Community Assistantship Program

Van's Island: Wastewater Treatment and Next Steps

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Prepared in partnership with
TAMS - The Association of Mink & Somers

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August, 2004

CAP Report 066

May 2006

CAP is a cross-college, cross-campus University of Minnesota initiative coordinated by the Center for Urban and Regional Affairs.

Funds for this project were generously provided by COPE.

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08/27/2003

Van's Island: Wastewater Treatment and Next Steps

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Expertise, guidance and support provided by the following University of Minnesota Extension Service Faculty: Ken Olson, Nancy Lenhart and Tom Hovde.

Funding for the research was provided by a grant from the University of Minnesota Extension Service and the University of Minnesota Council on Public Engagement.

Partnership organizations included The Association of Mink and Somers, The Hubert H. Humphrey Institute of Public Affairs' Center for Urban and Regional Affairs' Community Assistantship Program at the University of Minnesota, The University of Minnesota Extension Service and The University of Minnesota Extension Service in Wright County.

Part I– General Information

1. Introduction

Van's Island was identified as the most important priority for the study because of the high-density population and the small lot sizes that do not provide the space needed to build typical on-site septic systems that conform to sanitary ordinances. Additionally, the current method of handling waste via holding tanks and regular pumping may be more costly and less efficient than a community based treatment system.

In the future a community based treatment system would provide a long-term economic and efficient alternative to the current methods. An effective system will separate the solids from the liquids in the septic tank and then deliver the liquids to a soil treatment system. The soil treatment system will kill bacteria, viruses and other disease organisms, remove phosphorous and other nutrients, reduce nitrate content and recycle the water into the soil.[1]

2. Survey Results

Although the study consisted of an area with 26 plats, there were actually only 23 residences on those 26 plats. The results of the survey indicated that roughly 57% of the residents in the study area used their lake homes as year round homes. The other 43% were either seasonal or infrequent residences. 57% of the homes had holding tanks, 30% had septic and dispersal systems (i.e. septic and drain field and septic and treatment system) and 13% were unknown. Among residents surveyed, the average number of holding tank pumpings were 9.6 times per year or about every 5.42 weeks. Residents on septic and dispersal systems on average pumped their tanks .48 times per year or about once every 2 years. Some residents pumped as often as 17.3 times per year, while other residents had never pumped their systems. Year round residents with holding tanks pumped more frequently than seasonal or weekend residents. Residents with septic and dispersal systems pumped about as frequently regardless of whether they were year round or seasonal residents. Residents paid anywhere from $45 to $110 to have their tanks pumped. The typical range was $60-$80. Survey information can be found in Appendix A.

3. Projected Costs for maintaining existing systems

Though the average number of pumpings per year for residents on holding tanks was 9.6, the number may be closer to 6.6 including all residents on holding tanks and on septic and dispersal systems. Residents who lived on Van's Island and surrounds year round pumped as often as 17.3 times per year or every 3 weeks.

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[1] Olson, Ken. *Taking Care of Your Septic System: Owner's Basics.* University of Minnesota Extension Service. 1999.

The number of pumpings varied with the amount of company. In other words, the more people inhabited the home (weekend guests, etc.) the more often it was necessary to pump. Additionally, the more frequently homeowners pumped, the lower their cost per pump. In Appendix B, the amount of money spent on pumping septic tanks/holding tanks is calculated out over 15, 20, 25 and 30 yr intervals assuming a number of different pumping costs and frequencies of pumping. In example, a residence that pumps its septic tank roughly every 6.5 weeks, and pays $70 each time, over the course of 25 years, will have spent an estimated $13,913. A resident that must pump every three weeks at $70 per time will pay $30,333 over the course of thirty years. See Appendix B for projected cost tables.

4. Organizational Findings

The Association of Mink & Somers (TAMS) initiated this project and has and will be instrumental in this ongoing work. However, it may be necessary to form a Wastewater Committee of TAMS that meets regularly, makes wastewater decisions and maintains a dialog with all the homeowners about wastewater issues.

The residents of Van's Island and the peninsula that separates the lakes may want to consider whether they want to work with TAMS on developing an association wide solution using either the centralized (i.e. city sewer) or decentralized (individual and/or multi-household –"cluster") concept of wastewater treatment. The options that follow are contingent on whether the residents of different parts of TAMS decide to work together as an entire lake association or divide into smaller wastewater handling units.

Part II- Options

Option A

The first option is attempting to connect to a Wastewater plant. If this option were pursued, it would be less expensive per property if all the homes surrounding the lake opted to connect as compared to only part of them. Therefore TAMS would need to, in addition to creating a wastewater steering committee, examine all of the ownership and management options available to them, including annexation into the city or formation of a new entity such as a Subordinate Service District (SSD) through the county or Corinna Township to contract with the city to provide wastewater treatment. A township or county through a Subordinate Service District would be able to contract with a city to provide wastewater treatment for a portion of their residents. In this arrangement only the residents receiving the service pay for it. In this way, other constituents' tax dollars are not used. By petitioning the township to create a SSD, the residents agree to pay for the services provided.[2]

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[2] Olson, Ken, et al. *Small Community Wastewater Solutions: A guide to making treatment, management and financing decisions.* University of Minnesota Extension Service. 2002.

The formation of a SSD is one example possibility, but there are other entities that should be evaluated by the Wastewater Committee.

Under this option, in the future, Mink & Somers lakes would probably be annexed by the City of Maple Lake and would be taxed in the same way as other residents. Also Corinna Township would lose a portion of their tax base from loosing Mink & Somers lakes.

There are many cases where something similar has happened. In Saint Michael, the city recognized the environmental hazards of having leaking septic systems so close to Lakes Bebe and Charlotte and opted to connect them to the City Wastewater plant. The city collected assessments from all the residents that would be connected to the city sewer and these paid for 100% of the work. Some of the considerations that went in to the assessments were the installation of grinder pumps, removal of old holding/septic tanks ($190.50 each), extra depth, service line etc. In addition, each resident had to also pay for the connection and tubing from their house to the central sewer line (near the road). The average assessment was near $15,000. In this case, however, the lakes were already within the City of Saint Michael. This cost is typically spread over a number of years through a low interest loan. The Engineering Consulting Company that did the design and coordinated the project was McCombs, Frank and Roos Associates. Their contact information can be found in Appendix C.

Clear Lake outside of Watkins in Meeker County also provides another example, however I was not able to get further information about it.

Option B

Option B is to use one cluster system for the residents of Van's Island and possibly use that as a model for the rest of the lake. In this scenario, homes around the lake would divide into clusters of 6-25 homes for wastewater treatment purposes. Each of these cluster groups could be independent units or be members of a larger "area" unit. The Wastewater Committee would need to evaluate several options. There are many factors to consider when selecting the right treatment system including soil types, topology, temperature, precipitation and water use information.

There are three types of soil in the area around the island under consideration for a community based septic system. The first, 106C2 (Lester loam, 6 to 12% slopes, eroded) is very deep (greater than 60 inches), well drained and has a water table depth of greater than 6.0 feet. For septic tank absorption fields its limitations are rated moderate because it percolates slowly and is on a slope. Moderate means that the limitations should be recognized, but generally can be overcome by good design and management. For sewage lagoon areas, the limitations are rated severe because of the slope. The severe designate indicates that overcoming the limitations is difficult or impractical and that increased maintenance may be required.

The second type of soil is 1362B or Angus loam, 2 to 5% slopes. This soil also goes very deep (greater than 60 inches) and is well drained. However, the water

table here is only 3.5 to 6 feet deep. For septic tank absorption fields it is rated severe for wetness. For sewage lagoon areas it is rated moderate for seepage, slope and wetness.

1901B or Angus-Le Sueur complex, 1 to 5% slopes is the third soil type. The Angus component is characterized as very deep, well drained with a water table from 3.5 to 6 feet deep. The Le Sueur part is described as very deep, moderately well drained with a water table at 2.5 to 4 feet. The complex as a whole is classified as severe for septic tank absorption fields due to wetness. For sewage lagoon areas it is rated as moderate for seepage, slope and wetness[3]. A Soil type map is included in Appendix G[3].

A topographical map with 10-foot contours is included in Appendix H[4].

From 1951 to 1980, the area under consideration received an annual average of 44-48 inches of snowfall[5]. On average today, the area receives approximately 28 inches of precipitation per year[6]. It has a normal mean temperature of 43° F annually[7].

From 2000 to 2030, Wright County is expected to grow by 54.5% or from 89,986 residents in 2000 to 139,020 residents in 2030[8].

The County Comprehensive land use plan zones most of the plats surrounding the lakes as residential with the exception of a part of the lake that is zoned agricultural. The map is included in Appendix I.

Option C

Option C combines options A and B. In the short to medium timeline, efforts could be coordinated towards a series of cluster systems around the lake, with Van's Island being a pilot area. In the long term however, these cluster systems could eventually be connected to city sewer if it extended out to Mink and Somers lakes. In this option the short-medium term cluster community based septic systems would be designed so that in the future they would easily be able to be connected to city sewer.

Part III- Next Steps for the Community

One of the most important aspects of examining community wastewater treatment systems is the involvement of the whole community. Residents of Mink and Somers Lakes and Van's Island will have to consider how they envision their community and how they see its future. Once a community vision is established, the Wastewater Committee can develop a work plan, keep everyone informed and go

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[3] Wright Soil and Water Conservation District, 306C Brighton Ave, Buffalo, MN 55313.

[4] U.S Geological Survey, Reston, Virginia. Annandale, Minn., SE/4 Annandale 15' Quadrangle, N4515-W9400/7.5. 1974.

[5] DNR, Division of Waters State Climatology Office. September 1988.

[6] University of Minnesota. http://climate.umn.edu/img/normals/precip/precip_norm_annual.htm 2002.

[7] University of Minnesota. http://climate.umn.edu/img/normals/mean_temp_norm_adj/mean_temp_norm_adj_annual.htm 2003.

[8] Minnesota Department of Planning

forward with addressing wastewater issues. The publication *Small Community Wastewater Solutions: A Guide to Making Treatment, Management and Financing Decisions* by Ken Olson, Bridget Chard, Doug Malchow and Don Hickman will provide an invaluable tool in this process.

Additionally, the University of Minnesota Extension Service offers septic system education seminars, which would be excellent to use in the next TAMS meeting in October. Ken Olson, an expert in small community wastewater systems, also gives introductory small community wastewater presentations and would be good to schedule with him with the Wastewater Committee.

Some topics/steps that the Wastewater Committee will need to address include:

- Working with the community
- Collecting and interpreting data and keeping records
- Learning about the various kinds of treatment systems
- Designing a way to manage the treatment system
- Selecting an organizational structure
- Finding a way to fund the project
- Hiring qualified professional help and planning for a successful project.[9]

Moreover, it will be extremely helpful if the Wastewater Committee identifies all the stakeholders and invites county, township and city government members to discuss options so that all parties are involved from the beginning and no party is left out until the last moment.

In conclusion,

> "Every community would naturally like to skip all of the struggle and go right to the solution, but it doesn't work that way. The process of finding a viable solution to a community wastewater issue can take several years from inception through implementation. Working through the steps stimulates the people in the community to learn, to understand and negotiate their differences, and to come to a conclusion that everyone can live with. Such a decision will ensure that your community's wastewater is adequately treated at a reasonable cost and will accommodate the plans of your community in to the future[9]."

[9] Olson, Ken, et al. *Small Community Wastewater Solutions: A guide to making treatment, management and financing decisions.* University of Minnesota Extension Service. 2002.

Appendix A. Survey Results

Average Number of Bedrooms/Home	2.47	
Average Number of Residents/Home	2.75	
Maximum Number of Bedrooms	3.00	
Maximum Number of Residents	8.00	
Year Round Residences	13	57%
Seasonal/Infrequent/Unknown Residences	10	43%
Number of Holding Tanks	13	57%
Number of Septic & Drain	4	17%
Number of Septic Systems	3	13%
Number of Unknown Systems	3	13%
Average Number of Pumpings/Year (Holding Tanks)	7.95	
Maximum Number of Pumpings/Year (Holding Tanks)	17.33	
Minimum Number of Pumpings/Year (Holding Tanks)	4	
Average Number of Pumpings/Year (Septic & Dispersal)	0.48	
Maximum Number of Pumpings/Year (Septic & Dispersal)	1	
Minimum Number of Pumpings/Year (Septic & Dispersal)	0	
Number of Residences	23	
Number of Plats	26	

Appendix B. Projected Costs of Servicing Existing Systems

Figure 1. Cost over 15, 20, 25 and 30 years assuming 6.6 pumpings/year

Pumpings/year	Cost/pump	Over 15 yrs	Over 20 yrs	Over 25 yrs	Over 30 yrs	Study Area Over 30 yrs
6.6	$ 65	$ 6,435	$ 8,580	$ 10,725	$ 12,870	$ 334,620
6.6	$ 70	$ 6,930	$ 9,240	$ 11,550	$ 13,860	$ 360,360
6.6	$ 75	$ 7,425	$ 9,900	$ 12,375	$ 14,850	$ 386,100
6.6	$ 80	$ 7,920	$ 10,560	$ 13,200	$ 15,840	$ 411,840
6.6	$ 85	$ 8,415	$ 11,220	$ 14,025	$ 16,830	$ 437,580
6.6	$ 90	$ 8,910	$ 11,880	$ 14,850	$ 17,820	$ 463,320
6.6	$ 95	$ 9,405	$ 12,540	$ 15,675	$ 18,810	$ 489,060
6.6	$ 100	$ 9,900	$ 13,200	$ 16,500	$ 19,800	$ 514,800
6.6	$ 105	$ 10,395	$ 13,860	$ 17,325	$ 20,790	$ 540,540
6.6	$ 110	$ 10,890	$ 14,520	$ 18,150	$ 21,780	$ 566,280
6.6	$ 115	$ 11,385	$ 15,180	$ 18,975	$ 22,770	$ 592,020
6.6	$ 120	$ 11,880	$ 15,840	$ 19,800	$ 23,760	$ 617,760
6.6	$ 125	$ 12,375	$ 16,500	$ 20,625	$ 24,750	$ 643,500
6.6	$ 130	$ 12,870	$ 17,160	$ 21,450	$ 25,740	$ 669,240
6.6	$ 135	$ 13,365	$ 17,820	$ 22,275	$ 26,730	$ 694,980
6.6	$ 140	$ 13,860	$ 18,480	$ 23,100	$ 27,720	$ 720,720
6.6	$ 145	$ 14,355	$ 19,140	$ 23,925	$ 28,710	$ 746,460
6.6	$ 150	$ 14,850	$ 19,800	$ 24,750	$ 29,700	$ 772,200
6.6	$ 155	$ 15,345	$ 20,460	$ 25,575	$ 30,690	$ 797,940
6.6	$ 160	$ 15,840	$ 21,120	$ 26,400	$ 31,680	$ 823,680
6.6	$ 165	$ 16,335	$ 21,780	$ 27,225	$ 32,670	$ 849,420
6.6	$ 170	$ 16,830	$ 22,440	$ 28,050	$ 33,660	$ 875,160
6.6	$ 175	$ 17,325	$ 23,100	$ 28,875	$ 34,650	$ 900,900
6.6	$ 180	$ 17,820	$ 23,760	$ 29,700	$ 35,640	$ 926,640

Figure 2. Cost over 15, 20, 25 and 30 years assuming 9.6 pumpings/year

Pumpings/year	Cost/pump	Over 15 yrs	Over 20 yrs	Over 25 yrs	Over 30 yrs	Study Area Over 30 yrs
9.6	$ 65	$ 9,360	$ 12,480	$ 15,600	$ 18,720	$ 486,720
9.6	$ 70	$ 10,080	$ 13,440	$ 16,800	$ 20,160	$ 524,160
9.6	$ 75	$ 10,800	$ 14,400	$ 18,000	$ 21,600	$ 561,600
9.6	$ 80	$ 11,520	$ 15,360	$ 19,200	$ 23,040	$ 599,040
9.6	$ 85	$ 12,240	$ 16,320	$ 20,400	$ 24,480	$ 636,480
9.6	$ 90	$ 12,960	$ 17,280	$ 21,600	$ 25,920	$ 673,920
9.6	$ 95	$ 13,680	$ 18,240	$ 22,800	$ 27,360	$ 711,360
9.6	$ 100	$ 14,400	$ 19,200	$ 24,000	$ 28,800	$ 748,800
9.6	$ 105	$ 15,120	$ 20,160	$ 25,200	$ 30,240	$ 786,240
9.6	$ 110	$ 15,840	$ 21,120	$ 26,400	$ 31,680	$ 823,680
9.6	$ 115	$ 16,560	$ 22,080	$ 27,600	$ 33,120	$ 861,120
9.6	$ 120	$ 17,280	$ 23,040	$ 28,800	$ 34,560	$ 898,560
9.6	$ 125	$ 18,000	$ 24,000	$ 30,000	$ 36,000	$ 936,000
9.6	$ 130	$ 18,720	$ 24,960	$ 31,200	$ 37,440	$ 973,440
9.6	$ 135	$ 19,440	$ 25,920	$ 32,400	$ 38,880	$ 1,010,880
9.6	$ 140	$ 20,160	$ 26,880	$ 33,600	$ 40,320	$ 1,048,320
9.6	$ 145	$ 20,880	$ 27,840	$ 34,800	$ 41,760	$ 1,085,760
9.6	$ 150	$ 21,600	$ 28,800	$ 36,000	$ 43,200	$ 1,123,200
9.6	$ 155	$ 22,320	$ 29,760	$ 37,200	$ 44,640	$ 1,160,640
9.6	$ 160	$ 23,040	$ 30,720	$ 38,400	$ 46,080	$ 1,198,080
9.6	$ 165	$ 23,760	$ 31,680	$ 39,600	$ 47,520	$ 1,235,520
9.6	$ 170	$ 24,480	$ 32,640	$ 40,800	$ 48,960	$ 1,272,960
9.6	$ 175	$ 25,200	$ 33,600	$ 42,000	$ 50,400	$ 1,310,400
9.6	$ 180	$ 25,920	$ 34,560	$ 43,200	$ 51,840	$ 1,347,840

Figure 3. Cost over 15, 20, 25 and 30 years assuming 12 pumpings/year

Pumpings/year	Cost/pump	Over 15 yrs	Over 20 yrs	Over 25 yrs	Over 30 yrs	Study Area Over 30 yrs
12	$ 65	$ 11,700	$ 15,600	$ 19,500	$ 23,400	$ 608,400
12	$ 70	$ 12,600	$ 16,800	$ 21,000	$ 25,200	$ 655,200
12	$ 75	$ 13,500	$ 18,000	$ 22,500	$ 27,000	$ 702,000
12	$ 80	$ 14,400	$ 19,200	$ 24,000	$ 28,800	$ 748,800
12	$ 85	$ 15,300	$ 20,400	$ 25,500	$ 30,600	$ 795,600
12	$ 90	$ 16,200	$ 21,600	$ 27,000	$ 32,400	$ 842,400
12	$ 95	$ 17,100	$ 22,800	$ 28,500	$ 34,200	$ 889,200
12	$ 100	$ 18,000	$ 24,000	$ 30,000	$ 36,000	$ 936,000
12	$ 105	$ 18,900	$ 25,200	$ 31,500	$ 37,800	$ 982,800
12	$ 110	$ 19,800	$ 26,400	$ 33,000	$ 39,600	$ 1,029,600
12	$ 115	$ 20,700	$ 27,600	$ 34,500	$ 41,400	$ 1,076,400
12	$ 120	$ 21,600	$ 28,800	$ 36,000	$ 43,200	$ 1,123,200
12	$ 125	$ 22,500	$ 30,000	$ 37,500	$ 45,000	$ 1,170,000
12	$ 130	$ 23,400	$ 31,200	$ 39,000	$ 46,800	$ 1,216,800
12	$ 135	$ 24,300	$ 32,400	$ 40,500	$ 48,600	$ 1,263,600
12	$ 140	$ 25,200	$ 33,600	$ 42,000	$ 50,400	$ 1,310,400
12	$ 145	$ 26,100	$ 34,800	$ 43,500	$ 52,200	$ 1,357,200
12	$ 150	$ 27,000	$ 36,000	$ 45,000	$ 54,000	$ 1,404,000
12	$ 155	$ 27,900	$ 37,200	$ 46,500	$ 55,800	$ 1,450,800
12	$ 160	$ 28,800	$ 38,400	$ 48,000	$ 57,600	$ 1,497,600
12	$ 165	$ 29,700	$ 39,600	$ 49,500	$ 59,400	$ 1,544,400
12	$ 170	$ 30,600	$ 40,800	$ 51,000	$ 61,200	$ 1,591,200
12	$ 175	$ 31,500	$ 42,000	$ 52,500	$ 63,000	$ 1,638,000
12	$ 180	$ 32,400	$ 43,200	$ 54,000	$ 64,800	$ 1,684,800

Figure 4. Cost over 15, 20, 25 and 30 years assuming 17.33 pumpings/year

Pumpings/year	Cost/pump	Over 15 yrs	Over 20 yrs	Over 25 yrs	Over 30 yrs	Study Area Over 30 yrs
17.33	$ 65	$ 16,900	$ 22,533	$ 28,167	$ 33,800	$ 878,800
17.33	$ 70	$ 18,200	$ 24,267	$ 30,333	$ 36,400	$ 946,400
17.33	$ 75	$ 19,500	$ 26,000	$ 32,500	$ 39,000	$ 1,014,000
17.33	$ 80	$ 20,800	$ 27,733	$ 34,667	$ 41,600	$ 1,081,600
17.33	$ 85	$ 22,100	$ 29,467	$ 36,833	$ 44,200	$ 1,149,200
17.33	$ 90	$ 23,400	$ 31,200	$ 39,000	$ 46,800	$ 1,216,800
17.33	$ 95	$ 24,700	$ 32,933	$ 41,167	$ 49,400	$ 1,284,400
17.33	$ 100	$ 26,000	$ 34,667	$ 43,333	$ 52,000	$ 1,352,000
17.33	$ 105	$ 27,300	$ 36,400	$ 45,500	$ 54,600	$ 1,419,600
17.33	$ 110	$ 28,600	$ 38,133	$ 47,667	$ 57,200	$ 1,487,200
17.33	$ 115	$ 29,900	$ 39,867	$ 49,833	$ 59,800	$ 1,554,800
17.33	$ 120	$ 31,200	$ 41,600	$ 52,000	$ 62,400	$ 1,622,400
17.33	$ 125	$ 32,500	$ 43,333	$ 54,167	$ 65,000	$ 1,690,000
17.33	$ 130	$ 33,800	$ 45,067	$ 56,333	$ 67,600	$ 1,757,600
17.33	$ 135	$ 35,100	$ 46,800	$ 58,500	$ 70,200	$ 1,825,200
17.33	$ 140	$ 36,400	$ 48,533	$ 60,667	$ 72,800	$ 1,892,800
17.33	$ 145	$ 37,700	$ 50,267	$ 62,833	$ 75,400	$ 1,960,400
17.33	$ 150	$ 39,000	$ 52,000	$ 65,000	$ 78,000	$ 2,028,000
17.33	$ 155	$ 40,300	$ 53,733	$ 67,167	$ 80,600	$ 2,095,600
17.33	$ 160	$ 41,600	$ 55,467	$ 69,333	$ 83,200	$ 2,163,200
17.33	$ 165	$ 42,900	$ 57,200	$ 71,500	$ 85,800	$ 2,230,800
17.33	$ 170	$ 44,200	$ 58,933	$ 73,667	$ 88,400	$ 2,298,400
17.33	$ 175	$ 45,500	$ 60,667	$ 75,833	$ 91,000	$ 2,366,000
17.33	$ 180	$ 46,800	$ 62,400	$ 78,000	$ 93,600	$ 2,433,600

Appendix C. Designers of Community Based Septic Systems from the Minnesota Pollution Control Agency

Soil Scientists

James	Balogh	4915 E.Superior St. Ste.100	Duluth	MN	55804-2507	Spectrum Research Inc.	218-525-5322
Terry	Bovee	475 E. Washington	Le Center	MN	56057	MDH	507-357-6126
Paul	Brandt	317 E. Main St. Box 122	Melrose	MN	56352-0122	EarthTech of MN Inc.	320-256-4363
Norm	Kuhlman	501 S. Minnesota Ave.	St Peter	MN	56082	Nicollet County	507-931-6800
Dave	Larson	5473 Timber Ridge Dr. NE	Bemidji	MN	56601	Larson Environ. Consulting	218-751-2570
Steve	Lawler	40 16th St. SE	Rochester	MN	55904	Lawler Environmental Inc.	507-282-4090
Gary	Rathbun	1933 State Ave.	Anoka	MN	55303	S T S Consultants, Ltd.	763-315-6300
Michael	Rutten	14955 Galaxie Ave.	Apple Valley	MN	55124	Dakota County	952-891-7008
Mary	West	5818 Halifax Ave. N.	Brooklyn Center	MN	55429	Eagle Soil Services, Inc	763-504-9144
Robert	Whitmyer	3990 Farview Road	Duluth	MN	55803-2708	Matrix Soils & Systems, Inc.	218-728-3961

Engineers

Dan	Bigalke	3550 Lexington Ave. N.	Shoreview	MN	55126-8048	Arden Environmental Eng.	651-484-5415
Gerald	Canfield	2689 Eldridge Ave. N.	St. Paul	MN	55109	Earth Tech, Inc.	763-551-2440
Wade	DuMond	717 3rd Ave. SE	Rochester	MN	55904	Yaggy Colby Associates	507-288-6464
Richard	Elliott	15050 23rd Ave. N.	Plymouth	MN	55447	McCombs Frank Roos Assoc.	763-476-6010
Geoffrey	Griffin	17070 Highway 52 SE	Chatfield	MN	55923	GGG Engineering	507-867-9176
Dave	Gustafson	1725 Larpenteur Ave.	Maplewood	MN	55109	Woodland Engineering	651-704-9244
Willis	Hoyt	Box 120	Pequot Lakes	MN	56472	Landecker & Assoc., Inc.	218-568-4940
Steven	Klein	4700 W. 77th St.	Minneapolis	MN	55435	Barr Engineering Company	952-832-2600
Steven	Kline	8996 110th St. N.	Stillwater	MN	55082	Kline Bros. Excavating	612-429-5793
Stanley	Kumpula	4168 Interlachen Dr. N.	Hackensack	MN	56452-2169	Stanley R. Kumpula	218-682-2026
Scot	Leddy	602 2nd Ave. SW	Pipestone	MN	56164	Scot D. Leddy	507-825-6335
Michael	Mayer	830 26th Ave. N.	St Cloud	MN	56303		320-656-9073
Mary Jo	Miller	518 Maple Ridge Road	Berlin	WI	54923		
Richard	Otis	13 Blue Ridge Court	Madison	WI	53705	Ayres Associates	218-722-7131
Thomas	Prew	2522 Belmont Lane E.	St. Paul	MN	55109		
Curt	Sparks	20920 Keewahtin Avenue	Forest Lake	MN	55025	North American Wetland Eng.	651-433-2115
William	Stocker	18234 Raymond Drive SE	Cass Lake	MN	56633	Ecos Engineering	218-335-2999
Hugh	Veit	1604 South Washington St.	Grand Forks	ND	58201	KBM, Inc.	
Daniel	Viau	2000 Industrial Park Rd. S., PO Box 2720	Baxter	MN	56425-2720	Widseth Smith Nolting	218-829-5117

Appendix D. Installers of Community Based Septic Systems in Wright County - From the Minnesota Pollution Control Agency

A. L. Jordan Inc.	Arthur Jordan	620 Dutch Lake Dr. #600	Howard Lake	MN	55349	320-543-1120
Alley Excavating, Inc	Jason Kurkosky	5508 Lathrop Ave. NW	Annandale	MN	55302	320-274-2528
All-State Dirt Works	Curtis Mattila	2835 Hoyt Ave. NW	Maple Lake	MN	55358	320-963-6881
Annandale Septic Service	Norman Shoberg	675 Lake Dr. W.	Annandale	MN	55302	320-274-5984
C&G Diversified, Inc	Chris Grossinger	15605 112th St. NW	South Haven	MN	55382	320-980-3088
D. Kowalski Const.	Dennis Kowalski	1735 Ihrig Ave. SE	Buffalo	MN	55313	763-477-6866
D.J.B. Construction Service Inc.	Daniel A Reed	PO Box 1323	Monticello	MN	55362	763-263-7877
Dan Bonine Excavation	Dan Bonine	7285 120th St. NW	Annandale	MN	55302	320-274-2005
David J. Borrell	David Borrell	6607 County Road 7 NW	Maple Lake	MN	55358	320-963-3107
Davis Construction Co	William L Davis	700 Natalie Dr.	Buffalo	MN	55313	763-682-1846
Dean Glunz	Dean Glunz	5204 Cushing Ave. NW	Buffalo	MN	55313	320-963-3582
Duane's Septic Service	Duane D. Barthel	10502 31st Place NE	St. Michael	MN	55376	612-497-2764
Dudley Trucking	Richard Conally Jr.	7440 27th St. SE	Buffalo	MN	55313	763-477-6617
Ed Claessen Construction	Edward Claessen	7998 Ferman Ave. SW	Waverly	MN	55390	763-658-4278
Elmer J Peterson Company	James L. Braegelmann	5921 Dague Ave. SE	Delano	MN	55328	763-972-2420
Flygare Excavating, Inc.	Dean C. Flygare	9850 91st St. NW	Annandale	MN	55302	320-274-5437
Fyle's Excavating & Honey Wagon	Eugene H. Fyle	9697 Harding Ave. NE	Monticello	MN	55362	612-295-2511
Gullings Excavating	Wayne Gullings	6559 State Highway 25 NE	Buffalo	MN	55313	612-682-3649
Halstad Contracting	Duane Halstad	14180 91st St. NE	Elk River	MN	55330	763-441-4085
Hayes & Sons Excavating Inc.	Brad Hayes	263 82nd St. SE	Montrose	MN	55363	763-972-3521
Heart of the Lakes Pumping	Kelly S. Manley	8392 County Road 39 NW	Annandale	MN	55302	320-274-3351
Hudek Sewer Service	Dan Hudek	7542 Dempsey Ave. NW	Maple Lake	MN	55358	320-963-5834
J. L. Schmitz & Sons	Peter J. Schmitz/ Al Schmitz	13667 Meridian Ave. N.	Monticello	MN	55362	763-878-2296
JN Construction & Backhoe Service	James Niedzielski	PO Box 521	Maple Lake	MN	55358	612-741-0479
Kotila Excavating	Mark Kotila	14576 County Road 35 W	Cokato	MN	55321	320-286-2377
Kotilinek Excavating, Inc.	Mark Kotilinek	9133 Clementa Ave. NW	Maple Lake	MN	55358	320-963-3096
L. Ferrell Excavating, Inc.	Lamoine Ferrell	10908 Ireland Ave. NW	Annandale	MN	55302	320-274-8259
Lindberg Excavating, Inc	Warren Lindberg	895 Reardon Ave. SW	Cokato	MN	55321	320-286-2549

Lindenfelser Excavation	Jeff Lindenfelser	9058 85th St. NE	Monticello	MN	55362	763-295-6100
M. Praught Drilling, Inc.	Michael Praught	945 37th St. SE	Buffalo	MN	55313	763-682-3092
Mares Excavating	Ronald J. Mares	8344 State Hwy 55 NW	Annandale	MN	55302	320-274-3608
Meiny's Diggers Inc.	Julie Reemts	12211 42nd St. NE	St. Michael	MN	55376	763-497-2236
Metro General Services	Charles Cazett	5790 Quam Ave. NE	St. Michael	MN	55376	763-428-2938
Minnesota Environmental Services	Willie Gibbs	PO Box 553	Buffalo	MN	55313	763-684-0370
Morris Excavating Inc	Thomas Morris	425 Cokato St. W.	Cokato	MN	55321	320-286-5937
Otto Associates, Engineers & Land Survey	Edward J. Otto	9 West Division St.	Buffalo	MN	55313	763-682-4727
Ouverson Excavating	Douglas A. Ouverson	252 36th St. SW	Montrose	MN	55363	763-479-0337
R & L Dirtworks	Richard D. Etzel	4547 Desoto Ave. SW	Waverly	MN	55390	763-658-4211
RC Grading & Excavating, Inc.	Ryan Sarkinen	10594 56th St. NE	Albertville	MN	55301	763-497-1724
Rolstad Construction Co	Duane H. Rolstad	1855 20th St. SE	Buffalo	MN	55313	763-682-3765
Rusty's Perculation Testing	Joseph J Olson	11481 Riverview Rd. NE	Hanover	MN	55341	763-498-8779
Schirmers Wastewater Treatment Systems	Steven Schirmers	951 Katydid Lane NE	St. Michael	MN	55376	763-497-3566
Schluender Construction, Inc.	Gary Schluender	3331 90th St. NE	Monticello	MN	55362	763-295-5784
Severson Construction, Inc.	Roland Severson	PO Box 565	Cokato	MN	55321	320-286-5023
Sewerman Inc.	Merlin Brisbin	8182 NE River Rd.	Elk River	MN	55330	763-441-4548
S-P Testing, Inc.	Steven Schirmers	951 Katydid Lane NE	St. Michael	MN	55376	763-497-3566
Superior Septic Systems	Brian Edwards	8763 Mason Ave. NE	Elk River	MN	55330	763-441-3135
Tom's Backhoe Service	Tom Demarais	953 County Road 35 W	Buffalo	MN	55313	612-682-1011
Wright Excavating LLC	Rodney Werner	5580 County Road 6 SW	Howard Lake	MN	55349	320-543-3576
Yonak Sewer & Water Co.	James Yonak	1495 Gabler Ave. SE	Buffalo	MN	55313	763-477-5414

Appendix F. Contact Information of Resource People

Nancy Lenhart- Regional Extension Educator University of Minnesota Extension Service-Carver Co. 609 W. 1st St., Waconia, MN 55387. Tel: 952-442-4496 Email1: lenha002@umn.edu Email2: nlenhart@co.carver.mn.us Fax: 952-442-4497

Mary J. Anderson - Extension Educator University of Minnesota Extension Service- Wright Co. 10 2nd St. NW Room 130, Buffalo, MN 55313-1186. Phone: 763-682-7398 Fax: 800-362-3667 Email: ander326@umn.edu

Building Inspection/Environmental Health – Office of Wright County Planning and Zoning- Government Center, 10 NW 2nd St. Room 140, Buffalo, MN 55313-1185. Phone: 763-682-7338 Fax: 763-682-7872

Bradley Wozney-Water Resource Specialist- Wright Soil and Water Conservation District- 306C Brighton Ave., Buffalo, MN 55313. Phone: 763-682-1970 Fax: 763-682-0262

Kim Steffens- Contact given by Bradley Wozney as a resource for frost depth across Wright Co.- 763-566-2941

Corinna Township Clerk - 320-274-5179

Maple Lake City Hall -320-963-3611

Cherie Berning- City Assessor for the City of St. Michael- 763-497-5749

Carol Bell- City of St. Michael Clerk**-** 763-497-2041

Ken Olson- University of Minnesota Extension Service Expert in Small Communities Wastewater Management- Phone: 800-657-3516 Fax: 507-280-2872 Email: olson150@umn.edu

Tom Hovde- University of Minnesota Extension Service Regional Director for Wright and Sherburne Counties- Phone: 763-241-2720 Email: hovde003@umn.edu

City of Watkins Village Hall- Watkins MN, 55389, Phone: 320-764-2880

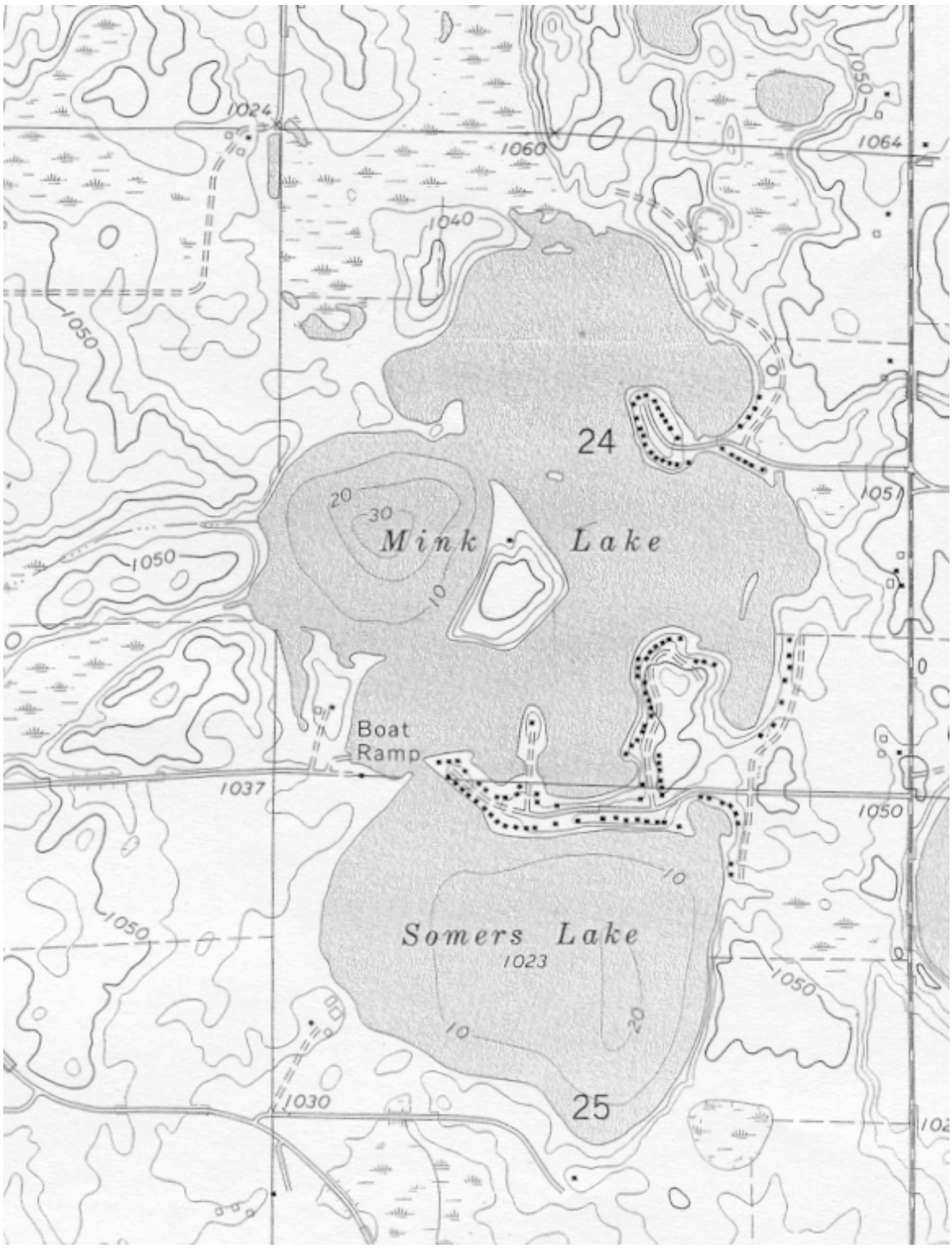
City of Howard Lake- Phone: 320-543-2318

Jennifer Klang- Minnesota Pollution Control Agency- Contact person for Nitrogen testing in the lakes, Phone: 651-282-2618

Benjamin Steiner- Undergraduate Researcher- Phone: 907-457-3990 Email: fsbjs@uaf.edu

Appendix G- Soil Type Map

Appendix H- Topographical Map



Appendix I- Comprehensive Land Use Plan for Corinna Township