8 person-days
	Sanitarian	4 days
	W. Q. Scientist	1 day
	Surveyor	3 days
		8 days

Step 8 - supervision, documentation, clerical	Steps 1-7 - 30 + 30 + 75 + 32 + 15 + 12 + 4 ≈	200 days
	Sanitarian	200 days
	Sr. Engineer	25% (200) + 15 = 65 days
	Secretary	200 days

Labor Summary

	Days Per Step								
	1	2	3	4	5	6	7	8	Total
Sanitarian	18			32		12	4	134	200
Sr. Engineer	18							43	61
Jr. Engineer	18	81							99
Soil Scientist	10		151						161
W. Q. Scientist	17					24	1		42
Surveyors	162		141		25	12	3		343
Laborers				195				200	195
Secretary									200
Total:	243	81	292	227	25	48	8	377	1,301

GLSSWD* Costs

Salaries	Sanitarian @ $25,000/year x 200 days	$19,230
	Surveyors @ $11,000/year x 343 days	14,510
	Laborers @ $12,000/year x 195 days	9,000
	Secretary @ $12,000/year x 200 days	9,230
	Subtotal:	$51,970
	20% fringe benefits	10,394
	Subtotal:	$62,364
Rent	Office @ $300/month x 10 months	$ 3,000
Service Contracts	Well sample analyses - $15/sample x 972	$14,580
	Septic tank inspection - $450/day x 81	36,450
	- $10/tank x 486	4,860
	Well water meters - $175/meter x 97	16,975
	Groundwater samples - $45 x 5 x 40	9,000
		$81,865

*Green Lake Sanitary Sewer and Water District

GLSSWD Costs (continued)

Equipment and sampling	Septic leachate detector - $15/day x 80 (rental)	$ 1,200
	Groundwater flow meter (rental)	350
	Field sampling equipment	1,500
	Paper, supplies	1,500
	Cameras and film for documentation	2,000
	2 vans @ ($350/mo + $120 gas-oil/mo) x 10	9,400
		$ 15,950
Summary	Salaries	$ 62,364
	Rent	3,000
	Contracts	81,865
	Equipment and supplies	15,950
		$163,179

Consultant Costs

Direct Labor	Sr. Engineer @ $35,000/year x 61 days	$ 8,210
	Jr. Engineer @ $20,000/year x 99 days	7,615
	Soil Scientist @ $25,000/year x 161 days	15,480
	W. Q. Scientist @ $25,000/year x 42 days	4,040
		$ 35,345
Other Direct Costs	Report reproduction	$ 150
	Communication	800
	Graphics, report preparation	1,500
		$ 2,450
Travel	House rental for office, sleeping - 10 mos	$ 5,000
	Other per diem @ $20/day x 363 days	7,260
	50 Rt x 200 miles x $0.20/mile	2,000
		$ 14,260
Summary	Direct labor x 3.0	$106,035
	Other direct costs x 1.2	2,940
	Travel x 1.2	17,112
		$126,087

Total Costs

GLSSWD Costs	$163,179
Consultant Costs	126,087
TOTAL:	$289,266

EIS Alternatives 4, 5, 6

Present Worths, User Charges

Assumptions

Centralized Treatment

New London, Spicer, Segments 1, 2, 9, 10, 11
EDU's - 675 (year 1980), 1,254 (year 2000)

Decentralized Treatment

All remaining segments
EDU's - 827 (year 1980), 855 (year 2000) 25% of EDU's to cluster systems 50% of remaining EDU's needing new ST/SAS's.

Capital Costs

Centralized treatment - Draft EIS costs used except that $26,100 has been added to Appendix H figures to bring them into agreement with Table IV-2.

Decentralized treatment -

- $100/ST access pipe
- $1,262/ST/SAS
- $4,371/ST/cluster system (includes $968 hookup)

O&M Costs

Centralized treatment - Draft EIS costs used except that the Appendix H collection O&M costs for Alternatives 4 and 5 have been reduced to bring them into agreement with Beard's original figures.

Decentralized treatment -

- $60/ST pumping (70% once/5 yr., 30% once/3 yr.)
- $55/yr./residence for cluster system DF's
- $15/well sample (1/5 yr./well, 2/yr./cluster well)
- $45/groundwater sample (20 tests, 3 samples/test)
- Sanitarian @ $25,000/yr. to provide engineering, administrative, planning - 160 days/yr.
- Surveyors @ $12,000/yr. to sample wells and lake shore groundwater - 72 days/yr.
- Secretary @ $12,000/yr. - 80 days/yr. (half-time)
- 20% fringe benefits for sanitarian, surveyors, secretaries
- Soil Scientist @ $325/day - 1 day/yr. (½ day/permit)
- Rentals - see cost pages

Salvage Values

Centralized treatment - Draft EIS costs used except that Appendix H figures have been changed by addition of salvage for force main, gravity tees and hookups, and by subtraction of salvage for engineering and contengency.

	Decentralized treatment - 50 year useful life for ST's 20 years for drainfields $2,122/EDU for cluster systems (includes hookup)
Present Worth	6-5/8, 20 years
User Charges	Federal funding - 75% conventional, 85% alternative State funding - 15% conventional, 9% alternative Debt Retirement - 6-7/8%, 30 years, 1980 capital Debt Reserve - 20% debt retirement Eligibility for funding - 0%, hookups; 80% centralized collection and treatment; 95% on-site and cluster systems

Alternative 4

Present Worth, User Charges

($ x 1,000)

Alternative Costs	Capital Costs	O&M Costs	Salvage Value
Centralized Treatment			
Existing EUS's:			
Collection & Conveyance Sewer	856.8	10.6/yr.	388.4
Rapid Infiltration Treatment	1,190.0	37.5/yr.	717.3
Subtotal	2,046.8		
25% Engineering & Contingency	511.7	-0-	-0-
Other Capital Costs	26.1	-0-	-0-
Total 1980	2,584.6	48.1/yr.	1,105.7
Future EDU's:			
Connections - 579	36.2*/yr.	-0-	463.2
Total 1980-2000	36.2/yr	-0-	463.2
Decentralized Treatment			
Existing EDU's:			
Replace 310 ST/SAS's	391.2	4.46/yr.	49.3
Connect 207 EDU's to Clusters	904.8	14.37/yr.	439.3
Retain 310 ST/SAS's (+ access pipes)	31.0	4.46/yr.	18.6
Subtotal	1,327.0	23.29/yr.	507.2
Future EDU's:			
Add 28 ST/SAS's	1.77/yr.	0.02/yr./yr.	5.9
Subtotal	1.77/yr.	0.02/yr./yr.	5.9

* Including 25% engineering and contingency.

($ x 1,000)

	Capital Costs	O&M Costs	Salvage Value
Salaries:			
Sanitarian @ $25,000/yr. x 160 days	-0-	15.39/yr.	-0-
Surveyors @ $12,000/yr. x 72 days	-0-	3.32/yr.	-0-
Secretary @ $12,000/yr. x 80 days	-0-	3.69/yr.	-0-
Subtotal		22.40/yr.	
20% fringe benefits	-0-	4.48/yr.	-0-
Subtotal	-0-	26.88/yr.	-0-
Retainer:			
Soil scientist @ $325/day x 1	-0-	0.33/yr.	-0-
Water Sample Analyses:			
Wells @ $15/sample x 174/year	-0-	2.60/yr.	-0-
Wells @ $15/sample x 0.3/yr./yr.	-0-	0.004/yr./yrs.	-0-
Shallow groundwater @ $45 x 20 x 3	-0-	2.70/yr.	-0-
Subtotal	-0-	5.30/yr.	-0-
		0.004/yr./yr.	
Rentals:			
Contribution to office rental	-0-	2.10/yr.	-0-
Office supplies, telephone, etc.	-0-	1.20/yr.	-0-
Van lease, gas and oil	-0-	3.60/yr.	-0-
Small motorboat - 3 weeks/yr.	-0-	0.30/yr.	-0-
subtotal	-0-	7.20/yr.	-0-
Engineering, Legal, Contingencies:			
Site Analysis	289.3	-0-	-0-
Cluster system design	45.0	-0-	-0-
Legal, etc. (9% construction cost)	119.4	-0-	-0-
Subtotal	453.7	-0-	-0-
Decentralized Treatment			
Total 1980	1780.7	63.0/yr.	507.2
Total 1980-2000	1.77/yr.	0.02/yr./yr.	5.9
Total Alternative Costs			
Total 1980	4365.3	111.1/yr.	1612.9
Total 1980-2000	38.0/yr.	0.02/yr.	469.1

Present Worths

($ x 1,000)

Centralized treatment P.W. = 2,584.6 + 10.9909 (48.1 + 36.2)
- 0.2772 (1105.7 + 463.2)
= 3,076.2

Decentalized treatment P.W. = 1,780.7 + 10.9909 (63.0 + 1.77)
+ 81.155 (0.024)
- 0.2772 (507.2 + 5.9)
= 2,350.4

Total P.W. = 3,076.2 + 2,350.4 = 5,426.6

Local Share

	($ x 1,000)
Centralized treatment:	
Hookups - 100% (1.25 x 140.4)	175.5
Collection Sewer - 20% (1.25) (856.8 - 140.4 - 337.0)	94.8
10% (80%) (1.25) (856.8 - 140.4 - 337.0)	37.9
Conveyance Sewer - 10% (1.25) (337.0)	42.1
Treatment - 10% (1.25) (1,190.0 - 716.0)	59.2
6% (1.25) (716.0)*	53.7
Other - 20% (26.1)	5.2
10% (80%) (26.1)	2.1
Total 1980	470.5
Decentralized treatment:	
All items - 5% (1,780.7)	89.0
- 6% (95%) (1,780.7)	101.5
Total 1980	190.5
Total Alternative: Total 1980	661.0

User Charges

Centralized Treatment U.C. = [0.07958 (1.2) ($470,500) + $48,100] ÷ 675
≅ $140/yr./residence (1980)

Decentralized Treatment U.C. = [0.07958 (1.2) ($190,500) + $63,000] ÷ 827
≅ $100/yr./residence (1980)

Total Alternative U.C. = [0.07958 (1.2) ($661,000) + $111,100] ÷ 1,502
≅ $120/yr./residence (1980)

Alternative 5

Present Worth Analysis

Alternative Costs ($ x 1,000)

Centralized Treatment	Capital Costs	O&M Costs	Salvage Value
Existing EDU's :			
Collection and Conveyance Sewer	856.8	10.6/yr.	388.4
Spray Irrigation Treatment	1,402.0	42.9/yr.	711.3
Subtotal	2,258.8		
25% Engineering & Contingency	564.7	-0-	-0-
Other Capital Costs	26.1	-0-	-0-
Total 1980	2,849.6	53.5/yr.	1,099.7
Future EDU's:			
Connections - 579	36.2/yr.	-0-	463.2
Total 1980-2000	36.2/yr.	-0-	463.2

* Pre-treatment, storage, treatment.

($ x 1,000)

		Capital Costs	O&M Costs	Salvage Value
Decentralized Treatment*				
	Total 1980	1,780.7	63.0/yr.	507.2
	Total 1980-2000	1.77/yr.	0.02/yr.	5.9
Total Alternative				
	Total 1980	4,630.3	116.5/yr.	1,606.9
	Total 1980-2000	38.0/yr.	0.02/yr./yr.	469.1

Present Worths

($ x 1,000)

Centralized Treatment P.W. = 2,849.6 + 10.9909 (53.5 + 36.2)
- 0.2772 (1,099.7 + 463.2)
= 3,402.5

Decentralized Treatment P.W. = 2,350.4 (Same as Alternative 4)

Total P.W. = 3,402.5 + 2,350.4 = 5,752.9

Local Share

Centralized Treatment:	
Hookups - 100% (1.25) (140.4)	175.5
Collection Sewer - 20% (1.25) (856.8 - 140.4 - 337.0)	94.8
- 10% (80%) (1.25) (337.0)	37.9
Conveyance Sewer - 10% 10% (1.25) (337.0)	42.1
Treatment - 10% (1.25) (1,402.0 - 893.0)	63.6
- 6% (1.25) (893.0)	67.0
Other - 20% (26.1)	5.2
10% (80%) (26.1)	2.1
Total 1980	488.2
Decentralized Treatment (Alternative 4):	
Total 1980	190.5
Total Alternative: Total 1980	678.7

User Charges

Centralized Treatment U.C. = [0.07958 (1.2) ($488,200) + $53,500] ÷675
≅ $120/yr./residence (1980)

* Same as for Alternative 4.

Alternative 6

Present Worth Analysis

Alternative Costs		($ x 1,000) Capital Costs	O&M Costs	Salvage Value
Centralized Treatment				
Existing EDU's:				
Collection and Conveyance Sewer		495.2	6.02/yr.	283.4
Upgrade of Existing STP's		652.0	78.50/yr.	196.0
	Subtotal	1,147.2		
25% Engineering and Contingency		286.8	-0-	-0-
Other Capital Costs		26.1	-0-	-0-
	Total 1980	1,460.1	84.52/yr.	479.4
Future EDU's:				
Connections - 579		36.2/yr.	-0-	463.2
	Total 1980-2000	36.2/yr.	-0-	463.2
Decentralized Treatment*				
	Total 1980	1,780.7	63.0/yr.	507.2
	Total 1980-2000	1.77/yr.	0.02/yrs.	5.9
Total Alternative				
	Total 1980	3,240.8	147.52/yr.	986.6
	Total 1980-2000	38.0	0.02/yr.	469.1

Present Worths

($ x 1,000)

Centralized Treatment P.W. = 1,460.1 + 10.9909 (84.52 + 36.2)
- 0.2772 (479.4 + 463.2)
= 2,525.6

Decentralized Treatment P.W. = 2,350.4 (Same as Alternative 4)

Total P.W. = 2,525.6 + 2,350.4 = 4,876.0

Local Share

Centralized Treatment:	($ x 1,000)
Hookups - 100% (1.25) (140.4)	175.5
Collection Sewer - 20% (1.25) (495.2 - 140.4 - 36.0)	79.7
- 10% (80%) (1.25) (495.2 - 140.4 - 36.0)	31.9
Conveyance Sewer - 10% (1.25) (36.0)	4.5
Treatment - 10% (1.25) (652.0)	81.5
Other - 20% (26.1)	5.2
- 10% (80%) (26.1)	2.1
Total 1980	380.4

* Same as for Alternative 4.

Decentralized Treatment (Alternative 4):		
	Total 1980	190.5
Total Alternative	Total 1980	570.9

User Charges

Centralized Treatment U.C. = [0.07958 (1.2) ($380,400) + $84,520] ÷ 675
≅ $180/yr./residence (1980)

Decentralized Treatment U.C. ≅ $100/yr/residence (Alternative 4)

Total Alternative U.C. = [0.07958 (1.2) ($570,900) + $147,520] ÷ 1,502
≅ $130/yr./residence (1980)

Limited Action Alternative

Present Worths, User Charges

Assumptions

Centralized Treatment	New London, Spicer EDU's - 530 (year 1980), 977 (year 2000)
Decentralized Treatment	Numbered segments EDU's - 972 (year 1980), 1,112 (year 2000) 50% (972) needing new ST/SAS's
Capital Costs	Centralized Treatment - Draft EIS STP Costs, $26,100 added to recreate Table IV-2 capital Decentralized Treatment - $1,262/ST/SAS, $100/ST access pipe
O&M Costs	Centralized Treatment - Draft EIS STP Costs Decentralized Treatment - $60/ST pumping (70% once/5 years, 30% once/3 years) 15/well sample (1/well/5 years) 45/groundwater sample (20 tests, 3 samples/test) Sanitarian @ $25,000/yr. - 200 days Surveyors @ $12,000/yr. - 100 days Secretary @ $12,000/yr. - 100 days 20% fringe benefits for sanitarian, surveyors, secretaries Soil Scientist @ $325/day - 4 days (½ day/permit) Rentals - see cost calculations
Salvage Values	Centralized Treatment - Draft EIS STP costs Decentalized Treatment - 50 yr. life for ST's
Present Worth	6-5/8%, 20 years
User Charges	Eligibility - STP's, 80%; ST/SAS's, 95% Federal funding - STP's 75%; ST/SAS's 85% State funding - STP's, 15%; ST/SAS's, 9% Debt retirement - 6-7/8%, 30 years, 1980 capital Debt reserve - 20% of debt retirement

Alternative Costs

($ x 1,000)

	Capital Costs	O&M Costs	Salvage Value
Centralized Treatment			
Existing EDU's:			
Upgrade of STP's	553.0	62.6/yr.	166.0
25% Engineering and Contingencies	138.2	-0-	-0-
Other Capital Costs	26.1	-0-	-0-
Total 1980	717.3	62.6/yr.	166.0

($ x 1,000)

	Capital Costs	O&M Costs	Salvage Value
Future EDU's:			
Connections - 467	29.2/yr.	-0-	373.6
Total 1980-2000	29.2/yr.	-0-	373.6
Decentralized Treatment			
Existing EDU's:			
Replace 486 ST/SAS's	613.3	7.00/yr.	77.3
Retain 486 ST/SAS's (+ access's)	48.6	7.00/yr.	29.2
Subtotal	661.9	14.0/yr.	106.5
Future EDU's:			
Add 140 ST/SAS	8.83/yr.	0.10/yr./yr.	29.7
Salaries:			
Sanitarian - $25,000/yr. - 200 days	-0-	19.23/yr.	-0-
Surveyors - $12,000/yr. - 100/days	-0-	4.62/yr.	-0-
Secretary - $12,000/yr. - 100 days	-0-	4.62/yr.	-0-
Subtotal		28.47/yr.	
20% fringe benefits	-0-	5.69/yr.	-0-
Subtotal	-0-	34.16/yr.	-0-
Retainer:			
Soil Scientist - $325/day - 4 days	-0-	1.3/yr.	-0-
Water Sample Analyses:			
Wells - $15/sample - 194/yr.	-0-	2.91/yr.	-0-
Wells - $15/sample - 7/yr./yr.	-0-	0.10/yr./yr.	-0-
Shallow groundwater - $45 x 20 x 3	-0-	2.70/yr.	-0-
Subtotal	-0-	5.61/yr.	-0-
		0.10/yr./yr.	
Rentals:			
Contribution to office rental	-0-	2.70/yr.	-0-
Office supplies, telephone, etc.	-0-	1.40/yr.	-0-
Van lease, gas and oil	-0-	4.21/yr.	-0-
Small motorboat - 3 weeks/yr.	-0-	0.30/yr.	-0-
Subtotal	-0-	8.61/yr.	-0-
Engineering, Legal Contingencies:			
Site Analysis	289.3	-0-	-0-
Legal, etc. (9% construction cost)	59.6	-0-	-0-
Subtotal	348.9	-0-	-0-
Total 1980	1,010.8	63.68/yr.	106.5
Total 1980-2000	8.83/yr.	0.20/yr./yr.	29.7
Total Alternative Costs			
Total 1980	1,728.1	126.3/yr.	272.5
Total 1980-2000	38.0/yr.	0.20/yr./yr.	403.3

Present Worths

($ x 1,000)

Centralized Treatment P.W. = 717.3 + 10.9909 (62.6 + 29.2)
- 0.2772 (166.0 + 373.6)
= 1,576.7

Decentralized Treatment P.W. = 1,010.8 + 10.9909 (63.68 + 8.83)
+ 81.155 (0.20)
- 0.2772 (106.5 + 29.7)
= 1,786.1

Total Alternative P.W. - 1,576.7 + 1,786.1 = 3,362.8

Local Share

	($ x 1,000)
Centralized Treatment:	
Treatment - 10% (1.25) (553.0)	69.1
Other - 20% (26.1)	5.2
10% (80%) (26.1)	2.1
Total 1980	76.4
Decentralized Treatment:	
All items - 5% (1,010.8)	50.5
6% (95%) (1,010.8)	57.6
Total 1980	108.1
Total Alternative: Total 1980	184.5

User Charges

Centralized Treatment U.C. = [0.07958 (1.2) ($76,400) + $62,600] ÷ 530
≅ $130/yr./residence (1980)

Decentralized Treatment U.C. = [0.07958 (1.2) ($108,100) + $63,680] ÷ 972
≅ $80/yr./residence (1980)

Total Alternative U.C. = [0.07958 (1.2) ($184,500) + $126,300] ÷ 1,502
≅ $100/yr./residence (1980)

PRELIMINARY ELIGIBILITY DETERMINATION FOR ALTERNATIVES IN GREEN LAKE EIS - JUNE 1979

Assumptions

1. Needs - We have assumed that a need exists in all alternatives. This was necessary since present versus future needs policy issues are, as yet, unresolved. We have assumed that the EIS consultant's assumptions related to these alternatives are valid.

2. On-site systems along Green Lake will be publicly owned and will be 95% eligible for 85% Federal funding. Cluster systems will be 95% eligible for 85% Federal funding. State funding will be 60% of the eligible cost.

3. Typical gravity sewer collection systems (not interceptors) will be 80% eligible for 75% Federal funding. Pressure sewers collection systems will be 80% eligible for 85% Federal funding. State funding will be 80% of the total share of eligible costs.

4. Hook-up costs for gravity and pressure systems are ineligible costs.

No-Action Alternative Present Worth Analysis

Assumptions:

Centralized treatment	New London, Spicer EDUs - 530 (Year 1980), 997 (Year 2000) Upgrade to meet state's effluent requirements without Federal or state funding
Decentralized treatment	Numbered segments EDUs - 972 (Year 1980), 1,112 (Year 2000) 1% (972)/year needing new ST/SASs 1% (972)/year needing new ST/SM
Capital costs	Centralized treatment - Draft EIS STP costs, $26,100 added to recreate Table IV-2 capital Decentralized treatment: $1,262/(ST/SAS) $8,850/(ST/SM) $8.65/hr/sanitarian x 12 hrs/new system permit $8.65/hr/sanitarian x 16 hrs/replacement permit
O&M costs	Centralized treatment - Draft EIS STP costs Decentralized treatment: $60/ST pumping (once/10 years) $55/yr/residence for ST/SM dose pump
Salvage values	Centralized treatment - Draft EIS STP costs Decentralized treatment - 50 year life for STs
Present worths	6-5/8%, 20 years
User charges	0% Federal and state funding Debt retirement - 30-year bond, 6-7/8%, 20% reserve

Alternative Costs:

($ x 1,000)

	Capital Costs	O&M Costs	Salvage Value
Centralized Treatment:			
Existing EDUs:			
Upgrade of STPs	553.0	62.6/yr	166.0
25% Engineering & Contingencies	138.2	-0-	-0-
Other Capital Costs	26.1	-0-	-0-
TOTAL 1980	717.3	62.6/yr	166.0

Centralized Treatment (continued)

($ x 1,000)

	Capital Costs	O&M Costs	Salvage Value
Future EDUs:			
Connections - 467	29.2/yr	-0-	373.6
TOTAL 1980 - 2000	29.2/yr	-0-	373.6

Decentralized Treatment

Existing and Future EDUs:			
Replace 10 (ST/SASs)/yr w/(ST/SASs)	12.64/yr	-0-	42.4
Replace 10 (ST/SASs)/yr w/(ST/SMs)	88.50/yr	0.55/yr/yr	42.4
Pump each ST once/10 years	-0-	5.82/yr	-0-
Add 140 new ST/SASs (inc. pumping)	8.83/yr	0.004/yr/yr	29.7
TOTAL 1980-2000	109.95/yr	5.82/yr	114.5
		0.554/yr/yr	

Total Alternative Cost

TOTAL 1980	717.3	68.42/yr	166.0
TOTAL 1980-2000	139.15/yr	0.554/yr/yr	488.1

Present Worths:

($ x 1,000)

Centralized treatment P.W. = 717.3 + 10.9909 (62.6 + 29.2)
- 0.2772 (166.0 + 373.6)
= 1,576.7

Decentralized treatment P.W. = 10.9909 (109.95 + 5.82)
+ 81.155 (0.554/yr/yr)
- 0.2772 (114.5)
= 1,285.6

Total P.W. = 1,576.7 + 1,285.6 = 2,862.3

User Charges: (Estimated 1980 User Charges)

Centralized treatment U.C. = [0.07958 (1.2) ($717,300) + $62,600] ÷ 530
≃ $250/yr/residence (1980)

APPENDIX C

Letter Response to Mr. F. W. Conner,
USDA, SCS, Regarding Soil Data

C

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

209 W. Mulberry St., St. Peter, MN 56082

March 20, 1980

Mr. Eric Hediger
WAPORA Inc.
6900 Wisconsin Ave. N.W.
Washington, D.C. 20015

Dear Mr. Hediger:

I am writing to you to express concern in regard to the draft of the Environmental Impact Statement "Alternative Waste Treatment Systems for Rural Lake Projects, Case Study No. 2, Green Lake Sanitary Sewer and Water District, Kandiyohi County, Minnesota". If you recall, two soil scientists of the Soil Conservation Service, Richard Paulson and Allan Giencke, soil mapped the requested sites and provided soil interpretation sheets and maps for the soils found to your company. Various members of the field staff have reviewed the above document and have noted significant errors in the Appendices, Section A. The errors are as follows:

1. The map scale in Appendices A, figures 1, 2, 3, 4 and 6 is 1 inch equals 1320 feet and not the 1 inch equals 2000 feet. The interpretive maps in these figures fit perfectly over our 4 inch equals 1 mile (1:1584) soil maps. We do not know what scale figure 5 is because we are unable to locate the soil survey area that resembles the interpretive map.

2. The acreage figures given for each site in Table 1 are not correct if the size is based on the area shown in figures 1 through 6. Consequently, the percent of soils listed as slight, moderate or severe are also incorrect. The correct acreage figures are approximately 20 percent of those listed in Table 1.

Site	WAPORA's Acres	Corrected Acres
A	270	52
B	232	45
C	274	60
D	306	62
E	248	51
F	378	86
G	82	16
H	208	38
I	262	49

C

Site	WAPORA's Acres	Corrected Acres
J	74	15
K	82	16
L	146	20
M	170	30
Rapid Infiltration	1184	240 1/
Spray Irrigation	1606	325

1/ This is the total acres that was soil mapped in the area identified in figure 5.

3. It appears from Guide Sheet No. 3, Soil limitation ratings for septic tank absorption fields, that soil features wetness and permeability were the only features used in evaluating the sites. Slope was briefly mentioned in the narrative but it was not used for the interpretive maps in figures 1 through 6. For example, most of the sites on the north side of Green Lake have "E" slopes, which are greater than 18 percent. They also have "D" slopes of 12 to 18 percent. Even though the guide sheet has the break at 15 percent, we rate "D" slopes as severe in Minnesota. We are concerned because even the "E" slopes were rated as moderate without further explanation.

4. The Soil Conservation Service does not have guide sheets which rate the soils as slight, moderate or severe for spray irrigation or rapid infiltration. We have an Irrigation Guide and a Minnesota Hydrology Guide which place soils in groups where each group has similar properties. Using the Guide Sheet No. 3, Soil limitation ratings for septic tank absorption fields, distorts the information given. For example, Estherville is a major soil in the Irrigation Site. This soil is in Irrigation Group 8 which has an intake rate of 1.5 inches per hour. If you applied 4 inches of effluent per acre, it could be put on at 1.65 inches per hour on "A" slopes (0 to 2 percent). However, it would be reduced to 0.8 inches per hour on "C" slopes if runoff is not wanted. There are substantial areas of soils which have "C", "D" and "E" slopes in this site.

5. The statements on soils for the Rapid Infiltration Site are contradictory. The dominant soils are Salida and Estherville which are sandy and gravelly. However, it was described as: "The soils on this site are primarily comprised of glacial till with scattered pockets of sand and gravel.

I feel, Mr. Hediger, that a corrected amendment to the draft of this Environmental Impact Statement is justified. The mis-information contained in the Appendices, Section A, Soil, could result in poor decision making. It also does not reflect the established technical quality of work performed by the respective soil scientists of the Soil Conservation Service.

Sincerely,

F. W. Conner
Area Conservationist

cc: Harry M. Major, State Conservationist, SCS, St. Paul, MN
Raymond Diedrick, State Soil Scientist, SCS, St. Paul, MN
Gregory A. Vanderlaan, EPA, Chicago, IL
Richard Paulson, Area Soil Scientist, SCS, St. Peter, MN
Allan Giencke, Party Leader, SCS, Willmar, MN
Lester Swanson, District Conservationist, SCS, Willmar, MN

C
WAPORA, Inc. Environmental/Energy Studies
Project 662-E
6900 WISCONSIN AVENUE N.W., WASHINGTON, D. C. 20015
PHONE - (301) 652-9520

22 May 1980

Mr. F. W. Conner
Area Conservationist
US Department of Agriculture
Soil Conservation Service
209 West Mulberry Street
St. Peter, Minnesota 56082

Re: Soil data presented in Draft Environmental Impact Statement "Alternative Waste Treatment Systems for Rural Lake Projects, Case Study No. 2, Green Lake Sanitary Sewer and Water District, Kandiyohi County, Minnesota"

Dear Mr. Conner:

Thank you for your letter of 20 March 1980 in which you expressed concern over selected soil data presented in the referenced EIS. Your comments, including those of your colleagues within the Soil Conservation Service, will enhance our ability to prepare a Final EIS that is both a factual and an objective decision-making tool. I would agree with you that several serious errors were apparent in Appendix A-1 (Land Application, Spray Irrigation, and Cluster System Sites). This unfortunate fact reflects poor proofreading of the material presented in this section. Let me hasten to add, however, that these errors, some of which were corrected prior to receipt of your letter, in no way reflect on the invaluable assistance received by Messrs. Allan Giencke, Richard Paulson, Lester Swanson, Harry Major, and yourself during preparation of the Draft Green Lake EIS. These errors do not reflect on our client, the US Environmental Protection Agency, either.

I will respond to your comments in the order in which they are listed in your letter.

1. Your first comment is duly noted. The map scale in Appendix A, Figures 1, 2, 3, 4, and 6 is 1 inch = 1,320 feet and not 1 inch = 2,000 feet. The "trial" soils map of the Green Lake area sent to us by Mr. Swanson in November 1977 contained no scale; it was, therefore, erroneously assumed during the preparation of the "potential cluster system treatment site maps" that the scale of the soils map was 1 inch = 2,000 feet. However, inspection of the cover letter to Mr. Swanson's November 1977 package shortly after the Draft EIS was published revealed the proper scale. The scale for Figure 5 is also 1 inch = 1,320 feet.

C

2. Comment is noted. The acreage figures in Table 1, Appendix A-1 are overstated by one order of magnitude. This error was also detected shortly after the Draft EIS was published. The area of the potential cluster system treatment sites was remeasured by planimeter and is included in the attached table along with your revised estimates of acreage for the same sites.

3. The percentages of slight, moderate, and severe limitations for the 13 cluster system sites and two land application sites have been revised in observance of your severe ratings for "D" slopes. However, we believe that cluster system drainfields are feasible on "D" slopes provided certain special engineering steps are taken. These include terracing the drainfield site and placing the drainfield laterals further apart than would be the case on slopes of less than 12%. It is our further contention that detailed investigation of each candidate site be conducted by a soil scientist and an engineer during the detailed design stage of the project, no matter what slopes, depth to water table, or permeability are indicated by planning-level data.

   Slope along with permeability and depth of water table was incorporated into the cluster system development process during preparation of the Draft EIS. We were most fortunate to have Mr. Paulson's assistance in this connection; where slopes are limiting, he so indicated in his report. This report was the narrative you refer to in your letter.

   The revision of limitation percentages does not alter the potential for cluster system treatment on each site (except site K which was rated in the Draft EIS as having severe limitations over its entirety). Out of the approximately 566 acres of potential cluster system treatment area, 244 acres or 43% have either moderate or slight limitations for the intended use. There is a minimum of 4 acres of soil with moderate limitations on every site, except site K. This should be sufficient to satisfy area requirements in the Green Lake area.

   In short, we agree that cluster system suitability as presented in Appendix A-1 is misleading, given the fact that certain "E" slopes are classified as having moderate limitations. We don't believe that all "D" slopes should categorically be classified as "severe" when selected site modifications are possible. Limiting slope, as reported by Mr. Paulson, was a key factor in the preliminary design of the cluster system.

4. Our use of SCS "soil limitation ratings for septic tank absorption fields" in presenting soil suitability information for spray irrigation and rapid infiltration was for purposes of rough acreage quantification only. It is assumed on a general basis that soils which are suitable/unsuitable for septic tank absorption fields are suitable/unsuitable for spray irrigation

fields, and possibly, for rapid infiltration basins. The extent to which these sites really are feasible for wastewater disposal and treatment can only be determined through detailed site investigation. While we utilized Guide Sheet No. 3 to present rough indexes of land application feasibility, we emphasized soil characteristics. This knowledge of soil characteristics on the rapid infiltration site as described in the Appendix A-1 narrative was only possible through Mr. Giencke's preliminary site investigative efforts.

5. On the surface, the two statements on soils at the rapid infiltration site appear contradictory, as you have noted. The statement describing the dominant soils as Salida and Estherville is confirmed by Mr. Giencke's preliminary assessment of the site as having soils which are "very sandy and quite deep to water" (in his letter dated 16 June 1978). The description of soils "comprised of glacial till with scattered pockets of sand and gravel" may, in fact, be more appropriate to the Green Lake Study Area. It is not inconceivable, however, that glacial till could be present on the site given that the Salida and Estherville soils may form part of the sand and gravel lenses in glacial till in the northwestern portion of the Study Area. We thank you for pointing out the contradiction in preliminary soils classification.

In sum, we appreciate your taking the time to review the Green Lake Draft EIS in detail and furthermore, your identification of errors in the document's presentation of technical data. These errors will be presented in the Final EIS, along with our corrections and explanation. I would like to emphasize that despite the errors and discrepancies discussed above, the conclusions of the Draft EIS have not changed.

If you have any questions, please feel free to contact me.

Sincerely yours,

Eric M. Hediger

Eric M. Hediger, M.E.M.
Project Manager

cc: Gregory A. Vanderlaan, EPA, Chicago, IL
Harry M. Major, State Conservationist, SCS, St. Paul, MN
Raymond Diedrick, State Soil Scientist, SCS, St. Paul, MN
Richard Paulson, Area Soil Scientist, SCS, St. Peter, MN
Allan Giencke, Party Leader, SCS, Willmar, MN
Lester Swanson, District Conservationist, SCS, Willmar, MN

TABLE 1. POTENTIAL LAND APPLICATION AND CLUSTER SYSTEM SITES

Site	Draft EIS Acres	SCS Corrected Acres	WAPORA Corrected Acres	Site Limitations @ Draft EIS % Severe	% Moderate	% Slight	Revised Site Limitations % Severe	% Moderate	% Slight
A	270	52	43	29	71	0	74	26	0
B	232	45	51	30	70	0	93	7	0
C	274	60	55	13	56	31	40	27	33
D	306	62	64	18	82	0	27	67	6
E	248	51	57	16	84	0	66	34	0
F	378	86	80	0	100	0	92	8	0
G	82	16	17	0	30	70	8	22	70
H	208	38	45	11	75	14	66	34	0
I	262	49	58	18	82	0	14	86	0
J	74	15	14	0	100	0	0	100	0
K	82	16	15	100	0	0	100	0	0
L	146	20	32	0	95	5	72	21	7
M	170	30	37	1	94	5	47	48	5
Rapid Infiltration	1,184	240	240	15	85	0			
Spray Irrigation	1,606	325	325	7	83	10			

APPENDIX D

Letters of Comment on the Draft EIS

RIEKE CARROLL MULLER ASSOCIATES INC

August 9, 1979

U.S. Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, IL 60604

ATTENTION: EIS SECTION

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT
ALTERNATIVE WASTEWATER TREATMENT SYSTEMS FOR
RURAL LAKE PROJECTS
CASE STUDY NUMBER 2
GREEN LAKE SANITARY SEWER AND WATER DISTRICT
KANDIYOHI COUNTY, MINNESOTA
EPA NO. C271377-01

Gentlemen:

This is a summary of oral comments RCM made at the public hearing on the referenced project August 4, 1979 in New London, Minnesota. These comments are submitted for consideration and inclusion in the final Environmental Impact Statement (EIS). The comments made herein are referenced by the page in the draft EIS.

Page v The third paragraph under Surface Water Resources says bacterial levels along shore areas are below Minnesota State Health Department and Minnesota Pollution Control Agency (MPCA) standards for recreational waters. Further in the paragraph reference is made to the Kerfoot (1979) study that reported low levels of fecal coliforms near septic leachate plumes. It should be noted that the Kerfoot study was done in March at a time water temperatures would be very low and the life expectancy of fecal coliform bacteria would be very short. Also in March, only permanent residents would be living on the lake and since the septic snooper used by Kerfoot also detects dormant leachate plumes, fecal coliforms would be expected to be very low. This data would mean that the low levels of fecal coliforms found during Kerfoot's study would have little meaning.

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Page vi Under Additional Studies, Item 1. The aerial survey was conducted in August 1978. This survey was conducted to detect septic system surface malfunctions. It should be noted that the vegetative cover is heaviest at this time of year and interference would therefore be greatest for surface malfunction detection by these methods. Three marginally failing systems were detected on Green Lake and one currently failing and one marginally failing systems were detected on Nest Lake. In conversations with Mr. Wally Fischer, Chairman, Green Lake Sanitary Sewer and Water District, he has said that he can show several failing systems during on-the-ground inspections.

Page vi Under Additional Studies, Item 2. The sanitary survey was done in November 1978 at a time when few people would be at the lake. In the EIS appendix, one comment under the sanitary survey is that most residents felt that this was a poor time of year to do the survey. It should also be pointed out that the investigator may not have received full cooperation from the people being interviewed since they did not know who he was and possibly would not want to say that their system was failing or that they had experienced problems with their system.

Page vi Under Additional Studies, Item 3. Kerfoot's study was done in March 1979. It is my understanding that there was three feet of ice, sixteen inches of snow and one foot of water on the ice at that time. Samples were taken every one hundred feet around the lake. It seems with intermittent samples that several leachate plumes could have been missed. Also at this time of year, only permanent residents live at the lake. It seems that leachate plumes that may have been present in the late fall after seasonal use by residents may not have been detected. Most of the leachate plumes that were discovered on Green Lake during Kerfoot's survey were located on the north shore of Green Lake. This is the area of the lake where there are the most permanent residences.

Page viii — Surface Water. This section of the EIS says that surface water quality will not improve much under any alternative. It would seem that upgrading the Spicer and New London discharges would eliminate much of the pollution from the Crow River.

Page ix — The last paragraph mentions that an additional 30 to 40 acres of lakeshore will be developed with a centralized sewer system. In observations of Green Lake, it is hard to determine where these 30 to 40 acres exist if they do exist. Also it would seem that these 30 to 40 acres of lakeshore would be developed one way or another under any of the alternatives not just the alternatives that include a sanitary sewer system.

Page 16 — The first paragraph says that only two cases of possible health hazards associated with septic tanks have been documented. These two cases were wells with high nitrate levels. There are several instances of backups and wastewater being discharged to road ditches and these represent health hazards.

Page 45 — The last paragraph states that the well water analyses conducted in 1979 were not complete enough to implicate human waste as the source of pollution in the water of some of the wells. Did EPA conduct studies to further determine if human waste were the source of this pollution? If not, why not?

Page 53 — The last paragraph indicates that total and fecal coliform levels near shore were acceptable by Minnesota Health Department and MPCA standards, yet the levels in the inlet and outlet of Green Lake are unacceptable. How does EPA account for unacceptable levels in the outlet since Green Lake has a detention time of 3.7 years and this would be significantly more than the life expectancy of fecal coliform bacteria?

Page 55 — Summary of Existing Data. Again the comment should be made that the timing for the aerial survey, the sanitary survey and Kerfoot's septic snooper survey was poor, and impacted the results.

Page 67 At the top of the page it says that Kerfoot found very low fecal coliform levels in the surface water located at the discharge of septic plumes. This should be expected since a dormant plume or even an erupting plume in March with very cold water temperatures would not be expected to contain high levels of fecal coliform bacteria.

Page 71 The last paragraph expresses concerns over disturbing wetlands. One of the concerns is that dewatering for a centralized sewer system would lower the water level in wetlands. This would also be a problem for the EIS alternatives since cluster systems would require at least some sanitary sewer collection lines. Also, the location of several of the cluster sites may require the construction of a forcemain directly through wetland areas.

Page 110 The last paragraph describes the spray irrigation system and mentions a design application rate of 2 inches per week. This is the maximum allowable application rate according to MPCA guidelines. How many weeks would this wastewater be applied? It has been RCM's experience that acceptable application rates in agricultural areas similar to Green Lake are usually in the range of 18 inches per year or less.

Page 111 The description of the rapid infiltration system does not give an application rate or number of days storage required.

Page 114 The last paragraph shows 25 percent of the residences going to cluster systems. After reviewing the area around Green Lake, this seems like a low percentage based on Kandiyohi County and state standards and requirements. An increase in this percentage may affect the cost-effective analysis presented in the EIS.

Page 120 At the top of the page, it says that the facilities plan does not address sludge disposal from lagoons in detail. This would imply that the facilities plan is not complete in this respect, yet it has been RCM's experience that sludge disposal, other than hauling grit and screenings to a sanitary

landfill, is not required for stabilization ponds during the 20-year planning period. The EIS states that sludge disposal would be by contract hauling and that farm lands are typical disposal sites for septic tank pumpings. The information in the EIS is insufficient for public comment and does not adequately discuss sludge disposal per MPCA guidelines.

Page 120 The third paragraph says it was assumed that septic tanks have to be pumped every three years. Is this adequate and regular maintenance? It would seem that the tanks should be pumped more frequently.

Page 135 Under the description of EIS Alternative 3. Why weren't stabilization ponds with alternative discharge points considered without land application? It has been RCM's experience that stabilization ponds, where adequate, are more cost-effective than land application alternatives.

Page 141 Under the description of EIS Alternative 4. The same questions apply to this alternative as to Alternative 3.

Page 141 Under the description of EIS Alternative 5. Again, what would be the application rate for this alternative? The description of this alternative shows 15 weeks of storage; it should be noted that MPCA guidelines require at least 210 days storage. What type of application method is anticipated under this alternative? The recommended area for siting the spray irrigation alternative is a wooded area and would probably require fixed irrigation equipment. Why weren't stabilization ponds with alternative discharge points considered without land application for this alternative? Again, it is noted that stabilization ponds alone, where adequate, are often more cost effective than land application alternatives.

Page 141 Under the description of EIS Alternative 6. Why weren't stabilization ponds or land application for Spicer and New London considered? It would seem that additional alternatives should be considered here since tertiary treatment and its

inherent chemical costs could place substantial financial burdens on these communities. The chemical treatment experiences at Ely, Minnesota are apparently being overlooked by EPA.

Page 144 Under the description of the EIS Limited Action Alternative. This alternative includes upgrading 50 percent of the on-site systems, but does not include anything for upgrading the 25 percent of the systems that were clustered under EIS Alternatives 3, 4, 5 and 6. Shouldn't the 25 percent that was clustered under other alternatives receive some type of upgrading under the limited action alternative? It is questionable whether this alternative is responsive to the needs at Green Lake.

Page 161 Mentions that a survey of archaeological and historical sites needs to be done as part of Step 2. MPCA requires that these surveys be done prior to the completion of Step 1.

Page 163 Under the section describing user charges, the EIS mentions that a reserve fund equaling 20 percent of capital cost is included in the user charges shown. Is this 20 percent of all capital costs? Is this included in the cost-effective analysis? More detail should be shown either in the EIS or its appendix regarding the cost-effective analysis. It is not possible from the information shown to determine the adequacy of the cost-effective analysis. Detailed cost breakdowns should be shown in the EIS for all elements of the cost estimates and the cost-effective analysis.

Page 165 The first paragraph says that EPA grant funding would be 85 percent of 95 percent of the capital cost of on-site/cluster systems. Why is 95 percent used rather than 100 percent?

The implementability of the EIS alternatives in regards to on-site/cluster systems may be very difficult. Land may not be available for cluster site systems without condemnation. Development of an equitable user charge system will be difficult. The risks involved and the difficulty in implementability should receive further consideration in the development of the EIS.

It is noted that the recommended alternatives in the EIS require further study. The further studies that are required may to some extent modify costs presented in the EIS and therefore the EIS conclusions and recommendation could be affected. It should be noted that this study is not complete at this time and that final conclusions will be made and presented after additional studies have been completed.

The EIS states that 8 percent of the pollution based on phosphorus loading going into Green Lake comes from septic tanks. The EIS seems to indicate that 8 percent is not significant and therefore the sewering of Green Lake is not plausible to EPA. It should be noted that 8 percent pollution is not a regulatory level below which funding cannot be made. In the case of small communities located on the Mississippi River or other rivers throughout the state and country, if they were to discharge raw sewage their contribution to the total pollution would still be significantly below 8 percent. Comments that refer to this 8 percent phosphorus contribution by septic tanks as being insignificant to the water quality of Green Lake would seem to be irrelevant and misleading, and consideration should be given to modifying these comments in the EIS.

If you have any questions concerning these comments, please contact me.

Yours very truly,

RIEKE CARROLL MULLER ASSOCIATES, INC.

Sam L. Claassen

Sam L. Claassen, P.E.

SLC:mt

cc: Wally Fischer, Chairman, Green Lake Sanitary Sewer & Water Dist
Wally Gustafson, Attorney
Doug Noyes, Noyes Engineering
Greg Vanderlaan, EPA

Route 1, Box 76
Spicer, Minnesota 56288
August 11, 1979

Mr. Gene Wojcik
Chief, EIS Section
U. S. Environmental Protection Agency
Region V Environmental Engineering Branch
230 South Dearborn Street
Chicago, Illinois 60604

Re: EIS, Case Study No. 2,
Green Lake, Kandiyohi County,
Minnesota, June 1979

Dear Mr. Wojcik:

A considerable number of us who are Green Lake property owners are disturbed by the draft of the EIS submitted to us this summer. As we move from segment to segment of the report, we are struck by the apparent superficiality of your study: e. g., your conclusions regarding algal growth in Green Lake, your summary of faulty septic tanks around the lake, your recommendation of cluster systems without an on-site examination of potential availability of land for drain fields, and your apparent indifference to nitrate-nitrogen content in wells along the east shore, to name just a few. At the hearing on August 4, Engineer Clauson raised 26 point-by-point issues; we hope that his questions are part of your record. Because we are also disturbed by the apparent reluctance of a group of self-declared spokesmen for property owners to report to you any questions that take issue with your recommendation of Alternatives 4, 5, and 6, especially 6.

Therefore, my wife and I, who are permanent residents on the south shore of Green Lake, wish to raise these questions with you:

1) Will you be making another examination of increased algal growth in Green Lake? We have noticed a considerable increase on the lake bed along our shore, and our observations on this location date from 1972. Our summer living on Green Lake dates back to Mrs. Olson's childhood in 1930.

2) Will your lot-by-lot survey take a good hard look at septic tanks, wells, drain fields, and soils on each lot (not just samples) in order to detect problems which your Septic Snooper did not detect, nor your questioner in November 1978?

3) Do your calculations of cost-effectiveness for Alternative 6 allow for:
   a) the willingness of farmers to allow their land to be used at all for cluster drain fields,
   b) the price farmers are likely to ask for such land, if they are willing,
   c) the price of long-term easements which take the land out of production,
   d) the length of time farmers may take to negotiate the use of such tracts?

4) Does Alternative 6 address the problem of nitrate-nitrogen in water wells along the east shore? Private tests have indicated high contents, and in Appendix C-1, the figures of SSU numbers 55 and 73, for example, should alert you to the problem, which could be serious.

We appreciate your efforts to determine cost-effective solutions to our problems, but we hope that such calculations will include all potential costs and not just write some of them off as "a local problem," as one of your spokesmen has dismissed them. We sincerely hope that from here on, your surveys and examinations will be made on the spot by persons who care to become familiar with the terrain and will not treat the situation just theoretically.

Spokesmen for your office who treat the situation superficially do not reflect well on you or on a federal office. Neither do their casual attitudes toward the passage of time. May we suggest that they have already used up their quota of unconscionable delays in this matter.

As a final comment, it is too bad that the EPA can't recommend to states and counties the establishment of water management districts, as there are in northern Texas, for instance. If it is true that the State of Minnesota owns all the water in the state, then why shouldn't a countywide or regional management district cope with water quality problems through authority to advise and "manage" lakeshore and riverbank residents, municipalities, farms, industries, and all sources which impact on water?

Thank you for your attention. We beg you to remember--we shall likely have to live with your decisions for the rest of our lives.

Respectfully yours,

Laurence W. Olson

Ernest M. Olson

(Mr. and Mrs. L. W. Olson)

Minnesota Pollution Control Agency

AUG 14 1979

Mr. Gene Wojcik
Chief, EIS Section
Region V
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Re: Draft Environmental Impact Statement
Green Lake Sanitary Sewer and Water District
Kandiyohi County, Minnesota

Dear Mr. Wojcik:

The Minnesota Pollution Control Agency has completed review of the Alternative Waste Treatment Systems for Rural Lake Projects: Case Study Number 2, Green Lake Sewer and Water District, Kandiyohi County, Minnesota.

In general, we concur with most of the conclusions of the report. Specifically, we agree that:

1) Improved maintenance and/or upgrading of inadequate existing on-site systems will substantially reduce the problems caused by them.

2) That the centralized treatment alternatives (Facilities Plan Proposed Action EIS alternatives 1, 2, and 3) are not cost effective solutions to the wastewater treatment problem currently existing in the study area.

3) EIS Decentralized treatment alternatives 4, 5, and 6, can all be considered cost-effective solutions.

4) Additional Step 1 work should be completed to develop a detailed cost-effective analysis of EIS alternatives 4, 5, and 6, and arrive at a specific recommended alternative.

In spite of our general concurrence with the report, there are several areas that we feel require further attention. Some of these concerns could be addressed in the final EIS and the others could be handled in the amended Step 1 Facilities Plan.

The Agency feels that the following general concerns should be

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AUG 1 4 1979

addressed in the final EIS:

1) The most important point of discrepancy seems to be between this Agency's definition of "need" and that of the Environmental Protection Agency's. "Need" for wastewater treatment, as defined in the Environmental Impact Statement, is proven only if there is positive, physical evidence of failure of a system. This includes violation of water quality standards, obvious physical failures, such as sewage on the ground surface, and public health hazards. These criteria are performance standards. If we can see and prove that the system is not working, it is determined that there exists a wastewater treatment need.

   The MPCA, however, feels that there is a second group of criteria that can be used to determine a need. We believe that along with the performance-failure criteria described above, a set of inferred-failure criteria can be applied. This set of criteria is based on research and experience with on-site systems. Guidelines have been determined and are being used as local and state regulations applying to on-site systems. These guidelines include ranges and limitations for such factors as:

   A) soil percolation rates
   B) slope
   C) setback distances from wells, property lines, waterfront
   D) depth to groundwater table or bedrock
   E) sizing of septic tanks and drainfields.

   Using these criteria, it can be determined that a particular on-site system will probably fail in the near future, or that it is now failing without any obvious evidence of failure.

   For example:

   a) A drainfield is installed in the groundwater, contaminating it, but this hasn't shown up yet, because movement of the groundwater is away from the lake and the well.

   b) A conscientious homeowner is limiting use of water in an effort to avoid problems with a system in an area where failures are common. Normal use would result in a failure, but the system is defined as "no need" because failure is not apparant. The result is that the homeowner must replace the system when it fails in a few years at his/her cost. Local state, and county standards for on-site wastewater treatment systems are design oriented. The design standards in these regulations can be used both to install a system "to code" and be relatively sure of success, and to determine if an existing system is probably failing or likely to fail in the near future.

AUG 1 4 1979

EPA standards (NPDES permit, H_2O quality criteria) are based on performance.

The variability of soils, groundwater hydrology, and the large number and vast dispersion of on-site systems makes monitoring economically unfeasible.

This particular EIS is part of a case study, and therefore will set a precedent for future EIS's and Facilities Plans, for Alternative Wastewater Systems for Rural Lake Projects. Therefore, we feel that it is very important for this conflict in definitions of "need" between the MPCA and the EPA to be resolved. General assessment techniques must be consistent from agency to agency for the construction grants program to be valid and workable.

By allowing "working" systems a variance if they do not meet state/local regulations, existing state and local programs will be weakened.

Of course, minor violations of certain criteria, such as setback distances from the house or property line, could be allowed. This could be left to the discretion of the consulting engineer and the city, and would vary.

It is the MPCA's recommendation that the definition of "wastewater treatment need" be changed in the final EIS, and that additional Step 1 work document current and potential problems using WPC 40 as a guideline. Kandiyohi could adopt WPC 40, and then issue variances only for horizontal setback distances from buildings and property lines on use by use basis.

2) The draft EIS does not sufficiently assess the issues of second tier development, inducted development or conversion pressure. The statement that 30 - 40 acres might be developed does not provide sufficient detail. In future such EIS's, the location of developable platted lots and unplatted acreage should be shown in map form, and various constraints on development indicated (zoning, lot limitations). Differential impacts of each alternative could thus be assessed. Location of sensitive areas should also be indicated on such a map.

3) It is further recommended that the Generic EIS include a review of historical data (building permits) in similar lake areas which have been sewered (i.e. Alexandria, Minnesota), and those which have not. Such a comparative review, if adequately performed, will provide information - which may be applied to all such projects.

AUG 1 4 1979

4) In view of the fact that extensive construction is expected along the entire shoreline of Green and Nest Lakes, it is recommeded that the archeological survey be performed during subsequent facilities planning, rather than merely prior to construction, so that those survey results can be input to facilites planning. This is contrary to the recommendation in the Draft EIS.

5) We are somewhat concerned with the population estimates and projections. The occupancy rate for seasonal dwelling units appears to be six persons per household. Was this in fact enumerated in the Directory and does it in fact, reflect actual occupancy or simply size of the owning family. (Not all of whom may be present.) It is also not apparent in the draft how these populations impact engineering design. How would projections change if shift-shares methodology or housing stock methodology were used?

6) It is recommended that future EIS related populations in geopolitically indiscrete planning areas be estimated by housing count in conjunction with a 20% sample census (which could be performed during the summer season by an already trained U.S. census ennumerator). Projections of population should be based on housing stock methodology.

7) Performance of a census will also enable reasonably accurate determination of socioeconomic data relating to seasonal residents, which was not addressed in the draft EIS.

8) The soil maps in appendix A-1, figures 5 and 6, indicate limitations, but do not identify whether those limitations are for on-site systems, rapid infiltration, or land applications. It would be preferrable to indicate soils types along with the degree of limitation. This is easily obtainable from the Soil Conservation Service.

9) On what basis was the selection of the potential land application sites made?

10) In the course of documenting malfunctioning systems, three surveys were performed. It would be desirable to correlate these data on a house to house basis in future similar EIS's. It would also be desirable to present such information on a map of sufficient scale.

AUG 14 1979

11) Use of a multiplier of 1.0 to account for day use and seasonal visitors should be clarified.

12) More detailed justification, such as historical experience, or numbers of permits, should be provided for assuming a 50% construction rate for on-site systems (p. 114).

13) Figure III-1, P. 105, depicts both a forcemain and a pressure sewer in a common trench. Only one pressure main is needed.

The following comments, along with a detailed lot by lot survey to determine need, and other tasks, should be addressed in subsequent Step 1 facilities planning work:

1) The draft EIS discusses a minimum vertical separation between treatment system and groundwater table of four feet. WPC-40 stipulates three feet. While the county has every authority to retain the obsolete standard, the three foot standard should apply in construction grants projects within the state of Minnesota.

2) Limiting factors such as steep slopes, high groundwater, and rapid or slow permeability are limiting factors for standard below grade septic tank/soil absorption system(st/sas). Systems can be installed on slopes with drop boxes and the other limiting factors can be compensated for by the construction of mound systems. This fact should be recognized in subsequent facilities planning.

3) The role of the managing agency relative to st/sas and cluster system maintenance should reflect PRM 79-8 and Region 5 EPA policy. This also applies to user cost and eligibility estimates.

4) The costs for the collection system in the EIS are the result of some conservative and contradictory assumptions. It is assumed that the average depth for a gravity sewer will be 15 feet. However, it is also assumed that the area is generally flat, therefore, a large number of lift stations will be required, and the maximum depth will be 16 feet. We recommend that the average gravity sewer depth be assumed to be 12 feet = (8 + 16) ÷ 2. Also, USGS topographic maps should be used to estimate relief. A 1/2 - 2/3 reduction in the number of pumping stations may result.

AUG 14 1979

5) A more detailed and documented cost breakdown for both on-site and cluster systems should be provided. The Arthur Beard Engineers, Inc. report "Green Lake, Minnesota" dated October 2, 1978, may be used as a resource and expanded upon. In the report, $1262/system is used as a cost for and individual system. We feel that $1500 - $2000/system is a more likely cost, considering that some sites may require more costly mound systems.

6) Maintenance costs estimated in the EIS seem high, but uniformly so for all systems.

The overall result of the above comments is a lowering of Facilites Plan proposed alternative and EIS alternatives 1 and 2 costs by up to $1.5 million and a raising of EIS alternatives 4, 5, and 6, by $300,000. However, the conclusions and recommendations of the EIS would remain unchanged. EIS alternatives 4, 5, and 6, would still be most cost-effective.

In summary, our main concern is with the method of assessment and definition of need. We recommend that the basic approach to assessment criteria be redefined in the EIS, and that these revised criteria be acted upon in the Facilities Plan.

If there are any questions, please do not hesitate to call.

Sincerely,

Rodney E Massey

Rodney E. Massey, P.E.
Facilities Section
Division of Water Quality

REM/DLT:pa

cc: Sam Claassen, RCM
Green Lake Sanitary Sewer and Water District

Minnesota Pollution Control Agency

ENVIRONMENTAL PROTECTION AGENCY

December 4, 1979

Mr. Greg Vanderlaan
Water Division
Region V
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Vanderlaan:

Accompanying this letter you will find additional comments on the Draft Environmental Impact Statement for Alternative Waste Treatment Systems for Rural Lake Projects, Case Study Number 2, Green Lake Sanitary Sewer and Water District, Kandiyohi County, Minnesota.

These comments relate primarily to the assessment of point source vs. non-point source phosphorus contributions in the Nest Lake and Green Lake watershed. Please let me know if you have any questions.

Sincerely,

Craig Affeldt

Craig N. Affeldt, Head
Lake Studies Unit
Surface and Groundwaters Section
Division of Water Quality

CNA:jw

Enclosure

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(612) 296-7256
1935 West County Road B2, Roseville, Minnesota 55113
Regional Offices • Duluth / Brainerd / Detroit Lakes / Marshall / Rochester / Roseville

Comments on Draft EIS - Green Lake Sanitary Sewer and Water District

p. i., para. 2:

This paragraph is incorrect. The assertion that "neither the Facilities Plan Proposed Action nor the EIS Alternatives are (sic) expected to either adversely or benefically affect the water quality of the open bodies of Green Lake or Nest Lake" is without foundation. The statement that non-point source loading associated with the Middle Fork Crow River constitutes 73% and 96% of the phosphorus input to Green and Nest Lakes, respectively, is also incorrect. It should be clearly stated that this loading includes contributions from Spicer, New London, and Belgrade point sources. (Ref. National Eutrophication Survey Working Papers on Nest Lake and Green Lake).

p. viii., "Surface Water"

Conclusions concerning impacts on Nest and Green lakes should be reviewed in light of the above comment.

p. 46, no. 5, para. 1, line 11:

Change eastern to northwest

p. 48, footnote to Table II-3:

Footnote should read average flow for a "normalized" or average year.

p. 53:

Appendix C-10, referred to in para. 1, appears to be missing from the Draft Appendices. This appendix was intended to illustrate nutrient contributions to Nest Lake, Green Lake and Woodcock Lake, in terms of percentage of phosphorus load from individual sources.

p. 53, sec. b, para. 2:

Was a trend in the water quality of these lakes expected to appear? In Appendix C-3, 1977 Secchi disc values for Nest Lake and Green Lake are

plotted incorrectly. Available data do not appear adequate to detect the presence or absence of a trend.

p. 49, sec. b, para. 3:

Mean flows presented in the reports of the National Eutrophication Survey are for a "normalized" or average year, not the period from October, 1972 to October, 1973. Subsequent references to these streamflows should be corrected.

p. 102, sec. b, para. 2:

Suggest that this paragraph be replaced with the following: In 1976, the Minnesota Pollution Control Agency (MPCA) limited the amount of phosphorus contained in household laundry and cleaning supplies sold in the state to 0.5%. Lawsuits and a temporary injunction prevented enforcement of the rule until September, 1979. Before then, most laundry products sold within Minnesota were no-phosphate due to voluntary compliance.

p. 103, para. 1, line 5:

Change 1974 to 1977.

p. 103, para. 2:

Delete last sentence.

p. 144, para. 1:

Do treatment plant improvements at New London include upgrading to meet MPCA standards of 5 mg/l BOD and TSS, as well as 1 mg/l phosphorus?

p. 149, A.1.a., para. 2:

The ranking of nutrient sources presented in this paragraph was not supported in earlier portions of the report and is in conflict with results of the National Eutrophication Survey. Figure V-1 on page 150 appears to be an inaccurate portrayal of the NES results which should have been included as Appendix C-10.

p. 152, Table V-1:

No information is provided on the derivation of these numbers. The phosphorus inputs listed for 1972-1973 conditions actually appear to be the phosphorus loading for an average year as reported by the National Eutrophication Survey. The "no action" loadings conflict with the NES results. These apparent errors would have a substantial impact on Figure V-2, page 153 as well as the conclusions stated in "Future Trophic Conditions" on page 151.

p. 169, sec. VF:

Impact descriptions for surface water quality should be revised in light of the foregoing comments.

p. 173, Table VI-1:

Same Comment

Minnesota State Planning Agency
101 Capitol Square Building
550 Cedar Street
St. Paul, Minnesota 55101
Phone 296-8254

August 3, 1979

Mr. Gene Wojcik
EIS Section
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, IL 60604

RE: Draft EIS/Alternative Waste Treatment Systems for Rural Areas - Case Study Number 2 Green Lake Sanitary Sewer and Water District Kandiyohi County, Minnesota.

Dear Mr. Wojcik:

We have reviewed the Green Lake Sanitary Sewer and Water District draft EIS and agree that septic systems are not significantly contributing to water quality and health problems within Green and Nest Lakes.

The selection of any wastewater collection and treatment alternative will have a minimal impact upon the overall water quality of the lakes because of the amount of phosphorus entering from the Crow River. The selection of alternative 6 would upgrade the inadequate Spicer and New London sewage facilities while alternatives 4 and 5 would also be cost effective, but encourage additional development in the shoreland areas.

It makes little sense to pursue the selection of a wastewater collection and treatment system that will encourage growth beyond existing services and do little to enhance the water quality within Green and Nest Lakes without first developing a management plan to limit non-point source pollution from the Crow River. This issue must be addressed before additional step 1 studies are commenced.

Sincerely,

Charles R. Kenow

Charles R. Kenow, Acting Manager
Program Review and Project Evaluation

CK:RK/pb

cc: Joe Sizer, Director, Environmental Planning
Terry Hoffman, Executive Director, MPCA

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R.R. #2
Spicer Minn. 56288
August 9, 1979

Mr. Gene Krajcik, Chief E & S Section,
U.S. Environmental Protection Agency
Region V Environmental Engineering Branch
230 South Dearborn Street
Chicago, Illinois 60604

Reference
Green Lake Sanitary
Sewer and Water Dist.

Dear Gene and Greg,

Thank you for returning to Minnesota again to help us find a solution to a problem that has become most complicated by personal greed.

The problem can be solved by implimentation of alternative 4, 5 or 6. Spicer accepts #4, New London prefers #6 and #4 as a compromise. Hence, alternative #4 should be pursued with diligence.

The appointment of a qualified Sanitarian with complete authority to approve, inspect and condem any and all on-site septic systems for both commercial and residential operations would do much to solve our problem.

The enclosed copy of a questionnaire used by Mr. Fisher to show a large number of malfunctioning systems gave no indication of the purpose or the user of the information. For these reasons many of us did not respond. It is my personal assumption, that Wallace Fisher and Wallace Gustafson do not have septic systems that conform to Minnesota Pollution Control Agency specifications.

A [illegible] surveyed survey would change the percentages.

In my statement with reference to Lake Hawasee, it was my desire to show an existing installation of on site septic systems and mound cluster that work satisfactorily. Mrs. Bigler and I both have cousins with property on both Syracuse and Hawasee lakes. The density of population is considerably higher than on Green lake. Channels have been cut back from the lakes and parallel laterals at 100 foot intervals necessitating total reliance on mound and mound collector systems. The land is about 2 ft to 5 ft above lake levels.

With more systems and higher usage, the Health Dept has yet to condem the water as unsafe for swimming.

There are many of us who are non voting summer residents of Green Lake. Our only assurance of an equitable and sensible solution to the problem is the E.P.A. Thank you for your concern and more especially your watching proposed expenditures, because any money spent is our money, yours and mine.

Sincerely
William H Bigler

Winter address
S. R. 340 Bryant Lane
Hamilton Mont. 59840

GREEN LAKE SEPTIC TANK QUESTIONNAIRE

1. Do you know the exact location of your septic tank? Yes___No___

2. How old is your septic tank? _____

3. How many times have you had your septic tank pumped?
   1977___1978___1979___

4. Why was it necessary to have your septic tank pumped?
   Regular maintenance____
   Septic Tank Backup ____

5. Have you observed any evidence that the effluent from your septic tank is overflowing, seeping to the surface or that your septic tank is not functioning properly? Yes___No___

Name of property owner_____
Fire Number _____

AGRICULTURAL EXTENSION SERVICE

UNIVERSITY OF MINNESOTA

Department of Agricultural Engineering
201 Agricultural Engineering Building
1390 Eckles Avenue
St. Paul, Minnesota 55108

August 9, 1979

Mr. Greg Vanderlaan, Project Officer
United States Environmental Protection Agency
Region IV
230 South Deerborn Street
Chicago, IL 60604

Subject: Green Lake Environmental Impact Statement

Dear Greg:

It was a pleasure to meet you and hear your comments concerning the Green Lake EIS. Apparently there has been alot of local controversy concerning the sewer plan. The public reaction voiced to me at previous meetings on the issue was certainly reinforced by the reactions at the public meeting on August 4. It is quite apparent to me that the Green Lake Sanitary Sewer Board is not reflecting the majority opinion of the people involved in the proposed project.

I also was advised of a television program which apparently portrayed Green Lake as a sea of floating algae and weeds. I enclose for your information an article by Ken Erickson who serves as a writer for the publication Outdoor News. I certainly deplore the use of news reporting tactics which were apparently used in this situation.

I have a number of comments on the EIS and the appendices.

It is extremely difficult to evaluate costs or to compare alternatives. A cost breakdown would be extremely helpful to evaluate alternatives four and five. For example, how many onsite systems are being served by a 25% cluster and how many are being served by a 50% cluster system? There is no quantity specified so it is virtually impossible to evaluate whether the costs are reasonable.

In regard to the spray irrigation system for alternative five, it seems to me that $450,000 is extremely high for an irrigation system. I learned at the meeting on Friday night that 165 acres was suggested because of a 1.8 inch per week application based on nitrogen uptake for alfalfa.

Alfalfa is a very poor crop to use for removal of nutrients. First of all it is legume which has root nodules formed by bacteria which fix nitrogen from the soil air and transform it into nitrates which are

used by the legume. While some yield increases have been shown by adding commercial nitrogen fertilizers to alfalfa, the plant certainly is not one that should be used to remove nitrogen from wastewater effluent. I simply do not understand the statement referring to a "high rate of application and because the plant is a perennial." The rate of infiltration will be dependent upon the soil texture and the plant cover. Alfalfa has no higher rate of infiltration than any grass cover such as Reeds canary grass or bromegrass. Also, both of these grasses are perennials. I recall having read research to the effect that Reeds canary grass can remove up to 300 pounds of nitrogen per acre per year. Also, Reeds canary grass flourishes under wet soil conditions such that considerably more than two inches per week could be applied. Any supplemental nitrogen to grow and is extremely responsive to additions of nitrogen fertilizer. Consequently, the ideal crop is one of the grasses and certainly not alfalfa. The statement on Page 141 of the EIS indicates wastewater storage of 15 weeks. Apparently this is an error since we certainly cannot apply wastewater for the other 37 weeks in Minnesota.

I strongly favor the wastewater treatment by surface application rather than the rapid infiltration method suggested. If the wastewater flows through a coarse soil with a limited amount of phosphorous fixing capacity, it will not be very long before the water percolating downward has the same phosphorous concentration as that which is applied. Rapid infiltration would not remove any of the nitrates as these are water soluable and will move with the percolating water. Consequently, about all the rapid infiltration will do is a small polishing of suspended solids or BOD. As far as the nutrients are concerned, the wastewater might as well be pumped directly into the receiving stream without going through the expense of constructing a rapid infiltration system.

I suspect that the local citizens are in favor of rapid infiltration because of the adverse reaction by farmers to spray irrigation. However, there has recently been some excellent publicity on the use of wastewater from the Paynesville, Minnesota sewage treatment facility. Perhaps this publicity will help to offset some of the bad publicity circulating in the Spicer-New London area.

Should the spray irrigation method of treatment receive adverse acceptance by the public, I would offer a third alternative which I believe is superior to both the spray irrigation and certainly vastly superior to the rapid infiltration. This would be surface spreading of wastewater effluent by gravity over basins upon which Reed canary grass or some other grass is growing. The effluent would be spread over the area by gravity rather than into the air under pressure so there would be no aerosol problem. Pumping costs would be minimal since the only head required would be elevation and friction loss in the pipe necessary to transport the effluent to the field. As I indicated above, Reeds canary grass will accept effluent applications far in access of two inches per week and effectively utilize all of the nitrogen and phosphorous. I do not recall seeing any statements made concerning the concentrations of phosphorous and nitrogen in the secondary effluent but certainly the amount of acreage required would be considerably less than the 165 acres proposed for the spray irrigation system.

It was indicated to me that some type of 3-way valve is suggested for the drainfield systems to be used for the proposed cluster systems. I am not sure what valve was in mind, but the proper way to design the drainfield for the cluster system is to utilize drop box distribution. With drop box distribution only that part of the soil absorption system which is required is actually utilized. It is particularly applicable for varying flows such as from seasonal businesses such as resorts or for cluster systems, such as those proposed. There should be no need whatsoever for any type of valve in the soil absorption system.

In general, I believe that the prices proposed for the cluster systems are quite high. I have not had the opportunity to review the booklet from Beard Engineers which you loaned to Mike Hansel. However, as I understand it their frost bury depths are exceptionally deep and probably not at all necessary according to our experience in Minnesota.

Appendix H-1 states some design assumptions. I believe that the flow of 60 GPCD is reasonable but I have difficulty following the reason for the peak flow rate of 45 GPM. I seem to recall somewhere in the appendix that it was stated the peak flow from a home was approximately 25% of one days sewage flow. In the pages entitled "Suggested Procedures and Criteria For Designing Collector Sewage Systems" taken from my 1978 Home Sewage Treatment Workshop Workbook we suggest that the pump should be capable of handling 25% of the total estimated daily sewage flow in a one hour period. With 3.5 persons per three-bedroom home as stated in Appendix H-1, there is a generated wastewater flow of 210 gallons per day. To pump 25% of this in a one hour period requires a flow rate of 52.5 gallons per hour. The design peak flow of 45 gallons per minute is equivalent to 2,700 gallons per hour or would handle a total of 51 of the above homes. This seems to be a considerable over design which would be reflected both in pump size and in size of pressure line from the pump to the drainfield trench area. It is difficult to make a thorough analysis of the design specifications because of the decided lack of information presented by the engineers. This is also quite true in the other areas which I pointed out above.

On Page 12 of the EIS it is stated that an estimated 55% of the on-site wastewater disposal systems around Green Lake cannot comply with the four foot separation. I wonder if a more accurate statement would be that the homes do not comply.

As an interesting sidelight to this discussion, after the hearing on Saturday, Mike Hansel, Dick Flisrand and I drove to the home of Mr. Leo Halliday at his request. His sewage treatment system had recently been added to by a local plumbing agency with both the septic tank and drainfield located under his driveway. Also, apparently the trench rock was not protected by hay or straw and untreated building paper prior to backfill. Mr. Halliday's system certainly did not conform to the four foot separation or to the size requirements of WPC-40. However, he had sufficient area of suitable soil on his lot to install a system which would easily comply with the provisions of WPC-40. In complying with these provisions, his sewage treatment system will provide excellent sewage treatment.

On Page 43 it is incorrectly stated that the Department of Health reviews plans of public water and sewer improvements and regulates on-site sewage disposal systems. It is my understanding that both the sewer and the on-site systems are reviewed and regulated by the Minnesota Pollution Control Agency. On Page 63 it is stated that the size of the septic tank and the soil absorption system must meet the criteria outlined in Appendix C-7. First of all, I believe that the proper appendix number is C-8. However, this is not the important point which is that the Kandiyohi County sanitary code does not provide any criteria for sizing the soil absorption system.

It is my observation that Kandiyohi County has provided minimal assistance to the residents of Green Lake concerning the proper design, installation and maintenance of their on-site sewage treatment systems. Much of the information contained in the Kandiyohi sanitary code is copied directly from the model ordinace proposed by the Minnesota Department of Natural Resources. This is basically the reason for four foot separation which is included in the code and seems to be such a point of great discussion. If Kandiyohi County copied the current Department of Natural Resource's regulations the number would read three feet.

On Page 63 some reference is made to undersized septic tanks with no particular reference as to the actual tank volume. The initial volume of a septic tank is based on storage for sludge at the bottom and scum floating at the top. If the septic tank is so small that the daily sewage flow passes rapidly through it, then some of the solids can be washed through the tank. If, however, there is approximately one days detention time in the tank, the solids will settle out and the septic action will take place. However, for the smaller tanks removal of solids will be required at more frequent intervals. As an example, a 750-gallon septic tank may be completely adequate for a three bedroom home if the tank is cleaned at the proper intervals. On the other hand, a 1,200-gallon septic tank may not be adequate for another three bedroom home if the tank is not cleaned as necessary. Therefore, a maintenance schedule must be considered with any septic tank which is of adequate size to reduce flow velocity and to provide separation of sewage solids.

On Page 122 the statement is made that sand mounds "do not always provide satisfactory service." Properly designed mounds have the same treatment capability as properly designed drainfield trenches. Pressure distribution over the rockbed of the mound provides for adequate removal of pathogens. Soil with phosphorous fixing capabilities under the mound provide for removal of that nutrient. While the cost of a mound may vary considerably around the state depending on local contractors and haul distances for materials the price ranges between $2,000 and $3,000 for the mound itself. Added to this must be the cost of a septic tank and a small lift station.

On Page 112, I would hope that evapotranspiration systems are not being suggested for use under Minnesota climatic conditions. In an area where

the rainfall and evaporation are approximately equal there is little chance for a total evapotranspiration system to work unless considerable extra energy is supplied.

On Page 113 I would again caution the use of hydrogen peroxide as a "treatment" to remove the organic mat from an underdesigned or overused sewage treatment system in sandy soil. If the hydraulic capacity of an underdesigned soil system is maintained by the use of hydrogen peroxide, the result will be inadequate sewage treatment. Surface ponding of sewage tank effluent usually means that more sewage is being generated than the system was designed to treat. The system may be structurally sound but inadequate in size so that ponding occurs. If the use of hydrogen peroxide on such a system eliminates the surface ponding, such use also eliminates sewage treatment.

Greg, as I stated at the meeting on August 4, I am very happy to see that the EPA is indeed taking a hard look at all sewage treatment systems, including on-site systems. While there are some deficiencies in the reporting of the cost figures, I don't really think it would make much difference in the outcome as far as which alternative is the most cost effective.

I hope that my above comments will be helpful to you in evaluating EIS. If you have any questions concerning my comments, please do not hesitate to contact me. Again, it was a pleasure meeting you and Gene in Wilmar and I look forward to future associations.

Sincerely,

Roger E. Machmeier

Roger E. Machmeier
Extension Agricultural Engineer

REM/bjf

Enclosure

'It Ain't Necessarily So' About Green Lake. . .

By KEN ERICKSON
Minnesota Conservation Officer

NEW LONDON, Minn. — Just as the song title from the operetta, "Porgy and Bess", so wisely stated many years ago, everything we see and hear, "It Ain't Necessarily So".

This thought was brought to mind this past week when I viewed a news report on a Twin Cities television station that related to the concerns of the water quality of Green Lake and the proposed sewer project. Lest I give the impression that I am not in favor of the project, I hasten to explain that I believe the lake is far too a valuable resource to risk losing it by delays in implementing any necessary corrective measures.

I AM CERTAIN that the average person viewing the film of the lake was left with the impression that Green lake is one vast body of algae. Two segments of the film were shown, the first being a scene from a helicopter taken at several hundred feet in the air. This gave the viewer an idea of the size of the lake, but not the quality of the water.

The second scene showed a reporter stirring in thick algae growth, supposedly on the shores of Green Lake, leaving the viewer to believe that this was typical of its water.

CONTRARY TO the impression that this story may have left with a great many viewers, Green Lake is not a vast "sea" of algae growth. Rather, this lake provides some of the most algae-free, clear water in the State of Minnesota for the fisherman, boater, swimmer and others who just enjoy the view of the beautiful water.

At first glance, a bit of "spicing up" the story may not seem so serious, but it can have a damaging effect on those directly concerned. Persons contemplating purchasing property on Green Lake may take a second thought after viewing the telecast. Likewise, those planning vacations at the lake or in the area could very likely make plans to go elsewhere. In each of these cases, it could mean a loss of revenue for local individuals and businesses because of the false impressions given on the news report.

PRESENTING a story in a manner which may be more dramatic or interesting to the public may make for good reporting, but only if the truth remains unscathed.

The Green Lake story is a good reminder that we must make an attempt to filter out that which is truth from that which is just "frosting" to make a story more palatable to a news-hungry public.

Robinson . . . (Continued from Page 3)

drove on to Bredenbury where I was a market hunter for Altherton Bean's three threshing crews in 1919. Then to the Quill Lake area where we contacted Fritz Hjartarson, goose hunter and former president of the Sask-Wynyard Wildlife Federation. "There were few breeding geese when I moved here from Winnipeg 50 years ago," said Fritz. Hjartarson, who keeps a private flock of breeders on his farm many years ago, told us that the Canada goose increase this year was unbelievable. "Every four or five-acre pothole has one or more broods of geese," he said.

Hooey and I found water conditions a cent over the 1948-1978 average. There was an increase in all species over 1978 and three times as many as 1977. The outlook is good."

TOM KUCK, waterfowl biologist for the State of South Dakota, said, "Breeding populations in South Dakota were good, although slightly down from the banner year of 1978. Generally water conditions were good to excellent, with a few voids primarily in the western part of the state. Nesting habitat was much improved over 1978, and the late spring and wet conditions delayed farming, especially hay mowing, which gave [illegible] a

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION 5
18209 DIXIE HIGHWAY
HOMEWOOD, ILLINOIS 60430

August 30, 1979

IN REPLY REFER TO
HED-05

Mr. Gene Wojcik
Chief, EIS Section
Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Wojcik:

The draft EIS prepared for the Alternative Treatment Systems for Rural Lakes Projects, Kandiyohi County, Minnesota, has been reviewed. It is difficult to determine from the exhibits if the proposed action will have an effect upon any existing or proposed highways in the area. The draft EIS does not specifically address this issue. It is therefore recommended that the final EIS address whether or not any highway impacts are anticipated. If they are anticipated, the final should specifically address the impacts and proposed mitigation measures.

Sincerely yours,

Donald E. Trull
Regional Administrator

By:
W. G. Emrich, Director
Office of Environment and Design

United States Department of the Interior

OFFICE OF THE SECRETARY
NORTH CENTRAL REGION
175 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

ER-79/624

August 16, 1979

Mr. John McGuire, Regional Administrator
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. McGuire:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for Alternative Waste Treatment Systems for Rural Lake Projects, Case Study No. 2, Green Lake Sanitary Sewer and Water District, Kandiyohi County, Minnesota. The draft document was found to be inadequate with respect to its description of project-related impacts to fish and wildlife resources, archeology and recreation.

Section 201(f) of the Clean Water Act encourages "waste treatment management which combines 'open space' and recreational considerations with such management." Current regulations (CFR Part 35.917-1(j)) require that facility planning begun after September 30, 1978, must include an analysis of the recreation/open space potential of the project. Since additional Step I planning will be performed, we urge the project sponsor to consider potential recreation benefits and to consult and coordinate with local recreation agencies. Recent recreation survey results published in the 1979 Minnesota State Comprehensive Outdoor Recreation Plan show that residents of Region 6E, including Kandiyohi County, most frequently requested increased opportunities for snowmobiling, hunting, cross-country skiing, camping, fishing, bicycling, swimming, tennis and hiking.

Because of the high probability of locating archeological sites in the project area, a survey to locate such sites should be undertaken so that the alternatives may be considered as to their impact on these resources. Once this survey has been performed, you should coordinate with the State Historic Preservation Officer with regard to the significance of the sites, and whether any may be eligible for the National Register of Historic Places.

Of major concern are potential impacts to state and federal wildlife areas, game refuges and other areas such as wetland and woodland complexes. The final document should discuss site-specific impacts to these areas and the measures taken to avoid, minimize and/or compensate for losses to fish and wildlife resources. Attempts should also be made to include those impacts caused by project-induced development. In addition, Executive Orders 11990 (Protection of Wetlands) and 11988 (Floodplain Management) emphasize the need for careful planning to avoid or minimize adverse impacts. Since federal funds are involved, this project must comply with these two Executive Orders.

Summary Comments

We feel that we cannot adequately assess the impacts of the proposed project due to lack of the site-specific information cited above. We favor the continued use of existing on-site treatment facilities since the DEIS indicated their present use has little effect on lake water quality. We also support the concept of on-land effluent disposal provided that areas of high wildlife value are avoided where practical.

These comments do not in any way preclude additional comments pursuant to the *Fish and Wildlife Coordination Act* or review of possible federal permits. Further coordination on fish and wildlife impacts and related aspects may be initiated by contacting the Regional Director, U.S. Fish and Wildife Service, Federal Building, Fort Snelling, Twin Cities, Minnesota 55111 (Staff Contact -- Mr. Larry Sisk - FTS 725-3536).

Sincerely,

David L. Jervis

David L. Jervis
Regional Environmental Officer

Green Lake Sanitary Water and Sewer Commission

Box 289 . NEW LONDON, MINNESOTA 56273

W. A. FISCHER, PRESIDENT
HAROLD YOUNG, SECRETARY-TREASURER

August 20, 1979

Mr. Gene Wojcik
Environmental Protection Agency
230 S Dearborn
Chicago, IL 60604

Re: Environmental Impact Statement
re Green Lake Sanitary Sewer and
Water District, Kandiyohi County, MN

Dear Mr. Wojcik:

I am pleased to enclose herewith the following items for your analysis and study as well as having the same included in the final draft of the EIS:

Letter from Russell Dykema dated August 20, 1979
Letter from Mr. Steve Peterson, Kandiyohi County Zoning Administrator dated August 17, 1979 together with attached plat showing the location of the homes between Green Lake and New London
Alternate No. 8 as presented by the Green Lake Sanitary Sewer and Water Commission at the EIS hearing as supplied and furnished by Messrs. Noyes and R.C.M. Engineers

As stated at the New London hearing recently, our proposed Alternate 8 is basically our original facilities plan, updated to include the East Half of Nest Lake but excludes a corridor from New London to Green Lake for the reasons set forth in Mr. Peterson's letter dated August 17, 1979.

I trust our alternate 8 will be included in the final draft of the EIS, and we respectfully urge your favorable concurrence and acceptance of the principles contained in Alternate 8.

Thank you for your many courtesies.

Respectfully submitted,

W. A. Fischer

W.A. Fischer, Chairman
Green Lake Sewer & Water Commission
1118 W 11th St., Willmar, MN 56201

WAF:vl
cc: Minn. Pollution Control Agency
1935 W County Road B2
St. Paul, MN

August 20, 1979

Mr. Gene Wojcik
Environmental Protection Agency
230 South Dearborn
Chicago, IL 60604

Re: Environmental Impact Statement
re Green Lake Sanitary Sewer and
Water Dist., Kandiyohi County, MN

Dear Mr. Wojcik:

I have examined in detail the Environmental Impact Statement with reference to the above named project. I live in New London Township on Green Lake and am writing this letter in response to the EIS Statement. I was distressed to learn of the inaccuracies in your population and socio-economic data presented in your document. Your statistics were garnered from the permanent population in the entire township, but 75% of the residents on Green Lake including the residents of Green Lake in New London Township are seasonal and claim their residence in other areas of Minnesota and the United States. More particularly, the EIS notes that 40% of New London Township residents 65 years or older are subsisting at a poverty level and that 64% in the study area have an annual income of less than $10,000. These statistics, insofar as the residents of Green Lake are concerned and the affected area that might be assessed for the project, are simply incorrect and the conclusions drawn from the study are erroneous.

An interested committee of people who live on Green Lake in New London Township and who are eminently acquainted with the residents on Green Lake in the New London Township portion made a careful and exhaustive study of the incomes and financial worth of those Green Lake property owners.

There are 47 permanent homes on Green Lake in New London Township. There are a total of 176 lakeshore residents on Green Lake in New London Township, and of that total only nine, or approximately 5%, would be adversely affected by a sewer system, either because of their low fixed net income or their minimum net worth. It is also the opinion of our committee that the same percentages and observations would prevail around the entire lake in addition to that portion of the lake which is located in New London Township.

The writer and our committee that made the study respectfully request that your final EIS Statement should adopt the statistics which are cited in this letter or conduct your own independent inquiry which I am sure will confirm the data contained in this letter.

Respectfully Submitted,

Russell Dykema
Property owner on Green Lake
and in New London Township

ZONING ADMINISTRATOR

Kandiyohi County
Courthouse
Willmar, Minnesota 56201
Telephone: 235-3917

August 17, 1979

Mr. Wally Fischer
Spicer, MN 56288

RE: A general analysis of the on-site sewage treatment systems located along a line from New London Village to the Old Mill Inn on Green Lake.

Dear Wally:

The analysis begins by designating a corridor between New London Village and Green Lake on township one-half section maps. The corridor follows state highway # 23 and county road # 131, with several of the platted areas included. The residences were then designated as to the known status of the on-site sewage treatment systems. Of the approximate 59 sites reviewed, it was found that 28 sites have installed on-site sewage treatment systems since 1972, which are in compliance with the minimum requirements as outlined under Kandiyohi County Zoning Regulations. Thirty-one sites were existing previous to Kandiyohi County requiring permits and inspections.

The existing sewer systems may or may not be in compliance with the minimum requirements. Sanitation regulations permit existing sewer systems to remain until such time as they would create a niusance or be in need of repair. If either of these occur, the system must be updated to comply with the minimum standards.

The incidence of known failure for existing sewer systems in this area has been small. Generally, most all the sites are of adequate size, thus providing suitable areas in which to install a new system or modify and repair an existing one. Nearness to ground water table and problem soil types do not create serious limitations with a very small percentage of exceptions. Water wells in this area are generally over 50 feet in depth.

In conclusion, I would say on-site sewer systems are providing an adequate means of sewage disposal in this area without creating pollution problems. This conclusion is arrived at because there are adequate lot sizes, acceptable permeable soils with adequate elevation above the ground water tables are present, limitations on sewer installations are few, congestion of dwellings are not a problem, and the record of systems which are known to have failed are few.

Sincerely,

Steve Peterson
Assistant Zoning Administrator
Plat attached
enc.

SP:dz

NOYES ENGINEERING SERVICE

P. O. BOX 1314 Phone 235-2603 WILLMAR, MINN. 56201

August 2, 1979

U. S. Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, Illinois 60604

Re: Green Lake Sanitary Sewer and Water District
Kandiyohi County, Minnesota
F.P.A. No. C271377-01
Environmental Impact Statement

Gentlemen;

After review of the Environmental Impact Statement Draft, we submit herewith data for your consideration prior to finalizing the EIS Statement.

At the May 17, 1979 conference with EPA officials in Senator Boschwitz's office in Washington, D.C., we indicated that revised cost estimates of wastewater treatment facilities favored mechanical treatment over stabilization ponds, and because of serious objections to ponds by area farmers, we were amending our recommendation in the Facilities Plan to use of the mechanical facility rather than stabilization ponds. This was not considered in the Draft of the EIS Statement.

Attached are the following:

Table I	Revised cost estimate for stabilization ponds
Table II	Revised cost estimate for mechanical treatment facility
Table III	Estimated annual O&M costs for treatment facilities
Table IV	Estimated Total Equivalent Annual Costs for each
Table X	Revised cost estimate for Collection (South Shore Green L.)
Table XI	Revised cost estimate for Collection (North Shore Green L.)
Table A	Cost estimate for gravity collection sewers for Nest Lake
Table B	Cost estimate for on-site & clusters for Nest Lake
Table C	Summary of estimated costs for new Alternates 7 and 8
Table D	Summary of all alternatives considered
Table F	Description of Proposed Alternatives 7 and 8

Very truly yours,

GREEN LAKE SANITARY SEWER AND WATER DISTRICT

W. A. Fischer, Chairman

cc: Minn. Pollution Control Agency
Reike Carroll Muller Associates, Inc.

encl/

TABLE I

ESTIMATED CAPITAL COSTS FOR WASTE STABILIZATION
LAGOON WATER POLLUTION CONTROL FACILITY
GREEN LAKE SANITARY SEWER AND WATER DISTRICT

ITEM	UNITS	ESTIMATED COSTS	SALVAGE VALUE
Main Lift Station	1 each	$ 50,000	--
Portable Pump	1 each	10,000	--
Forcemain	19,200 L.F.	307,200	$153,600
Control Manholes	10 each	25,000	12,500
Internal Piping	6,200 L.F.	111,600	55,800
Concrete Splash Pads	16 each	8,000	4,000
Earthwork	110,200 c.y.	137,800	68,900
Seepage Control	276,000 s.y.	372,600	186,300
Erosion Control	27,900 s.y.	232,500	116,200
Outfall Sewer	5,000 L.F.	90,000	45,000
Flow Metering	2 each	16,000	--
Control Building	210 s.f.	12,800	6,400
Pond Prefill	L.S.	5,700	--
Seeding	12 acres	8,000	--
Fence	8,000 L.F.	24,000	--
Tractor	1 each	20,000	--
Electrical	L.S.	25,000	--
Subtotal		$1,456,200	
Contingencies (10%)		145,600	
Engineering, Legal & Administration (15%)		240,300	
Operation & Maintenance Manual		10,000	
Land		76,000	76,000
Total Estimated Initial Capital Costs		$1,928,100	$724,700

File No. 741001-2
May 16, 1979

TABLE II

ESTIMATED COSTS FOR MECHANICAL
WATER POLLUTION CONTROL FACILITY
GREEN LAKE SANITARY SEWER AND WATER DISTRICT

ITEM	UNITS	ESTIMATED COSTS	SALVAGE VALUE
Bar Screen & Flow Measuring Station	1 each	$ 23,300	$ 11,600
Main Lift Station	1 each	50,000	--
Portable Pump	1 each	10,000	--
Forcemain	12,600 L.F.	201,600	100,800
Grit Chamber	1 each	32,100	4,600
Oxidation Ditch	1 each	162,200	57,100
Final Clarifiers	2 each	102,000	31,000
Tertiary Filters	2 each	224,300	5,000
Chlorination Facility	1 each	36,100	12,000
Internal Piping	420 L.F.	42,000	21,000
Outfall Flow Measuring Station	1 each	4,000	2,000
Outfall Sewer	1,000 L.F.	18,000	9,000
Office Building	360 s.f.	11,000	5,500
Standby Power	1 each	25,000	--
Sludge Storage Lagoon	1 each	28,000	14,000
Sludge Truck	1 each	56,100	--
Site Grading	L.S.	40,000	20,000
Seeding	L.S.	6,000	--
Fence	1,900 L.F.	19,000	--
Electrical (includes meters)	L.S.	128,600	--
Subtotal		$1,219,300	
Contingencies (10%)		121,900	
Engineering, Legal & Administration (15%)		201,200	
Operation & Maintenance Manual		15,000	
Land		5,000	5,000
Total Estimated Initial Capital Costs		$1,562,400	$298,600

File No. 741001-2
May 16, 1979

TABLE III

ESTIMATED ANNUAL OPERATION AND MAINTENANCE
COSTS FOR PROPOSED WATER POLLUTION CONTROL FACILITIES

ITEM	MECHANICAL FACILITY	WASTE STABILIZATION LAGOON FACILITY
Salaries	$21,000	$ 7,000
Power	6,200	1,300
Chemicals	1,000	--
Supplies & Fuel	5,000	2,000
Scheduled Replacement (2% of Equipment)	12,900	1,700
Independent Lab Testing	--	1,500
Total Estimated Annual O&M Cost, $/yr	$46,100	$13,500

File No. 741001-2
May 16, 1979

TABLE IV

ESTIMATED TOTAL EQUIVALENT ANNUAL COSTS
FOR WATER POLLUTION CONTROL ALTERNATIVES

ITEM	MECHANICAL FACILITY	WASTE STABILIZATION LAGOON FACILITY
1. Total Estimated Initial Capital Cost	$1,562,400	$1,928,100
2. Estimated Salvage Value	298,600	724,700
3. Estimated Equivalent Annual Cost, $/yr	146,100	180,200
4. Estimated Equivalent Annual Salvage Value, $/yr	7,400	17,900
5. Estimated Equivalent O&M Cost, $/yr (Refer to Table III)	46,100	13,500
6. Estimated Total Equivalent Annual Cost, $/yr (Line 3 + Line 5-Line 4)	184,800	$175,800

File No. 741001-2
May 16, 1979

TABLE X

ESTIMATED CAPITAL COSTS FOR SANITARY SEWER COLLECTION SYSTEM
PROPOSED FOR THE SOUTH SHORE OF GREEN LAKE

ITEM	QUANTITY	UNIT PRICE	TOTAL
8" Sewer Pipe (0- 8')	205 LF	$ 12.00	$ 2,460.00
" (8-10')	2236 LF	13.20	29,515.20
" (10-12')	4024 LF	14.40	57,945.60
" (12-14')	5268 LF	16.80	88,502.40
" (14-16')	2786 LF	19.20	53,491.20
" (16-18')	1371 LF	21.60	29,613.60
" (18-20')	1015 LF	24.00	24,360.00
" (20-22')	829 LF	27.60	22,880.40
10" Sewer Pipe (0- 8')	400 LF	13.20	5,280.00
" (8-10')	825 LF	14.40	11,880.00
" (10-12')	1796 LF	15.60	28,017.60
" (12-14')	614 LF	18.00	11,052.00
" (14-16')	1860 LF	20.40	37,944.00
" (16-18')	277 LF	22.80	6,315.60
" (18-20')	228 LF	26.40	6,019.20
Standard Manhole, (0-8')	75 Each	660.00	49,500.00
Extra Depth Manhole (over 8')	453 LF	60.00	27,180.00
8" Drop Section	35 LF	120.00	4,200.00
Service Wyes	307 Each	60.00	18,420.00
6" Service Pipe	9115 LF	12.00	109,380.00
Rock Bedding	4300 Ton	4.20	18,060.00
Lift Station	6 Each	30000.00	180,000.00
6" Forcemain	5235 LF	9.00	47,115.00
Connect to Terminal Manhole	1 Each	120.00	120.00
Air Release	1 Each	1200.00	1,200.00
Channel Crossing	1 Each	2400.00	2,400.00
Clear and Grub	12 Tree	150.00	1,800.00
Street Restoration	Lump Sum	276000.00	276,000.00
		SUB-TOTAL	$ 1,150,651.80
		Plus 25%	287,662.90
		TOTAL ESTIMATED COST	$ 1,438,314.70

Dated August 1, 1979

TABLE XI

ESTIMATED CAPITAL COSTS FOR SANITARY SEWER COLLECTION SYSTEM
PROPOSED FOR THE NORTH SHORE OF GREEN LAKE

ITEM	QUANTITY	UNIT PRICE	TOTAL
8" Sewer Pipe (0- 8')	1380 LF	$ 12.00	$ 16,560.00
" (8-10')	3980 LF	13.20	52,536.00
" (10-12')	1250 LF	14.40	18,000.00
" (12-14')	825 LF	16.80	13,860.00
" (14-16')	575 LF	19.20	11,040.00
10" Sewer Pipe (0- 8')	3024 LF	13.20	39,916.80
" (8-10')	2045 LF	14.40	29,448.00
" (10-12')	1200 LF	15.60	18,720.00
" (12-14')	500 LF	16.80	8,400.00
" (14-16')	340 LF	19.20	6,528.00
12" Sewer Pipe (0- 8')	875 LF	14.40	12,600.00
" (8-10')	2315 LF	15.60	36,114.00
" (10-12')	3180 LF	16.80	53,424.00
" (12-14')	2785 LF	19.20	53,472.00
" (14-16')	1760 LF	21.60	38,016.00
" (16-18')	805 LF	24.00	19,320.00
" (18-20')	300 LF	27.60	8,280.00
" (20-22')	150 LF	30.00	4,500.00
" (22-24')	175 LF	33.60	5,880.00
Forcemain 6" and 8"	9800 LF	12.00	117,600.00
Construct Manhole, Avg. 10' Deep	82 EA	720.00	59,040.00
Construct Service Branch,	312 EA	480.00	149,760.00
Construct Riser Assembly,	104 EA	60.00	6,240.00
Pipe Bedding Material	800 CY	6.00	4,800.00
Lift Station	6 EA	30000.00	180,000.00
Restore Surface (Old design)	46000 SY	3.60	165,600.00
Restore Surface (New design)	9650 SY	4.80	46,320.00
		SUB-TOTAL	$ 1,175,974.80
		Plus 25%	293,993.70
		GRAND TOTAL	$ 1,469,968.50

Dated August 1, 1979

TABLE A

GREEN LAKE WATER AND SEWER DISTRICT

FOLLOWING IS AN UP-DATED COST ESTIMATE FOR COLLECTION SEWERS ON WEST LAKE

(Original estimate contained in the Feasibility Report of Dec. 1974)

NORTH SHORE:

ITEM	QUANTITY	UNIT PRICE	TOTAL
8" Sewer Pipe (10-12')	3100 LF	$ 14.00	$ 43,400
" (12-14')	900 LF	16.00	14,400
" (14-16')	800 LF	19.00	15,200
" (16-18')	750 LF	21.50	16,125
" (18-20')	450 LF	24.00	10,800
Construct Manhole, complete	16 EA	850.00	13,600
Construct Riser Assembly	24 EA	70.00	1,680
Highway Crossing	90 LF	80.00	7,200
Railroad Crossing	50 LF	90.00	4,500
Pumping Station	3 EA	30000.00	90,000
Forcemain	4400 LF	12.00	52,800
Construct Service Branch	60 EA	450.00	27,000
Restore Bituminous Surface	11000 SY	4.00	44,000
SUB-TOTAL			$ 340,705
Plus 25%			85,175
TOTAL ESTIMATED CAPITAL COST			$ 425,880

NOTE: Approximate 75% increase since 1974.

SOUTH SHORE:

THE APPROXIMATE CAPITAL COST FOR SOUTH SHORE COLLECTION USING THE SAME BASIC UNIT COSTS AS FOR THE NORTH SHORE IS $ 363,475

NOTE: COST ESTIMATE ON SUMMARY SHEET ROUNDED OFF TO $ 800,000.00.

(USED WITH PROPOSED ALTERNATE 7)

TABLE B

GREEN LAKE WATER AND SEWER DISTRICT

SUPPORTING DATA FOR PROPOSED ALTERNATE B FOR NEST LAKE SEWERS:

BY INSPECTION OF THE NORTH SHORE, IT IS ESTIMATED THAT APPROXIMATELY 20 DWELLINGS WOULD ACCUMULATE ON-SITE SYSTEMS AND ABOUT 40 WOULD BE COVERED IN 2 CLUSTERS.

USING THE ABOVE:

20 on-site systems @ $2,000 each	$ 40,000
2 clusters at $ 35,000 each	70,000
Pumps and collection system	15,000
TOTAL ESTIMATED COST-NORTH SHORE	$ 125,000

SOUTH SHORE

Estimated 20 on-site systems @ $2,000 each	$ 40,000
10 Grinder pumps estimated @ $1,500 each	15,000
Collection costs	15,000
One large or 2 smaller cluster fields	50,000
TOTAL ESTIMATED COST - SOUTH SHORE	$ 120,000
SUB-TOTAL TO NEST LAKE	$ 245,000
Add land, fees, contingencies	55,000
TOTAL ESTIMATED COST TO NEST LAKE	$ 300,000

TABLE C

GREEN LAKE WATER AND SEWER DISTRICT

SUMMARY OF COSTS FOR PROPOSED ALTERNATE 7: August 1, 1979
(No grants allowed--25% Overhead included)

ESTIMATED COST OF COLLECTION (North Shore Green Lake)	$ 1,469,968.50
ESTIMATED COST OF COLLECTION (South Shore Green Lake)	1,438,314.70
SPICER, NEW LONDON & CORRIDOR BETWEEN	496,636.80
SUB-TOTAL ORIGINAL DISTRICT COLLECTION	$ 3,404,920.00
ESTIMATED COST OF COLLECTION (NEST LAKE) (Gravity)	$ 300,000.00
ESTIMATED COST FOR COMBINED MECHANICAL TREATMENT	$ 1,562,400.00
TOTAL ESTIMATED CAPITAL COSTS (ALTERNATE 7)	$ 5,767,320.00

SUMMARY OF COSTS FOR PROPOSED ALTERNATE 8:
(No grants allowed--25% overhead included)

ESTIMATED COST OF COLLECTION (North Shore Green Lake)	$ 1,469,968.50
ESTIMATED COST OF COLLECTION (South Shore Green Lake)	1,438,314.70
SPICER, NEW LONDON & CORRIDOR BETWEEN	496,636.80
SUB-TOTAL ORIGINAL DISTRICT COLLECTION	$ 3,404,920.00
ESTIMATED COST OF ON-SITE & CLUSTERS--NEST LAKE	300,000.00
ESTIMATED COST FOR COMBINED MECHANICAL TREATMENT	$ 1,562,400.00
TOTAL ESTIMATED CAPITAL COSTS (ALTERNATE 8)	$ 5,267,320.00

TABLE D

GREEN LAKE WATER AND SEWER DISTRICT

SUMMARY OF ALTERNATIVES IN E.I.S. DRAFT

ALTERNATIVE	CAPITAL COST	ANNUAL O&M COST	COST PER 20 YEARS
Facilities Plan	$ 6,130,000.00	$ 96,100	$ 1,922,000
Limited Action	Not Feasible		
Alternate No. 1	Not Feasible		
Alternate No. 2	8,613,000.00	13 ,400	2,686,000
Alternate No. 3 w/25% clusters	4,801,000.00	148,700	3,174,000
Alternate No 3 w/50% clusters	5,307,000.00	135,700	2,716,000
Alternate No. 4 w/25% clusters	3,931,000.00	83,100	1,662,000
Alternate No. 4 w/50% clusters	4,649,000.00	101,900	2,038,000
Alternate No. 5 w/25% clusters	4,191,000.00	88,500	1,770,000
Alternate No. 5 w/50% clusters	4,909,000.00	107,300	2,146,000
Alternate No. 6 w/25% clusters	2,804,000.00	111,400	2,228,000
Alternate No. 6 w/50% clusters	3,522,000.00	130,200	2,604,000

ALTERNATE NO. 7
(Revision of Plan Recommended in Facilities Plan)

Mechanical Treatment	1,562,400.00	46,100)	
Collection G.Lake	3,404,920.00)	)	1,888,000
Collection N.Lake	800,000.00)	48,300)	
	5,767,320.00	94,400	

ALTERNATE NO. 8

Gravity coll. G. Lake	3,404,920.00	50,000)	
On Site & Clusters for West Lake	300,000.00	)	1,922,000
Mechanical Treatment	1,562,400.00	46,100)	
	5,267,320.00	96,100	

TABLE E

GREEN LAKE WATER AND SEWER DISTRICT

DESCRIPTION OF PROPOSED COLLECTION AND WASTEWATER TREATMENT PLAN AS OUR RECOMMENDED REVISION OF PLAN IN 8-16-76 FACILITIES PLAN.

With the serious objections to the proposal for use of stabilization ponds for wastewater treatment East of Green Lake, the proposed use of this method has been abandoned. However, the cost estimates for both stabilization ponds and aeration channel mechanical treatment contained in the Facilities Plan have been amended to reflect current costs and are attached and identified as Tables I and II.

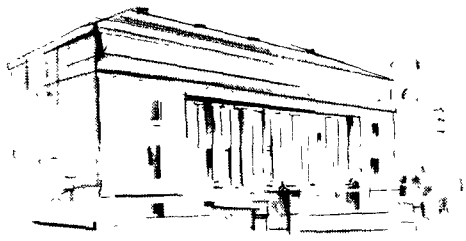
The Facilities Plan did not include any service for West Lake (which was not a part of the Green Lake Water and Sewer District), but provision was made in the design of the trunk sewer on the North side of Green Lake to accommodate future inclusion of West Lake loads.

ALTERNATE 7, submitted for your consideration, proposes inclusion of Spicer, New London, the Spicer-New London corridor, West Lake using a gravity collection system and all of Green Lake with gravity sewers leading to a central wastewater treatment facility using the mechanical option which would be located South and East of Lake Calhoun with discharge to the Middle Fork of the Crow River at a point East of Lake Calhoun. Farmers in that area have indicated no objection to such a facility.

ALTERNATE 8 proposes the same general plan as Alternate 7 except that in place of gravity collection sewers for West Lake, that area would be taken care of by use of on-site and cluster ground dispersal systems as necessary. Generally, West Lake properties are more adaptable to use of this type of systems than Green Lake. Limitations by lot size, density of occupancy, elevations and topography are more severe on Green Lake than on West Lake.

As it will be necessary to amend the Facilities Plan upon completion of the Environmental Impact Study and Report, and upon completion of the additional field studies under a proposed grant amendment to determine the potential for on-site and cluster concepts, these alternatives noted above will be covered completely at that time in the Facilities Plan.

These data are submitted for preliminary consideration by the Minnesota Pollution Control Agency, Environmental Protection Agency and their contractors for preparing the Environmental Impact Statement.



MINNESOTA HISTORICAL SOCIETY

690 Cedar Street, St. Paul, Minnesota 55101 • 612-296-2747

July 31, 1979

EIS Preparation Section
Planning Branch
U.S. Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, Illinois 60604

Dear Sir or Madam:

RE: Green Lake Sanitary Sewer and Water District for the villages of Spicer and New London, Kandiyohi County

MHS Referral File Number B99

In September, 1976, our office reviewed the above referenced project and determined that there was a high probability that prehistoric archaeological sites (not yet identified) may exist within the proposed project area. Consequently, we requested that an archaeological survey be conducted. To date, we have not received any indication that this work was completed. Therefore, we wish at this time to reiterate our original request. A copy of our original letter is enclosed for your information.

Sincerely,

Russell W. Fridley
State Historic Preservation Officer

RWF/cjb
Enclosure

B 99

30 September 1976

Mr. William G. Hendrickson, P.E.
RIEKE CARROLL MULLER ASSOCIATES, INC.
Post Office Box 130
Hopkins, Minnesota 55343

Dear Mr. Hendrickson:

RE: Historical/Cultural Significance of Proposed Pollution Control Facility Sites
Green Lake Sanitary Sewer and Water District
File No. 741001-2

We have researched the town site and Sioux Indian Village to which you refer in your letter of August 30, 1976. The town site of Irving was established in 1856 in section 30, T121-33, and was abandoned in 1862 during the Sioux Uprising. None of the proposed locations will affect the site, which now appears to be built up in lake cabins. The Sioux Indian Village appears to be located somewhere in Section 19, T121-33, well away from the proposed facilities areas. Our records also show prehistoric sites to be located at the outlet of Green Lake and on the east shore of Calhoun Lake. Neither site will be affected.

Examination of the pertinent topographic maps indicates that the proposed facilities will be located within a complex of marshes adjacent to lakes Green and Calhoun. Although we do not have sufficiently detailed soil maps to be certain, it is possible that the marsh areas represent silted lake basins. Prehistoric sites are frequently encountered along the shorelines of new-extinct bodies of water; the probability of prehistoric archaeological sites occuring in any of the proposed facilities locations is greater than chance. We would therefore request an on-site inspection of the location you select by a qualified archaeologist. You indicate that the four locations are now under cultivation, which means that any prehistoric sites that may be present will be evident on the surface. A simple walkover survey would be entirely adequate for our purposes, and would require a very small expenditure of time and money.

Sincerely,

Russell W. Fridley
State Historic Preservation Officer

RWF/fr

KANDIYOHI COUNTY BOARD OF COMMISSIONERS

Kandiyohi County Courthouse
Willmar, Minnesota 56201

Ralph M. Demgen
1st District

Virgil M. Olson
2nd District

Earl Larson
3rd District

Elroy Lovander
4th District

Richard Post
5th District

Wayne Thompson
Administrative Assistant

December 10, 1979

Mr. John C. McGuire
Regional Administrator
U. S. Environmental Protection Agency
230 South Dearborn
Chicago, Illinois 60604

Dear Mr. McGuire:

Re: GREEN LAKE EIS, Kandiyohi County, MN.

Recently, it was brought to the attention of the County Board that the County's septic tank regulations would have to be relaxed for purposes of implementing the proposed on-site sewage systems as recommended in alternative 5 and 6 of the EIS. The County Board believes that to relax standards, that are designed to protect the health, safety and welfare of the public, is a mistake.

It is the opinion of the County Board that the lakes, rivers and streams of the county are valuable resources that deserve protection above and beyond those septic tank standards called for in the EIS. In as much as there are no performance standards on which to judge the effectiveness of on-site systems, we believe that the present standards must continue to apply. Relaxing the standards, may in fact, cause unknown damages to the health, safety and welfare of the community.

The County Board realizes that in many cases on-site systems probably do not conform to our standards. We also realize that those systems, such as those around Green Lake, were installed during a period of time when standards did not exist. It is for that reason that the Kandiyohi County Board supports a lot-by-lot survey to determine where there are septic systems that do not meet standards on Green Lake.

We fully realize that EPA is not inclined to assist or approve a central sewage system around Green Lake. In the spirit of cooperation it is the County Board's intention to implement the on-site and cluster system recommendation. However, at the same time, we would expect that the county's present septic tank standards be adhered to in the evaluation and design of any on-site system.

Enclosed is a copy of the Kandiyohi County standards for home sewage systems.

Sincerely,

Virgil M. Olson

Virgil Olson
Chairman

VO:mj
Enc.

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