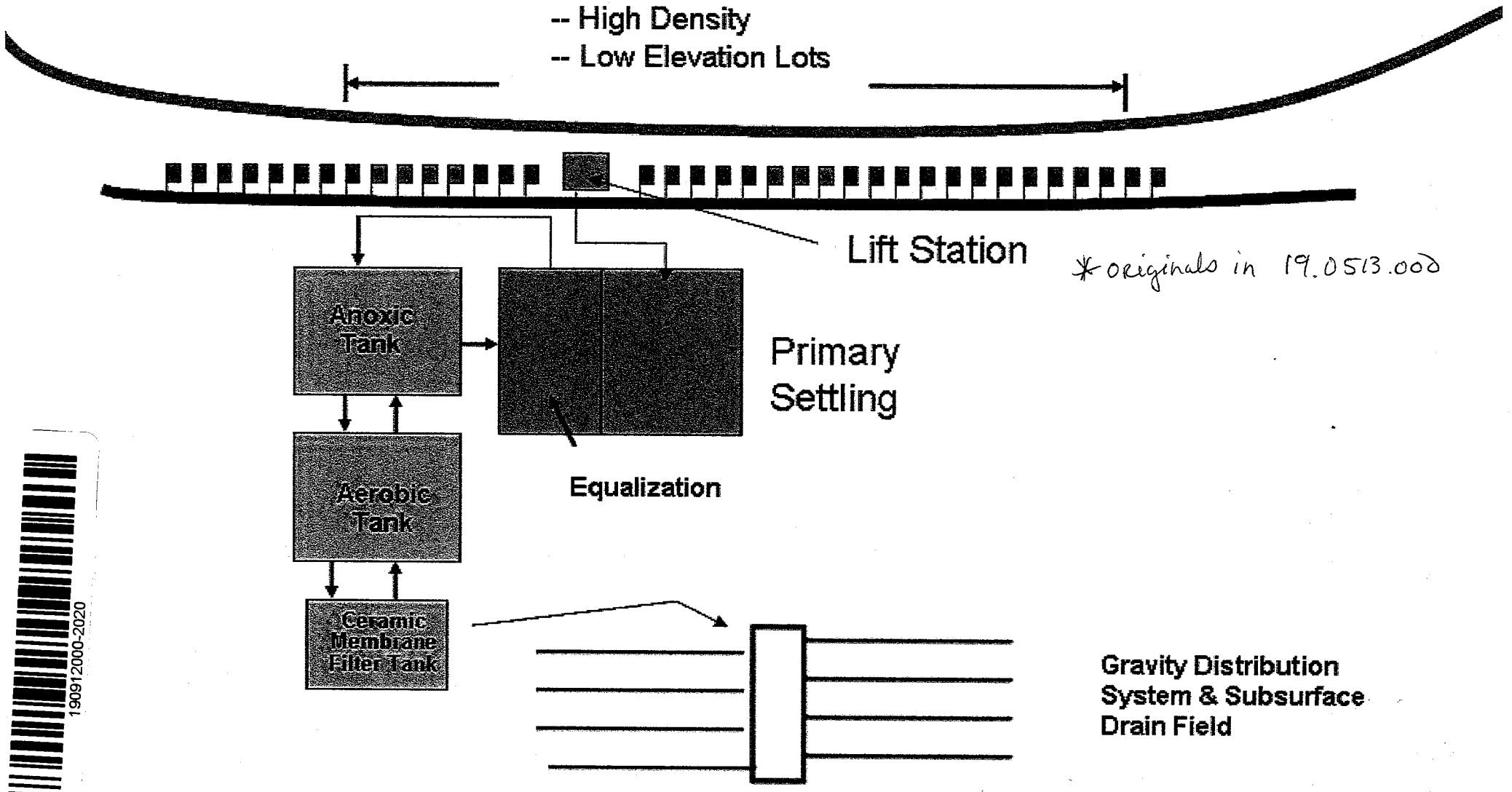
Lake Melissa Ceramic MBR Cluster System

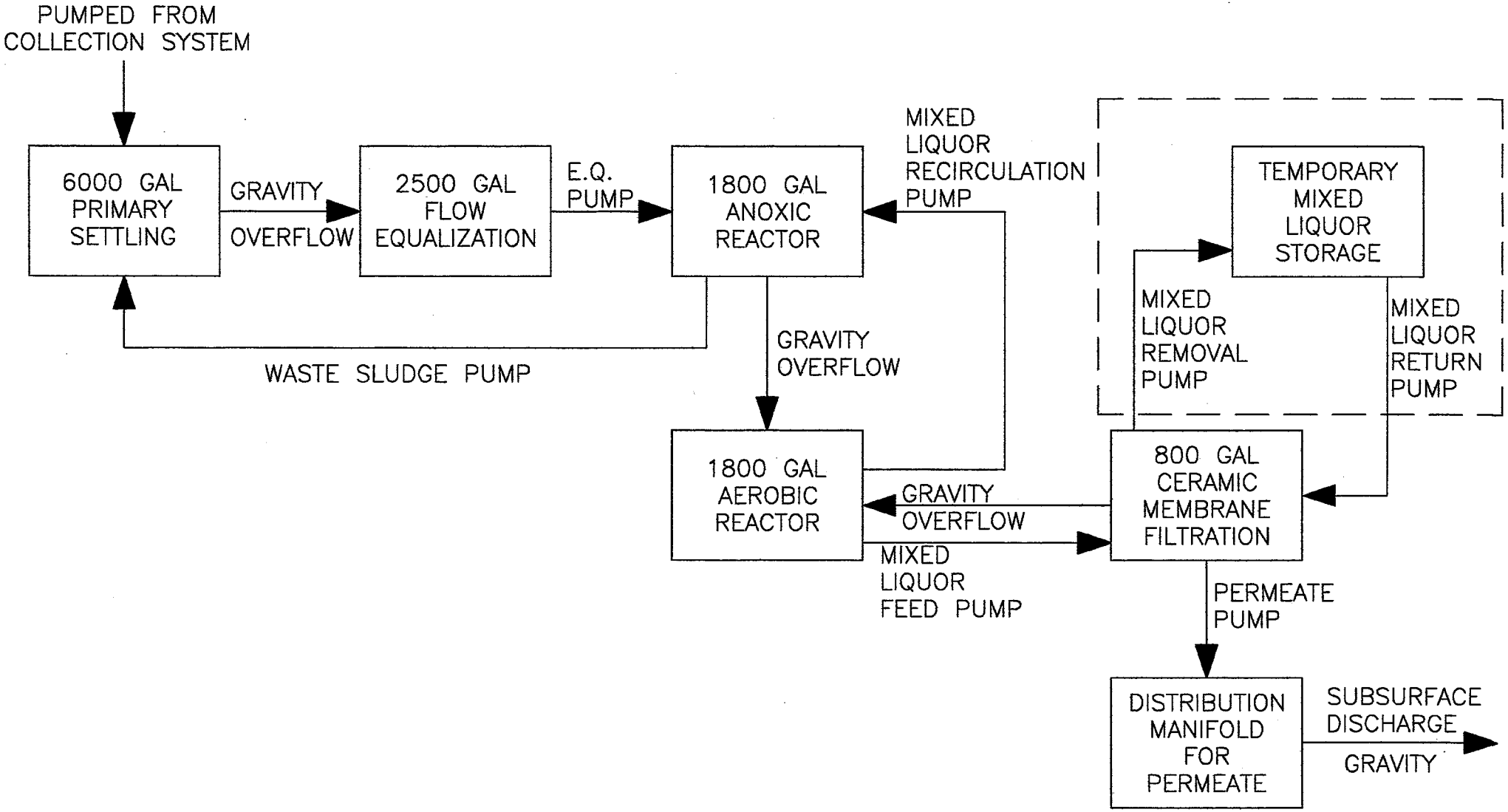
36 homes along 2,640 ft of lakeshore *Ravenswood Beach*

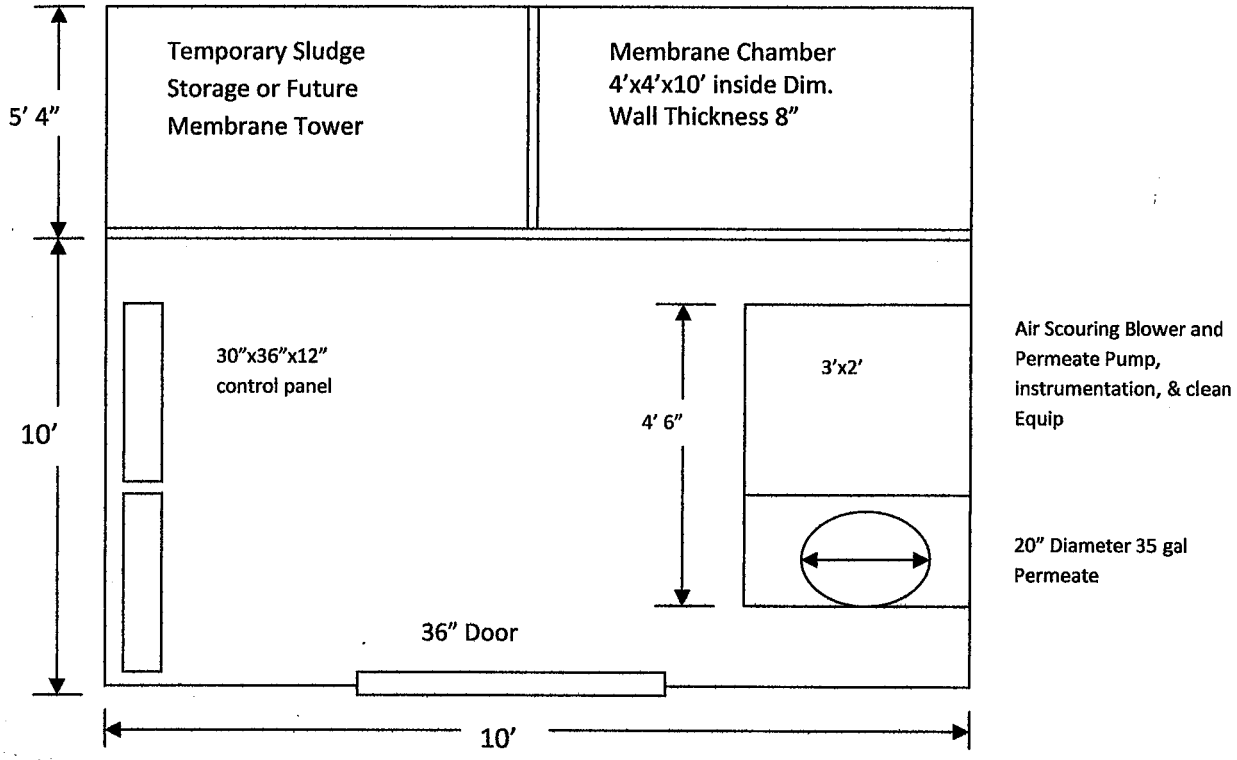
-- High Density

-- Low Elevation Lots

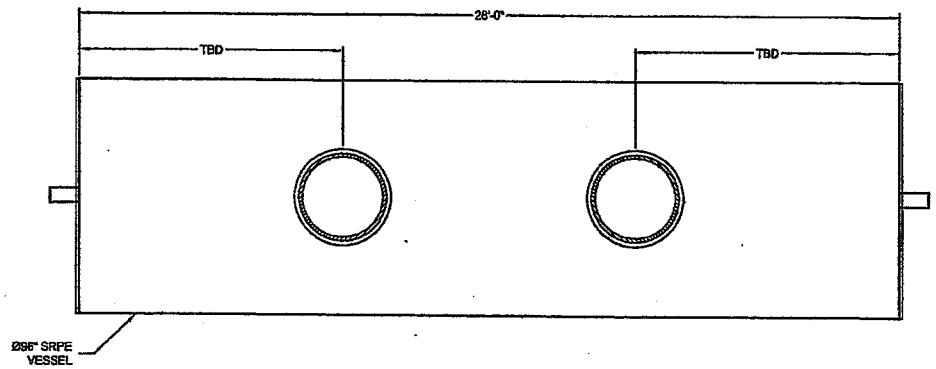


*originals in 19.0513.000

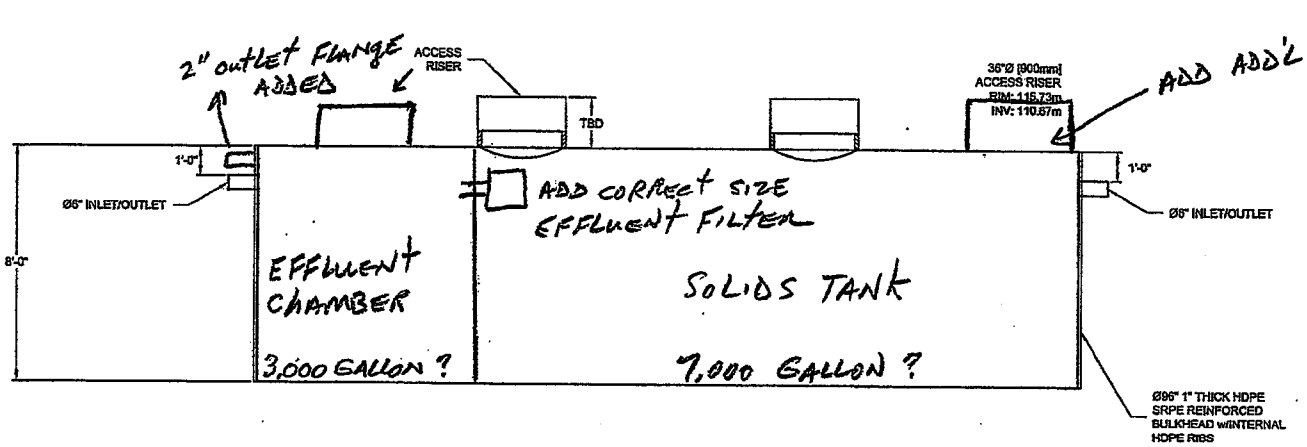

PUMPED FROM COLLECTION SYSTEM
6000 GAL PRIMARY SETTLING
GRAVITY OVERFLOW
2500 GAL FLOW EQUALIZATION
E.Q. PUMP
1800 GAL ANOXIC REACTOR
MIXED LIQUOR RECIRCULATION PUMP
TEMPORARY MIXED LIQUOR STORAGE
MIXED LIQUOR REMOVAL PUMP
MIXED LIQUOR RETURN PUMP
WASTE SLUDGE PUMP
GRAVITY OVERFLOW
1800 GAL AEROBIC REACTOR
800 GAL CERAMIC MEMBRANE FILTRATION
GRAVITY OVERFLOW
MIXED LIQUOR FEED PUMP
PERMEATE PUMP
DISTRIBUTION MANIFOLD FOR PERMEATE
SUBSURFACE DISCHARGE
GRAVITY



Lake Melissa Basic Building Layout



PLAN VIEW



ELEVATION VIEW

NOTE: IS THERE A MOLDED PART ON TANK FOR LIFTING TANK VIA A CHERRY PICKER ?

DRAWING.DWG 7/25/2013 4:18 PM

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

DuroMaxx STEEL REINFORCED PE TECHNOLOGY
CONTECH CONTRACT DRAWING

Ø96" DUROMAXX STORAGE TANK

PROJECT No.:	SEQ. No.:	DATE:
XXXXX	001	7/25/13
DESIGNED: XXX	DRAWN: RTF	
CHECKED: XXX	APPROVED: XXX	
SHEET NO.: 1 OF 1		

Harmony Beach

Lot 1	Bushland	19.0910.000
2	Laffen	19.0911.000
3	Cornforth	19.0912.000
4	Geyer	19.0913.000
5	Rick	19.0914.000
6	Lindsay	19.0915.000
7	Weum	19.0916.000
8	Hehn	19.0917.000
9	Maurer	19.0918.000
10	McCloud	19.0919.000

Ravenswood Beach

1+2	Pace	19.1679.000
3+4	Hempel	19.1680.000
5	Bye	19.1681.000
6	Vigen	19.1682.000
7	Shirley	19.1683.000
8	Anderson	19.1684.000
9+10	McRoberts	19.1685.000
11	McArthur	19.1686.000
12	Solberg	19.1687.000
13 5½	Rudrud	19.1688.000
14+15	Crahan	19.1689.000
16-18	Koehnleen	19.1690.000
South ½ Lot 19		
N½ 19+20	Hornstein	19.1691.000
21	Eberhardt	19.1692.000
22	Muhs	19.1693.000

(Lot 15) Across Rd

N½ of Lot 15

Ravenswood 1st Addition
H.D. Blandings / Beach

1+2	Lynch	19.1694.000
3+4	San Fox Trust	19.1695.000
5	Olson	19.1696.008
6	Monroe	19.1697.000
7+8	Hake	19.1698.000
9+10	Hand	19.1699.000
11	Riley	19.1700.000
12+13	McElroy	19.1701.008
14+15	Riley	19.1702.000
S 30ft of Lot 15	McElroy	19.1703.000
16	Riley	19.1704.008
17	Conn	19.1705.008

15/605 alley Rd

across the Rd

KRS. Box 259.

MINNESOTA DEPARTMENT OF HEALTH
Division of Environmental Health

Information Necessary for Review of Individual Sewage Disposal Systems

Submitted with plans and specifications for individual sewage disposal systems serving:

Facility Ravenswood Beach. Location Becker (County) Lake View (City or Twp.)

Prepared and submitted by Thomas H. Kochanek & Eugene A. Hansen.

Ownership Ravenswood Beach Imp. Assn. Date 6/15/92

Plans required:

The site plans shall show isolation distances from the septic tank and drainfield to wells, surface waters, property lines and buildings.

The drainfield plan shall show overall dimensions, spacing between pipes, location of and connection to drop or distribution boxes.

Estimate of sewage flow:

See attached report Gallons per day, or

See attached report Number of people served by the system

See attached report Number of days used per year

Not applicable If food service, number of hours of operation per day

Soil data:

.83 (1) Percolation rate (minutes per inch)

_____ Depth of water table in drainfield area (must be at least 3 feet below bottom of drainfield)

_____ % SLOPE OF LAND

Septic tank:

See attached report Size (gallons)

See attached report Construction (such as concrete or fiberglass)
Provide: Inlet and outlet tees or baffles, inspection pipe and manhole

Disposal system:

See attached report Type (such as trenches, bed or mounds)

_____ Distribution (gravity or pressure)

_____ Soil treatment area (square feet)

_____ Pipe size(s) (inches)

_____ Pipe material(s)

_____ Lift or pumping station(s) (must be provided with alarm system)

Details for drainfield trench or bed construction:

existing
100 Length of trenches or bed (feet) (maximum 100' from distribution point)

3 Width of trenches (18-36 inches), or bed

_____ Depth of rock below the drain pipes (6-24 inches)

_____ Depth of rock above the pipes (at least 2 inches)

_____ Provision of a permeable layer above the rock (such as straw, hay, untreaded building paper)

_____ Depth of earth backfill above rocks (6-36 inches)

_____ Provision of top soil and grass cover

Details for mounds construction:

_____ Filter rock area length (feet)

_____ Filter rock area width (feet) (ten feet or less per bed)

_____ Depth of sand fill (at least 12 inches)

_____ Depth of rock below pipes (at least 9 inches)

_____ Depth of rock above pipes (at least 2 inches)

_____ Provision of permeable layer above the rock (such as straw, hay, untreaded building paper)

_____ Slope of sides (3 to 1 maximum)

_____ Provision of top soil and grass cover

Report of:

RAVENSWOOD BEACH IMPROVEMENT CORPORATION

RURAL ROUTE # 5, BOX 259, DETROIT LAKES, MN 56501

June 1992

To the:

BECKER COUNTY BOARD OF COMMISSIONEERS

In care of your Zoning Administration office

The Ravenswood Beach Improvement Corporation serves the Ravenswood Beach area with a sewer collection and disposal system. This sewage system is located on the east shore of Lake Mellisa, Lakeview Township, Becker County, Detroit Lakes, Minnesota.

History of the Sewer System.

The sewer system was built to help alleviate septic tank and drainfield problems due to the traditional high water table in the Ravenswood Beach area. The sewer system is owned by the property owners of the Ravenswood Beach area, known as The Ravenswood Beach Improvement Corporation. The Corporation uses the address of its current president, which is shown above. This corporation was formed in 1975 to construct and operate a collection and disposal system to meet MPCA requirements at the time of construction in 1975.

The sewer collection system was built in the fall of 1975. The septic tank, drain field and sewage pumps installation was constructed in the spring of 1976. Actual operation begin in late spring of 1976. The sewer system consists of about 3,000 lineal feet of 6 inch diameter collection lines located along the road serving the beach, at the rear of the properties, about 200 feet from the lake. This is connected to a lift station about midway between each end of the service area which contains two sewage lift pumps. The collection line is about 10 feet deep at the lift station and rises in each direction to the ends which are about the depth of the lake level. The lift station pumps the sewage up the hill and across County Road # 17, approximately 600 feet from the lake and 50 feet above Lake Mellisa. At this location there is a 12,000 gallon reinforced poured concrete partition septic tank, a lineal distribution box, and a 3,000 square foot drainfield. The sewage lift pump station contains two 3 inch sewage pumps with hour running meters for each pump, so the actual sewage flow is determinable. Either pump has the capacity to handle the amount of sewage collected.

The system was designed and built by licensed Civil Engineer, Eugene A. Hansen, P.E. of Detroit Lakes, Minnesota. The drawings showing the original designs are on file at the Becker County Zoning Administrators office and are available for public record. The size of the septic tank drainage field etc.. were verified by the County last year. Mr. Hansen has overseen the operation and maintenance of the system since its construction on a consulting basis.

History of Operations.

The sewer system is a collection and disposal system that has operated with a minimum of maintenance problems since its inception. The only problems have been those of continuing maintenance type, such as replacement of a float switch or a diode in the control panel. No major repairs have been necessary in the 16 years of operation. The system is pumped out and cleaned each year. This includes pumping the septic tank and the distribution box and back washing each of them. The drainage field is checked periodically during the spring and summer months for any possible problems. The entire area of the drainage field and septic tank are maintained by mowing and weed control. Lakeview Township is cooperating with the Ravenswood Beach Improvement Corporation by providing assistance in the weed mowing of the drainage field.

Background of the System.

Lakeview Township proposed a sewer system for the Township in 1974-75. They started as federally financed study to provide a sewer collection system around the entire lake with a sewage lagoon for the treatment of the effluent and proposed using an irrigation system for disposal of the effluent. Ravenswood Beach property owners supported that proposal. Had that proposal become a reality the Ravenswood Beach Improvement Corporation would have in place, for its portion of the lake, the collection system with the lift station necessary to tie into the Township system. Had this been approved it would eliminate the necessity for the separate septic tank and drain field and they would have been abandoned when the larger system was constructed. Ravenswood Beach members felt a positive approach to sewage treatment was needed at that time and wanted to do something about it.

The design engineer of the Ravenswood system, Eugene Hansen, P.E. had worked on a number of federal and state funded projects throughout the United States and was familiar with the problems and procedures of these type of projects proceeding. Problems can occur in these type of programs and often, either the project does not get the governmental funds or the Local Government Unit (LGU) does not proceed with the project when the federal and / or state grants are awarded. This is what happened with the Lakeview Township project. Due to this possibility Mr. Hansen provided the forsight to provide for an alternative plan. Mr. Hansen had selected a site that could be expanded from the original construction if necessary. In the event the LGU (Lakeview Township) did not proceed with their project, the design was such, that by actual demonstration, the Ravenswood Beach system could be proven to operate properly or could be expanded upon if necessary. If it did not properly handle the effluent in accordance with the pollution control requirements, it had the area that would allow the system to expand.

The history of the system, its operation, and the background of the Lakeview Township proposed township wide system should help in explaining the purpose of this report.

Purpose of Report.

Ravenswood Beach Improvement Corporation proposes to increase the number of approved connections of homes to its sewer collection and disposal system from the present approval of **30** units to **38** units. The design data included with this report will give your office the necessary information on the existing system, its actual use and operation, and the over capacity constructed in place. This should substantiate the position of the Board of Directors in making this request. This is a request of only 8 additional house units which is an increase of about 27% over the original design requirements. The original project was constructed with a greater capacity than we are now requesting.

Most of these house units are summer homes only. Currently there are only 5 homes on Ravenswood Beach that are a year around residences. One of these is not currently on the sewer system, and should be. Three or four others could possibly be converted to year around residences with some minor alterations. All the others would require major alteration. This should not effect the determination on the acceptability of adding to the system now, because an examination of the data shows the existing year around use, and the existing fall, winter, and spring use to be much less than the summer use.

Eugene A. Hansen, a Professional Engineer has handled all maintenance and repair problems. He has advised the Corporation on maintenance decisions over the last 16 years. He is very familiar with any problems to be expected with the existing system. He will continue to watch over the system and make recommendations after the approval is granted to add the additional 8 house units. He will also oversee the connection construction of the addition units if and when they are added to the system. He is the designer of the original system. The following are his calculations to show how the Design Data will change with the adding of the eight (8) additional house units.

Peak Summer Months Use:

8 new units x 192 GPD = 1,536 GPD + existing 6,136 GPD = 7,672 GPD

Septic Tank Actual Size = 12,000 Gal.
Peak Summer Months Use @ 38 units = 7,672 GPD

Reserve Capacity = 4,328 Gal. (36%)

Drainfield - existing @ 3,000 square feet @ 5 gal per square foot.
3,000 sf x 5 gal/sf = 15,000 gal/sf Design Load

Actual usage - Peak Summer Month = 6,136 GPD
8 additional house units = 1,536 GPD
Gallons per Day Total = 7,672 GPD

Drainfield Design Capacity = 15,000 GPD
Actual usage w/ 38 house units = 7,672 GPD

Reserve Capacity = 7,328 GPD (95%)

Conclusion: The drainfield has a 95% reserve capacity within the existing drainfield construction, and the sepetic tank has a 36% reserve capacity using the Peak Summer Flow. Therefore the existing septic tank and drainfield system will accept and handle the eight (8) additional house units and still have substantial reserve capacity. Additional property is available to increase the size in the future if proven necessary.

The Board of Directors feels that this request is justified due to the following:

1. Actual Construction. The original design of this collection system was to allow for all of the house units between the ends of the collection line to become part of the system. At the time the Board of Directors felt that in the short term only about 30 units would want to hook up prior to the Township system coming on line. Therefore in interest of cost, the disposal part of the system was only designed for 30 units. This was intended to either be abandoned when the Township wide system was constructed, or if found to not handle all units on Ravenswood beach, could be expanded if necessary. Actual construction of the disposal part of this system is a minimum of 34% over design and the drain field was constructed 67% greater than the design requirements. This over capacity of the present construction will more than handle the additional units.

2. Maximum Use. Examination of the present lots, both built on and vacant, between the ends of the collector line show a maximum of 38 allowable units. Actually only 35 legal lots by today's standards, however if some were allowed an exception due to grandfather conditions a case could be made for 38 units. If the 38 house unit request were granted, all units of this area of the lake would meet current standards of construction, maintenance, and operation. Future problems for the County in this area would be eliminated.

3. Actual Useage. We have been discussing this request for increase of house units with the county for about three years now. At the request of the County we have been gathering data on the actual sewage flow since September of 1989. Now with almost three years of data we know that the peak use of the sewer system is within the summer months. The major usage of this system, averages only 6,138 gal. per day. Compared to the design requirement of 9,000 gal. per day, we are only at 67% of capacity. Presently less than 200 gal. per day per house unit is being used by actual measurement. If we were to increase the house units to 38, we would still only generate about 7,600 gal. per day, less that the 9,000 gal. per day design requirement.

4. Design Calculations. The above calculations by our consulting Professional Engineer and the attached data prove that the present system can handle the additional eight (8) house units with no increase in facilities.

5. Expansion Capabilities. In the event the effluent can be proved to not meet current EPA , Department of Health, or County standards, sufficient land is available to expand the drainage field in the existing area. The collection and pumping system can handle the increase, and the septic tank system can be expanded if necessary. The existing septic tank and drainfield is more than adqeuate to handle the additional sewage flow without expansion.

5. Operation and Maintenance. Time has proven that the present system works and is under capacity. The group collection and disposal system is operated as a minor utility. It receives much better care and maintenance that individually operated systems. The Corporation charges its users an annual fee and has built up a reserve for any future problems.

6. History of Operation. This system has worked well for 16 years.

Attached to this report and made part of the report are three data documents:

1. **Ravenswood Beach Sewer System - Design Data.**
2. **Ravenswood Sewer Use Study - Data Readings.**
3. **Ravenswood Sewer Use Study - Calculations & Miscellaneous Data. Resource Personnel for Operations & Maintenance.**

The above documents provides for all the data contained in this report, along with the construction drawings and observation of what is actually constructed and working in the field. Please contact the writers of this report if you have any questions. Please feel free to contact any of the resource personnel for additional data on how the system has been operating. Also you may contact any of the Board members or general membership users of the system to question its operation.

This report was prepared by: Thomas H. Koehnlein, MN Registered Architect #09365
and Eugene A. Hansen, P.E., MN Registered Engineer # 7618

Signed: Eugene A. Hansen

Eugene A. Hansen
Minnesota P.E. # 7618

Thomas H. Koehnlein

Thomas H. Koehnlein
Minnesota Architect # 09365

This report is filed this 15 day of June 1992, with Margaret Foster

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To the Becker County Board of Commissioneers:

This is a formal request made by the Board of Directors of the Ravenswood Beach Improvement Corporation to Becker County to increase the approved number of house units allowed to be connected to our existing collector and disposal system to thirty eight (38).

Thomas H. Koehnlein

Dan Riley

Dean Hempel

Cheryl Weum

Glen Bye

Ravenswood Sewer Use Study - Data Readings

Date	#Days	Pump #1	Pump #2	Total Hours used	x 60 min.	x 100 gal./ min.	÷ # of days = ave. daily use
9 - 3-89		2161.9 hrs.	1.6823 hrs.				
		Base Reading of all Data					
6-28-90	(301)	2235.3	1774.5	73.4 + 92.2 = 165.6	x 60 = 9,936	x 100 = 993,600	÷ 301 = 3,301 gal / day
		Typical Fall, Winter, & Spring Use			**the pump ran an average of 33 min. per day**		
7-14-91	(381)	2390.8	1943.8	155.5 + 169.3 = 324.8	x 60 = 19,488	x 100 = 1,948,800	÷ 381 = 5,115 gal / day
		Typical Year Around Use			**the pump ran an average of 51 min. per day**		
8-22-91	(39)	2409.6	1964.9	18.8 + 21.1 = 39.9	x 60 = 2,394	x 100 = 239,400	÷ 39 = 6,138 gal / day
		Typical Summer Month Use			**the pump ran an average of 61 min. per day**		
8-23-91	(1)	2409.9	1965.3	0.3 + 0.4 = 0.7	x 60 = 42	x 100 = 4,200	÷ 1 = 4,200 gal / day
Fri		**Typical Summer Weekday DailyUse**			**the pump ran 42 min. this day**		
8-24-91	(1)	2410.2	1965.6	0.3 + 0.3 = 0.6	x 60 = 36	x 100 = 3,600	÷ 1 = 3,600 gal / day
Sat		**Typical Summer Weekend DailyUse**			**the pump ran 36 min. this day**		
8-25-91	(1)	2410.7	1966.2	0.5 + 0.6 = 1.1	x 60 = 66	x 100 = 6,600	÷ 1 = 6,600 gal / day
Sun		**Typical Summer Weekend DailyUse**			**the pump ran 66 min. this day**		
8-26-91	(1)	2411.1	1966.6	0.4 + 0.4 = 0.8	x 60 = 48	x 100 = 4,800	÷ 1 = 4,800 gal / day
Mon		**Typical Summer Weekend DailyUse**			**the pump ran 48 min. this day**		
8-27-91	(1)	2411.4	1966.8	0.3 + 0.2 = 0.5	x 60 = 30	x 100 = 3,000	÷ 1 = 3,000 gal / day
Tue		**Typical Summer Weekday DailyUse**			**the pump ran 30 min. this day**		
8-28-91	(1)	2411.6	1967.1	0.2 + 0.3 = 0.5	x 60 = 30	x 100 = 3,000	÷ 1 = 3,000 gal / day
Wed		**Typical Summer Weekday DailyUse**			**the pump ran 30 min. this day**		
8-29-91	(1)	2411.9	1967.4	0.3 + 0.3 = 0.6	x 60 = 36	x 100 = 3,600	÷ 1 = 3,600 gal / day
Thur		**Typical Summer Weekday DailyUse**			**the pump ran 36 min. this day**		
8-30-91	(1)	2412.2	1967.7	0.3 + 0.3 = 0.6	x 60 = 36	x 100 = 3,600	÷ 1 = 3,600 gal / day
Fri		**Typical Summer Weekday DailyUse**			**the pump ran 36 min. this day**		
8-31-91	(1)	2412.5	1968.1	0.3 + 0.4 = 0.7	x 60 = 42	x 100 = 4,200	÷ 1 = 4,200 gal / day
Sat		**Typical Summer Holiday Weekend DailyUse**			**the pump ran 42 min. this day**		
9- 1-91	(1)	2413.0	1968.6	0.5 + 0.5 = 1.0	x 60 = 60	x 100 = 6,000	÷ 1 = 6,000 gal / day
Sun		**Typical Summer Holiday Weekend DailyUse**			**the pump ran 60 min. this day**		
9- 2-91	(1)	2413.6	1969.3	0.6 + 0.7= 1.3	x 60 = 78	x 100 = 7,800	÷ 1 = 7,800 gal / day
Mon		**Typical Summer Holiday Weekend DailyUse**			**the pump ran 78 min. this day**		
9- 3-91	(1)	**2414.1**	**1969.7**	0.5 + 0.4 = 0.9	x 60 = 54	x 100 = 5,400	÷ 1 = 5,400 gal / day
Tue		**Typical Summer Holiday Weekend DailyUse**			**the pump ran 54 min. this day**		

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730 Days **Typical Two Year Use - the pump ran an average of 44 min. per day over two years**

2414.1 1969.7
- 2161.9 - 1682.3
252.2 hrs 287.4 hrs

= 539.6 hours x 60 min. = 32,376 min. x 100 gal./min. = 3,237,600 gal. ÷ 730 days = **4,435 gal./ day** average over two years

Ravenswood Beach Sewer System - Design Data

The original design was based on a projected sewage flow of 75 gal. / day/ person with 4 people per dwelling unit and 30 units or a designed capacity or 9,000 gal. per day.

75 gal. x 4 people = 300 gal. / unit x 30 units = 9,000 gal. per day sewage flow

Permit was for a 10,000 gal. septic tank. (111% of design capacity)

Actual size of tank based on pumping it out is 12,000 gal. (134% of design capacity)
(8 loads of 1,500 gal. each = 12,000 gal.) (also by calculation = 11,782 gal.)

The drain field was calculated at 5 gal. per sq. ft. application rate based on the percolation rate of 1 inch per min. This resulted in a drainage field requirement of 1,800 square feet.

The original design was for 10 lines of 100 feet each in a 2 foot trench which would have produced a drain field of 2,000 square feet.

10 lines x 100 feet x 2 feet wide = 2,000 square feet (111% of design capacity)

Permit was for 3,000 square feet of drainage field. (167% of design capacity)
(3 foot trenches were specified)

Actual size of the drainfield is 3,000 square feet. By actual measurement.

Actual sewage flows taken by measurement over the last two years have averaged less than the designed flow of 9,000 gal. per day.

Actual **two year average** flow = **4,435 gal. per day.** for 32 units.(138.6 gal. per unit)
Actual summer **month**, Peak Use = **6,138 gal. per day.** for 32 units.(191.8 gal. per unit)
Actual summer **day**, Peak Use Holiday = **7,800 gal. per day.** for 32 units.(243.8 gal. per unit)

The actual measured sewage flow during summer use has averaged 67% of design capacity.

An increase of 33% in the amount of units would by measurement bring the daily sewage flow to design capacity. One third of 30 units = 10 additional units, or a total of 40 units. The maximum number of legal lots contained between the ends of the sanitary sewer collection line are 38 units.

If the number of units specified on the permit were increased to 38 units the system would still be less than the design capacity (95%). The actual installation has a capacity over and above the design capacity of a 34% larger septic tank, and a 67% larger drainfield.

The existing system has been in operation for 15 years without major problems.

Allowing the increase in units will bring the system up to the suggested standards and criteria for designing a collector sewage system today. No individual septic tanks or holding tanks will be allowed along the entire stretch of the beach. (over one half mile of lake frontage)

Ravenswood Sewer Use Study - Calculations & Misc. Data

Septic Tank	7' wide x 25' long x 9' high	= 1,575 cu. ft.	
	1 cu. ft. = 1,728 cu. in.	= 2,721,600 cu. in.	
	1 gal. = 231 cu. in.	= 11,781.8 gal.	
		SAY **11,750 Gal.**	**(actually pump out 12,000 gal. when cleaning)**
Lift Station	π r2 x height		
	π x 48" x 48" x 144"	= 1,041,776.6 cu. in.	
		= 4,509.9 gal.	
		SAY **4,500 Gal.**	
Distribution Box	24" wide x 20' long x 12" high	= 69,120 cu. in.	
		= 299.2 gal.	
		SAY **300 Gal.**	
Sanitary Sewer Collection Line:		**6"** each direction from lift station @ a 5% grade	
	πr2 x 2,800' = 949,536 cu. in.	= 4,111 gal..	
		SAY **4,000 Gal.**	
Drain Field Lines:		**4"** 10 each direction from distribution box 3,000 sf	
Force Main:		**3"**	

Resource Personnel for Operation & Maintenance:

Engineer:	**Eugene Hansen** **R, Rt. #1, Box 58A** **Detroit Lakes, MN 56501**	**847-5918**
Pump Repair:	**North Dakota Sewage Pump &** **Lift Station Service Co.** **411 Broadway, Fargo, ND**	**282-6760**
Septic Tank Pumping:	**Art W. Anderson Septic Tank Pumping** **R. Rt. # 3, Box 180** **Detroit Lakes, MN 56501**	**847-4321**
Drain Field Mowimg:	**Lakeview Township** **Call Bill Jordan Jr.** **R. Rt. #5 Box 343A, Detroit Lakes, MN 56501**	**847-3416**
Electrican:	**Schatts Electric** **Don Schattscheider** **R. Rt. #4, Detroit Lakes, MN 56501**	**847-5255**
Ravenswood Beach Improvement Corporation	**Thomas H. Koehnlein President,** **R. Rt. #5, Box 259** **Detroit Lakes, MN 56501**	**847-6707**

BECKER COUNTY

Sewage Permit No. SP № _____

Location: Lake No._____ Sec._____ Twp._____ Range_____ Twp. Name_____

_____

_____

_____

Issued_____ 19__, To_____

Work Authorized_____

_____

_____

NOTE: This card must be placed in a conspicuous place not more than 12 feet above grade on the premises on which work is to be done, and must be maintained there until completion of such work. No part of system shall be covered until it has been inspected and approved. Notify Zoning Administrator, (847-3938) office when job is ready for inspection.

_____

Becker County Zoning Administrator

BECKER COUNTY, MINNESOTA
Board of County Commissioners

RAVENSWOOD BEACH IMPROVEMENT CORP.
Route 5 Box 258A
DETROIT LAKES, MINNESOTA 56501

The following regulations for the use and operation of the Ravenswood Beach Improvement Corporation's sewage collection system have been adopted by the Board of Directors, pursuant to authority contained in the Articles of Incorporation and By-Laws of the corporation. The term "RBIC" used herein means Ravenswood Beach Improvement Corporation, the term "member" means a member of the corporation, and "office of the president" means the residence of R. E. Enger, Box 258A, Route 5, Detroit Lakes, MN 56501.

REGULATIONS FOR THE USE AND OPERATION OF RAVENSWOOD BEACH IMPROVEMENT CORPORATION SEWER COLLECTION SYSTEM

ARTICLE I.
SEWERS AND CONNECTIONS

Section 1.01. Non-authorized connections, disturbances, etc. of sewer forbidden. No person other than representatives of RBIC shall uncover, make any connections with or opening into, use, alter, or disturb any sewer without first obtaining a written permit from RBIC.

Section 1.02. Permits. The member or his agent shall make application for a sewer permit on a special form furnished by RBIC. Such application shall be supplemented by any plans, specifications, or other information considered pertinent in the judgment of the president of RBIC.

Section 1.03. Permits-procedure for obtaining. Sewer permits shall be obtained in the following manner:

a. Permits shall be issued only upon proper application at the office of the president of RBIC.

b. Permits shall be issued only to the member-owner, or to a licensed plumbing installer.

c. The applicant shall supply the following information:
   (1) Member-owner's name.
   (2) Location to be served.
   (3) Member's mailing address.
   (4) Licensed plumbing installer's name and address.
   (5) Full course of proposed side sewer.

d. A permit shall be obtained before any side sewer work is started.

Section 1.04. Side sewer contract. Side sewer contract between member-owners and licensed plumbing installer shall provide that connections shall be made to all outlets from plumbing fixtures existing at the time work is done.

Section 1.05. Wyes, tees, stubs-location. Wyes, tees, and stubs shall be located as follows:

a. Connection will be made at the point designated by RBIC.
b. If a side sewer tee or stub is not found at the measurement given by RBIC, the contractor shall prospect two feet in all directions from the measurement given and if not found, then notify RBIC.
c. Wyes may be used only if permitted by RBIC and at a location approved by RBIC.

Section 1.06. Costs of side sewer borne by owner-member. All costs and expenses incident to the installation and connection of a side sewer shall be borne by the owner-member. Owner-member shall indemnify RBIC from any loss or damage that may directly or indirectly be occasioned by the installation of the side sewer.

Section 1.07. Reuse of old sewer lines. Old sewers, including septic tank lines, may be used only when found, on examination and tested by RBIC, to meet all requirements of these regulations. Owner-member shall demonstrate to RBIC that no connection to such sewer or septic tank line exists which conveys any material prohibited by these regulations.

Section 1.08. Side sewers-specifications. Side sewers shall be construct ed of four inch (4") PVC, Schedule 40 unthreaded, or Schedule 30 threaded (ASTM D-2729, D-3033, or D-3034). All joints between pipes and fittings shall have water tight and root tight joints. Portland cement mortar joints are not allowed. The slope shall be not less than 3/16 inches per foot, unless the depth of the main collection lines requires a lesser slope and such lesser slope is approved by RBIC. Side sewers shall be laid at uniform grade and in straight alignment insofar as possible. Pipe shall be carefully bedded and trench shall be free of water during laying of pipe. No backfill shall be placed over the pipe until the work has been inspected and approved by RBIC and Becker County Zoning Administrator.

ARTICLE II.
USE OF SEWERS

Section 2.01. Unlawful discharge of storm and other waters. No person shall discharge or cause to be discharged any storm water, surface water, roof runoff, subsurface drainage or cooling water to any sewer.

Section 2.02. Unlawful wastes. Except as hereinafter provided, no person shall discharge or cause to be discharged any of the following waters or wastes to any sewer:
a. Any liquid or vapor having a temperature higher than 150°F.
b. Any water or waste which may contain more than 100 parts per million by weight of fat, oil, or grease.
c. Any gasoline, benzie, naptha, fuel oil, lube oil, or other flammable or explosive liquid, solid, or gas.

d. Any garbage that has not been properly shredded.
e. Any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, or any other solid or viscous substance capable of causing obstruction to the flow of sewers or other interference with the proper operation of the sewage system.
f. Any waters or wastes having any corrosive property capable of causing damage or hazard to structures, equipment, or persons.
g. Any waters or wastes containing toxic or poisonous substances in sufficient quantity to injure or interfere with any sewage treatment process, constituting a hazard to humans or animals, or create any hazard in the receiving waters of the system.
h. Any waters or wastes containing suspended solids of such character and quantity that unusual attention or expense is required to handle such materials.
i. Any noxious or malodorous gas or substance capable of creating a public nuisance.

C

BECKER COUNTY

Sewage Permit No. SP № 12-3335-35

Location: Lake No. ____ Sec. 28 Twp. 138 Range 41 Twp. Name Lake View

All that part of Gov't Lot 2 of Sec. 28, T 138N, R 41W of the 5th P.M. that lies E of former state Hwy 59, now County Hwy 17, running Northerly and Southerly through said Gov't Lot 2, subject to Hwy easements and excepting therefrom the tracts heretofore conveyed to Anna F. Wagner by Warranty Deeds recorded in Book 108 of Deeds, page 407, and in 119 of Deeds, Page 113, and further excepting that certain tract conveyed to Carol E. Hanson by Warranty Deed recoreded in Book 152 of Deeds, page 301.

Issued November 19 **19** 75 , **To** Ravenswood Beack Improvement Corp.

Work Authorized SEPTIC TANK - 10,000 Gals., 100 ft. from well, 800 ft. from lake, 100 ft. from buildings, 100 ft. from prpperty lines. DRAIN FIELD 3,000 Sq. ft., 100 ft. from well. 700 ft. from lake, 100 from buildings, 100 from property lines. Collectors linc for no more than 30 homes, Grinder pump with cycle counter, drain field trenches 3 ft. wide, with no less than one foot of washed rock.

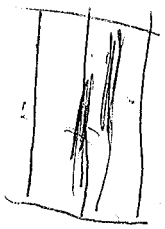
NOTE: This card must be placed in a conspicuous place not more than 12 feet above grade on the premises on which work is to be done, and must be maintained there until completion of such work. No part of system shall be covered until it has been inspected and approved. Notify Zoning Administrator, (847-3938) office when job is ready for inspection.

Brian E. Moran

Becker County Zoning Administrator

BECKER COUNTY, MINNESOTA
Board of County Commissioners
AN EQUAL OPPORTUNITY EMPLOYER.

Collection System
38 units
Seasonal - grave
Future
Collection
3,000 gal
25%



3800 60
2
13
12.5
60
9500

80'

640
3
1920
1800
3720

78

8

8

150 SF

54

98

10

600
3

MOUND DESIGN WORKSHEET
(For Flows up to 1200 gpd)

FLOW
Estimated 450 gpd
(see pages D-7 or I-3, 4, 5)
or measured _____gpd

SEPTIC TANK LIQUID VOLUMES
1250 gallons
(see pages C-3 or C-5)

SOILS (refer to site evaluation)
1. Depth to restricting layer = _____inches
2. Depth of percolation tests = _____inches
3. Percolation rate 120 mpi
4. Allowable soil loading rate (see page E-16)
.24 sq ft/gpd
5. Land slope _____%

218
30

ROCK LAYER DIMENSIONS
1. Multiply flow rate by 0.83 to obtain required area of rock layer: A x 0.83 = 450 gpd
x 0.83 sq. ft./gpd
= 373.50 sq. ft. 400
2. Select width of rock layer (10 feet or less) = _____ft.
3. Length of rock layer = area ÷ width = _____sq. ft. ÷ _____ft.
= _____ft.

ROCK VOLUME
1. Multiply rock area by rock depth to get cubic feet of rock; _____sq. ft. x _____ft.
= _____cu. ft.
2. Divide cu. ft. by 27 cu. ft./cu. yd. to get cubic yards; _____cu. ft. ÷ 27 = _____cu. yd.
3. Multiply cubic yards by 1.4 to get weight of rock in tons; _____cu. yd. x 1.4 ton/cu. yd.
= _____tons

PRESSURE DISTRIBUTION SYSTEM
1. Select number of perforated laterals _____
2. Select perforation spacing = _____ft.
3. Since perforations should not be placed closer than 1 ft. to the edge of the rock layer (see p. E-14), subtract 2 ft. from the rock layer length.
rock layer length - 2 ft.
= _____ft.
4. Determine the number of spaces between perforations. Divide the length above by perforation spacing and round down to nearest whole number.
Length ÷ perf. spacing =
_____ft. ÷ _____ft. =
_____spaces
5. Number of perforations is equal to one plus the number of perforation spaces =
_____perforations/lateral
6. Multiply perforations per lateral by number of laterals to get total number of perforations = _____laterals
x _____perfs/lateral
= _____perforations
7. Determine required flow rate by multiplying number of perforations by flow per perforation (see page E-17)
_____perfs x _____gpm/perf
= _____gpm
8. If laterals are connected to header pipe as shown on page E-5, select minimum required lateral diameter from table on page E-17, enter table with perforation spacing and number of perforations per lateral. Select minimum diameter for perforated lateral
= _____inches
9. If perforated lateral system is attached to manifold pipe near the center, as on page E-12, perforated lateral length and number of perforations per lateral will be approximately one half of that in step 8. Using these values, select minimum diameter for perforated lateral from page E-17 as _____inches

BASAL WIDTH
1. Percolation rate in top 12 inches of soil is _____mpi
2. Select allowable soil loading rate from table on page E-16; _____gpd/ft²

MOUND DESIGN WORKSHEET (Continued)
(For FLows up to 1200 gpd)

G.3. Calculate basal width ratio by dividing rock layer loading rate of 1.20 gpd/ft^2 by allowable soil loading rate;
1.20 gpd/ft^2 + _____ gpd/ft^2 = _____
Check this value on page E-16.

4. Multiply basal width ratio by rock layer width to get required basal width;
_____ x _____ft = _____ft

H. DOWNSLOPE DIKE WIDTH

1. If landslope is 3% or more, subtract rock layer width from basal width to obtain minimum downslope dike toe width
_____ft - _____ft = _____ft

2. Calculate mound height at edge of rock layer on downslope side;
   a. Determine depth of clean sand fill at upslope edge of rock layer: _____feet
   b. Multiply rock layer width by landslope to determine drop in elevation;
   _____ x _____% + 100 = _____ft
   c. Add drop in elevation to depth of clean sand at upslope edge of rock layer to get depth of clean sand at downslope edge of rock layer.
   _____ft + _____ft = _____ft
   d. Add depth of clean sand at downslope edge to depth of rock layer to depth of soil backfill to get mound height at downslope edge of rock layer;
   _____ft + _____ft + _____ft = _____ft
   e. Enter table on page E-18 with landslope and downslope dike ratio. Select dike multiplier of _____.

H.2.f. Multiply dike multiplier by downslope mound height to get downslope dike width:
_____ x _____ = _____ft
   g. Compare the values of step H.1 and Step H.2.f. Select the greater of the two values as the downslope dike width; _____feet
   h. Calculate upslope dike width using upslope mound height and upslope dike multiplier from page E-18;
   _____ x _____ = _____ft
   i. Total mound width is the sum of upslope dike width plus rock layer width plus downslope dike width;
   _____ft + _____ft + _____ft = _____ft

3. If landslope is 2.9 percent or less, basal width includes both the upslope and downslope dike widths.
   a. Calculate downslope dike width using steps H.2.a. through H.2.f; _____feet
   b. Calculate upslope dike width using upslope mound height and dike multiplier from Page E-18; _____ x _____ft = _____ft
   c. Add downslope dike width to upslope dike width to rock layer width to get total mound width;
   _____ft + _____ft + _____ft = _____ft
   d. Compare total mound width to required basal width from step G.4. If total mound width is greater than required basal width, use calculated dike widths. If required basal width is greater than total mound width, increase downslope dike width.

White – Office
Yellow – Owner
Pink – Assessor
Goldenrod – Inspector

BECKER COUNTY ZONING ADMINISTRATION

COUNTY COURT HOUSE — Phone 218-847-3938—Detroit Lakes, Minn. 56501

Permit No. 14-12592-35

Date 11/3/83

APPLICATION FOR BUILDING OR SEWAGE PERMIT AND CERTIFICATE OF OCCUPANCY

LEGAL DESCRIPTION AND LOCATION	Lake No.	Lake Name	Lake Classif.	Sec.	TWP	Range	TWP Name
				NW¼ NW¼ 28	138	41	Lake View

8552

IDENTIFICATION: Please Print All Information

	Last Name	First	Initial	Mailing Address– No. Street, City and State	Zip No.	Tel. No.
Owner	RAVENWOOD	BEACH		DETROIT LAKES, M		
Contractor	Name EUGENE A HANSEN			RT 1		
	+ Associates			DETROIT LAKES, MN.		

TYPE OF IMPROVEMENT:
( ) New Building ( ) Alteration
Other Sewer Repairs

RESIDENTIAL PROPOSED USE:
( ) One Family Dwelling
( ) Multiple Dwelling _____ Units

NON–RESIDENTIAL PROPOSED USE:
Specify: _____
Size: _____

ESTIMATED COST OF IMPROVEMENT $

Construction Starting Date:

PRINCIPAL TYPE OF FRAME:
( ) Masonry
( ) Wood Frame
( ) Structural Steel
( ) Other – Specify

Type of Roof:

TYPE OF SEWAGE DISPOSAL:
( ) Public
( ) Individual Septic Tank, etc.

WATER SUPPLY:
( ) Public
( ) Individual Well

MECHANICAL EQUIPMENT:
Elevator: ( ) Yes ( ) No
Air Conditioning: ( ) Yes ( ) No
( ) Central ( ) Unit

DIMENSIONS:
Basement: ( ) Yes ( ) No
Stories above basement: .....
Sq. feet (outside dimension) .....
Bedrooms ..... Baths .....

HEATING:
( ) Electric ( ) Gas ( ) Oil
( ) Coal ( ) None
Other:

SEWAGE DISPOSAL SYSTEM DATA:	SEPTIC TANK	SEEPAGE PIT	DRAIN FIELD
Capacity	Gls.	Sq. Ft.	Sq. Ft.
Distance from nearest well	Ft.	Ft.	Ft.
Distance from lake or stream	Ft.	Ft.	Ft.
Distance from occupied building	Ft.	Ft.	Ft.
Distance from property line	Ft.	Ft.	Ft.
Distance from bottom to Water Table	Ft.	Ft.	Ft.

All distances are shortest distance between nearest points

APPROVED
NOV 07 1983

CHARACTERISTICS:

Lot Area is ..... square feet. Water frontage is ..... feet.

Building set back from high water mark is ..... feet. (Building Line)

Land height above high water mark at building line is ..... feet

Building set back from State highway is ..... feet – from road or street is ..... feet.

Side yard is ..... and ..... feet. Rear yard is ..... feet.

Building will be located ..... feet from septic tank (Sewage System Permit must be obtained before installation).

Building will be located ..... feet from soil absorption system (Cesspool, Drainfield, etc.).

Agreement: I hereby certify that the information contained herein is correct and agree to do the proposed work in accordance with the description above set forth and according to the provisions of the ordinances of Becker County, Minnesota. I further agree that any plans and specifications submitted herewith shall become a part of this permit application. I also understand that this permit is valid for a period of six (6) months. Applicant further agrees that no part of the sewage system shall be covered until it has been inspected and accepted. It shall be the responsibility of the applicant for the permit to notify the County Zoning Administrator, 48 hours before the job is ready for inspection.

Dated _____ _____
Signature of Owner

When signed and approved by the Zoning Administration this becomes your permit. Permission is hereby granted to the above named applicant to perform the work described in the above statement and/or as shown on the sketch. This permit is granted upon the express condition that the person to whom it is granted, and his agent, employees and workmen shall conform in all respects to the ordinances of Becker County, Minnesota. This permit may be revoked at any time upon violation of said ordinances.

MUST BE POSTED AT THE BUILDING SITE

Dated 11/3/83

Permit Fee $ 10.00 State Surcharge $ .50

Lloyd Svenby
Becker County Zoning Administrator

Comments: REPAIRS to DRAIN FIELD REMOVE Buildup of ~~sludge~~ UNWASHED SCUM IN Distribution Pipes O— SCUM at bottom of IN LET.

INSPECTOR'S CHECK LIST

Make all measurements and computations

	ACTUAL IS ↓	MINIMUM Shall Be ↓ Sq. Ft.
Building Set Back from High Water Mark	Ft.	Ft.
Building Set Back from State Highway	Ft.	Ft.
Side Yard	_____ & _____ Ft.	_____ & _____ Ft.
Rear Yard	Ft.	Ft.
Elevation at Building Line above High Water Mark	Ft.	Ft.

SEWAGE DISPOSAL SYSTEM STATISTICS

CATEGORY	SEPTIC TANK				SEEPAGE PIT				DRAIN FIELD		
	Actual		Should be		Actual		Should be		Actual	Should be	
Capacity		Gls.		Gls.		S F		S F	S F		S F
Distance from Nearest Well		F		F		F	75	F	F	50	F
Distance from Lake or Stream		F		F		F		F	F		F
Distance from Occupied Building		F	10	F		F	20	F	F	20	F
Distance from Property Line		F	10	F		F	10	F	F	10	F
Distance from Bottom to Water Table	—	F	—	F		F	4	F	F	4	F

Inspector's Comments: _____

INTERPRETATION OF ABBREVIATIONS

Gls — Gallons
SF — Square Feet
F — Linear Feet

_____
Inspector's Signature

_____
Title

Inspection Dated _____ 19 _____

_____
Agency

White – Office
Yellow – Owner
Pink – Assessor
Blue – Inspector

BECKER COUNTY ZONING ADMINISTRATION

COUNTY COURT HOUSE — Phone 218-847-7721 — Detroit Lakes, Minn. 56501

Permit No. 12-333-35

Date 11-18-75

APPLICATION FOR BUILDING OR SEWAGE PERMIT AND CERTIFICATE OF OCCUPANCY

LEGAL DESCRIPTION AND LOCATION

SEE ATTACHED DESCRIPTION

Lake No.	Lake Name	Lake Classif.	Sec.	TWP.	Range	TWP Name
	MILLISSA		28	138N	41W	LAKE VIEW

IDENTIFICATION: Please Print All Information

	Last Name First Initial	Mailing Address– No. Street, City and State	Zip No.	Tel. No.
Owner	RAVENS WOOD BEACH IMPROVEMENT CORP	RR 5 DeL. c/o RUBEN ENGER		847-6838
Contractor	Name KERMIT KRUGGER	CALLAWAY		375-2965

1047

TYPE OF IMPROVEMENT:
( ) New Building ( ) Alteration
Other _____

RESIDENTIAL PROPOSED USE:
( ) One Family Dwelling
( ) Multiple Dwelling _____ Units

NON–RESIDENTIAL PROPOSED USE:
Specify: _____
Size: _____

ESTIMATED COST OF IMPROVEMENT $

Construction Starting Date:

PRINCIPAL TYPE OF FRAME:
( ) Masonry
( ) Wood Frame
( ) Structural Steel
( ) Other – Specify

Type of Roof:

TYPE OF SEWAGE DISPOSAL:
(X) Public
( ) Individual Septic Tank, etc.

WATER SUPPLY:
( ) Public
(X) Individual Well

MECHANICAL EQUIPMENT :
Elevator: ( ) Yes ( ) No
Air Conditioning: ( ) Yes ( ) No
( ) Central ( ) Unit

DIMENSIONS:
Basement: ( ) Yes ( ) No
Stories above basement: .....
Sq. feet (outside dimension) .....
Bedrooms ..... Baths .....

HEATING:
( ) Electric ( ) Gas ( ) Oil
( ) Coal ( ) None
Other:

SEWAGE DISPOSAL SYSTEM DATA:	SEPTIC TANK	SEEPAGE PIT	DRAIN FIELD
Capacity SEE PLAN APPROVED BY COUNTY	1000 Gls.	Sq. Ft.	~~1500~~ Sq. Ft. 3000
Distance from nearest well	100+ Ft.	Ft.	100+ Ft.
Distance from lake or stream	100+ Ft.	Ft.	100+ Ft.
Distance from occupied building	100+ Ft.	Ft.	100+ Ft.
Distance from property line	100+ Ft.	Ft.	100+ Ft.
Distance from bottom to Water Table	20+ Ft.	Ft.	20+ Ft.

All distances are shortest distance between nearest points

CHARACTERISTICS:

Lot Area is ..... square feet. Water frontage is ..... feet.

Building set back from high water mark is ..... feet. (Building Line)

Land height above high water mark at building line is .....feet

Building set back from State highway is ..... feet -- from road or street is .... feet.

Side yard is ..... and ..... feet. Rear yard is ..... feet.

Building will be located ..... feet from septic tank (Sewage System Permit must be obtained before installation).

Building will be located ..... feet from soil absorption system (Cesspool, Drainfield, etc.).

Agreement: I hereby certify that the information contained herein is correct and agree to do the proposed work in accordance with the description above set forth and according to the provisions of the ordinances of Becker County, Minnesota. I further agree that any plans and specifications submitted herewith shall become a part of this permit application. I also understand that this permit is valid for a period of six (6) months. Applicant further agrees that no part of the sewage system shall be covered until it has been inspected and accepted. It shall be the responsibility of the applicant for the permit to notify the County Zoning Administrator, 48 hours before the job is ready for inspection.

Dated 11/11/75

R E Enger Pres
Signature of Owner Ravenswood Beach Improvement Corp

Permit: Permission is hereby granted to the above named applicant to perform the work described in the above statement. This permit is granted upon the express condition that the person to whom it is granted, and his agent, employees and workmen shall conform in all respects to the ordinances of Becker County, Minnesota. This permit may be revoked at any time upon violation of said ordinances.

Dated 11-18-75

Floyd Swenby
Becker County Zoning Administrator

Permit Fee $ 3.00 State Surcharge $ .50

Comments: Collector line for no more than 30 homes. Trenches pump with cycle counter. Drain field [illegible] 3 feet under with no less than one foot of washed rock.

Report of:

RAVENSWOOD BEACH IMPROVEMENT CORPORATION

RURAL ROUTE # 5, BOX 259, DETROIT LAKES, MN 56501

June 1992

To the:

BECKER COUNTY BOARD OF COMMISSIONEERS

In care of your Zoning Administration office

The Ravenswood Beach Improvement Corporation serves the Ravenswood Beach area with a sewer collection and disposal system. This sewage system is located on the east shore of Lake Mellisa, Lakeview Township, Becker County, Detroit Lakes, Minnesota.

History of the Sewer System.

The sewer system was built to help alleviate septic tank and drainfield problems due to the traditional high water table in the Ravenswood Beach area. The sewer system is owned by the property owners of the Ravenswood Beach area, known as The Ravenswood Beach Improvement Corporation. The Corporation uses the address of its current president, which is shown above. This corporation was formed in 1975 to construct and operate a collection and disposal system to meet MPCA requirements at the time of construction in 1975.

The sewer collection system was built in the fall of 1975. The septic tank, drain field and sewage pumps installation was constructed in the spring of 1976. Actual operation begin in late spring of 1976. The sewer system consists of about 3,000 lineal feet of 6 inch diameter collection lines located along the road serving the beach, at the rear of the properties, about 200 feet from the lake. This is connected to a lift station about midway between each end of the service area which contains two sewage lift pumps. The collection line is about 10 feet deep at the lift station and rises in each direction to the ends which are about the depth of the lake level. The lift station pumps the sewage up the hill and across County Road # 17, approximately 600 feet from the lake and 50 feet above Lake Mellisa. At this location there is a 12,000 gallon reinforced poured concrete partition septic tank, a lineal distribution box, and a 3,000 square foot drainfield. The sewage lift pump station contains two 3 inch sewage pumps with hour running meters for each pump, so the actual sewage flow is determinable. Either pump has the capacity to handle the amount of sewage collected.

The system was designed and built by licensed Civil Engineer, Eugene A. Hansen, P.E. of Detroit Lakes, Minnesota. The drawings showing the original designs are on file at the Becker County Zoning Administrators office and are available for public record. The size of the septic tank drainage field etc.. were verified by the County last year. Mr. Hansen has overseen the operation and maintenance of the system since its construction on a consulting basis.

History of Operations.

The sewer system is a collection and disposal system that has operated with a minimum of maintenance problems since its inception. The only problems have been those of continuing maintenance type, such as replacement of a float switch or a diode in the control panel. No major repairs have been necessary in the 16 years of operation. The system is pumped out and cleaned each year. This includes pumping the septic tank and the distribution box and back washing each of them. The drainage field is checked periodically during the spring and summer months for any possible problems. The entire area of the drainage field and septic tank are maintained by mowing and weed control. Lakeview Township is cooperating with the Ravenswood Beach Improvement Corporation by providing assistance in the weed mowing of the drainage field.

Background of the System.

Lakeview Township proposed a sewer system for the Township in 1974-75. They started as federally financed study to provide a sewer collection system around the entire lake with a sewage lagoon for the treatment of the effluent and proposed using an irrigation system for disposal of the effluent. Ravenswood Beach property owners supported that proposal. Had that proposal become a reality the Ravenswood Beach Improvement Corporation would have in place, for its portion of the lake, the collection system with the lift station necessary to tie into the Township system. Had this been approved it would eliminate the necessity for the separate septic tank and drain field and they would have been abandoned when the larger system was constructed. Ravenswood Beach members felt a positive approach to sewage treatment was need[illegible]

The design engine[illegible] n a
number of federal a[illegible] iiliar
with the problems a[illegible] occur
in these type of pro[illegible] unds or
the Local Governm[illegible] and / or
state grants are aw[illegible] Due to
this possibility Mr. H[illegible] Hansen
had selected a site[illegible] In the
event the LGU (Lak[illegible] such,
that by actual demo[illegible] ate
properly or could be[illegible] ent in
accordance with th[illegible] e
system to expand.

Classified Type II

The history of the s[illegible]
proposed township[illegible]

Purpose of Report.

Ravenswood Beach Improvement Corporation proposes to increase the number of approved connections of homes to its sewer collection and disposal system from the present approval of **30** units to **38** units. The design data included with this report will give your office the necessary information on the existing system, its actual use and operation, and the over capacity constructed in place. This should substantiate the position of the Board of Directors in making this request. This is a request of only 8 additional house units which is an increase of about 27% over the original design requirements. The original project was constructed with a greater capacity than we are now requesting.

Most of these house units are summer homes only. Currently there are only 5 homes on Ravenswood Beach that are a year around residences. One of these is not currently on the sewer system, and should be. Three or four others could possibly be converted to year around residences with some minor alterations. All the others would require major alteration. This should not effect the determination on the acceptability of adding to the system now, because an examination of the data shows the existing year around use, and the existing fall, winter, and spring use to be much less than the summer use.

Eugene A. Hansen, a Professional Engineer has handled all maintenance and repair problems. He has advised the Corporation on maintenance decisions over the last 16 years. He is very familiar with any problems to be expected with the existing system. He will continue to watch over the system and make recommendations after the approval is granted to add the additional 8 house units. He will also oversee the connection construction of the addition units if and when they are added to the system. He is the designer of the original system. The following are his calculations to show how the Design Data will change with the adding of the eight (8) additional house units.

Peak Summer Months Use:

8 new units x 192 GPD = 1,536 GPD + existing 6,136 GPD = 7,672 GPD

Septic Tank Actual Size = 12,000 Gal.
Peak Summer Months Use @ 38 units = 7,672 GPD

Reserve Capacity = 4,328 Gal. (36%)

Drainfield - existing @ 3,000 square feet @ 5 gal per square foot.
3,000 sf x 5 gal/sf = 15,000 gal/sf Design Load

Actual usage - Peak Summer Month = 6,136 GPD
8 additional house units = 1,536 GPD
Gallons per Day Total = 7,672 GPD

Drainfield Design Capacity = 15,000 GPD
Actual usage w/ 38 house units = 7,672 GPD

Reserve Capacity = 7,328 GPD (95%)

Conclusion: The drainfield has a 95% reserve capacity within the existing drainfield construction, and the sepetic tank has a 36% reserve capacity using the Peak Summer Flow. Therefore the existing septic tank and drainfield system will accept and handle the eight (8) additional house units and still have substantial reserve capacity. Additional property is available to increase the size in the future if proven necessary.

The Board of Directors feels that this request is justified due to the following:

1. Actual Construction. The original design of this collection system was to allow for all of the house units between the ends of the collection line to become part of the system. At the time the Board of Directors felt that in the short term only about 30 units would want to hook up prior to the Township system coming on line. Therefore in interest of cost, the disposal part of the system was only designed for 30 units. This was intended to either be abandoned when the Township wide system was constructed, or if found to not handle all units on Ravenswood beach, could be expanded if necessary. Actual construction of the disposal part of this system is a minimum of 34% over design and the drain field was constructed 67% greater than the design requirements. This over capacity of the present construction will more than handle the additional units.

2. Maximum Use. Examination of the present lots, both built on and vacant, between the ends of the collector line show a maximum of 38 allowable units. Actually only 35 legal lots by today's standards, however if some were allowed an exception due to grandfather conditions a case could be made for 38 units. If the 38 house unit request were granted, all units of this area of the lake would meet current standards of construction, maintenance, and operation. Future problems for the County in this area would be eliminated.

3. Actual Useage. We have been discussing this request for increase of house units with the county for about three years now. At the request of the County we have been gathering data on the actual sewage flow since September of 1989. Now with almost three years of data we know that the peak use of the sewer system is within the summer months. The major usage of this system, averages only 6,138 gal. per day. Compared to the design requirement of 9,000 gal. per day, we are only at 67% of capacity. Presently less than 200 gal. per day per house unit is being used by actual measurement. If we were to increase the house units to 38, we would still only generate about 7,600 gal. per day, less that the 9,000 gal. per day design requirement.

4. Design Calculations. The above calculations by our consulting Professional Engineer and the attached data prove that the present system can handle the additional eight (8) house units with no increase in facilities.

5. Expansion Capabilities. In the event the effluent can be proved to not meet current EPA , Department of Health, or County standards, sufficient land is available to expand the drainage field in the existing area. The collection and pumping system can handle the increase, and the septic tank system can be expanded if necessary. The existing septic tank and drainfield is more than adqeuate to handle the additional sewage flow without expansion.

5. Operation and Maintenance. Time has proven that the present system works and is under capacity. The group collection and disposal system is operated as a minor utility. It receives much better care and maintenance that individually operated systems. The Corporation charges its users an annual fee and has built up a reserve for any future problems.

6. History of Operation. This system has worked well for 16 years.

Attached to this report and made part of the report are three data documents:

1. **Ravenswood Beach Sewer System - Design Data.**
2. **Ravenswood Sewer Use Study - Data Readings.**
3. **Ravenswood Sewer Use Study - Calculations & Miscellaneous Data. Resource Personnel for Operations & Maintenance.**

The above documents provides for all the data contained in this report, along with the construction drawings and observation of what is actually constructed and working in the field. Please contact the writers of this report if you have any questions. Please feel free to contact any of the resource personnel for additional data on how the system has been operating. Also you may contact any of the Board members or general membership users of the system to question its operation.

This report was prepared by: Thomas H. Koehnlein, MN Registered Architect #09365
and Eugene A. Hansen, P.E., MN Registered Engineer # 7618

Signed: Eugene A. Hansen — Thomas H. Koehnlein

Eugene A. Hansen
Minnesota P.E. # 7618

Thomas H. Koehnlein
Minnesota Architect # 09365

This report is filed this _____day of June 1992, with _____

To the Becker County Board of Commissioneers:

This is a formal request made by the Board of Directors of the Ravenswood Beach Improvement Corporation to Becker County to increase the approved number of house units allowed to be connected to our existing collector and disposal system to thirty eight (38).

Thomas H. Koehnlein — Dan Riley — Dean Hempel

Cheryl Weum — Glen Bye

Ravenswood Beach Sewer System - Design Data

The original design was based on a projected sewage flow of 75 gal. / day/ person with 4 people per dwelling unit and 30 units or a designed capacity or 9,000 gal. per day.

75 gal. x 4 people = 300 gal. / unit x 30 units = 9,000 gal. per day sewage flow

Permit was for a 10,000 gal. septic tank. (111% of design capacity)

Actual size of tank based on pumping it out is 12,000 gal. (134% of design capacity)
(8 loads of 1,500 gal. each = 12,000 gal.) (also by calculation = 11,782 gal.)

The drain field was calculated at 5 gal. per sq. ft. application rate based on the percolation rate of 1 inch per min. This resulted in a drainage field requirement of 1,800 square feet.

The original design was for 10 lines of 100 feet each in a 2 foot trench which would have produced a drain field of 2,000 square feet.

10 lines x 100 feet x 2 feet wide = 2,000 square feet (111% of design capacity)

Permit was for 3,000 square feet of drainage field. (167% of design capacity)
(3 foot trenches were specified)

Actual size of the drainfield is 3,000 square feet. By actual measurement.

Actual sewage flows taken by measurement over the last two years have averaged less than the designed flow of 9,000 gal. per day.

Actual **two year average** flow = **4,435 gal. per day.** for 32 units.(138.6 gal. per unit)
Actual summer **month**, Peak Use = **6,138 gal. per day.** for 32 units.(191.8 gal. per unit)
Actual summer **day**, Peak Use Holiday = **7,800 gal. per day.** for 32 units.(243.8 gal. per unit)

The actual measured sewage flow during summer use has averaged 67% of design capacity.

An increase of 33% in the amount of units would by measurement bring the daily sewage flow to design capacity. One third of 30 units = 10 additional units, or a total of 40 units. The maximum number of legal lots contained between the ends of the sanitary sewer collection line are 38 units.

If the number of units specified on the permit were increased to 38 units the system would still be less than the design capacity (95%). The actual installation has a capacity over and above the design capacity of a 34% larger septic tank, and a 67% larger drainfield.

The existing system has been in operation for 15 years without major problems.

Allowing the increase in units will bring the system up to the suggested standards and criteria for designing a collector sewage system today. No individual septic tanks or holding tanks will be allowed along the entire stretch of the beach. (over one half mile of lake frontage)

Ravenswood Sewer Use Study - Data Readings

Date	#Days	Pump #1	Pump #2	Total Hours used	x 60 min.	x 100 gal./ min.	÷ # of days = ave. daily use
9 - 3-89		2161.9 hrs.	1.6823 hrs.				
		Base Reading of all Data					
6-28-90	(301)	2235.3	1774.5	73.4 + 92.2 = 165.6	x 60 = 9,936	x 100 = 993,600	÷ 301 = 3,301 gal / day
		Typical Fall, Winter, & Spring Use			the pump ran an average of 33 min. per day		
7-14-91	(381)	2390.8	1943.8	155.5 + 169.3 = 324.8	x 60 = 19,488	x 100 = 1,948,800	÷ 381 = 5,115 gal / day
		Typical Year Around Use			the pump ran an average of 51 min. per day		
8-22-91	(39)	2409.6	1964.9	18.8 + 21.1 = 39.9	x 60 = 2,394	x 100 = 239,400	÷ 39 = 6,138 gal / day
		Typical Summer Month Use			the pump ran an average of 61 min. per day		
8-23-91	(1)	2409.9	1965.3	0.3 + 0.4 = 0.7	x 60 = 42	x 100 = 4,200	÷ 1 = 4,200 gal / day
Fri		Typical Summer Weekday DailyUse			the pump ran 42 min. this day		
8-24-91	(1)	2410.2	1965.6	0.3 + 0.3 = 0.6	x 60 = 36	x 100 = 3,600	÷ 1 = 3,600 gal / day
Sat		Typical Summer Weekend DailyUse			the pump ran 36 min. this day		
8-25-91	(1)	2410.7	1966.2	0.5 + 0.6 = 1.1	x 60 = 66	x 100 = 6,600	÷ 1 = 6,600 gal / day
Sun		Typical Summer Weekend DailyUse			the pump ran 66 min. this day		
8-26-91	(1)	2411.1	1966.6	0.4 + 0.4 = 0.8	x 60 = 48	x 100 = 4,800	÷ 1 = 4,800 gal / day
Mon		Typical Summer Weekend DailyUse			the pump ran 48 min. this day		
8-27-91	(1)	2411.4	1966.8	0.3 + 0.2 = 0.5	x 60 = 30	x 100 = 3,000	÷ 1 = 3,000 gal / day
Tue		Typical Summer Weekday DailyUse			the pump ran 30 min. this day		
8-28-91	(1)	2411.6	1967.1	0.2 + 0.3 = 0.5	x 60 = 30	x 100 = 3,000	÷ 1 = 3,000 gal / day
Wed		Typical Summer Weekday DailyUse			the pump ran 30 min. this day		
8-29-91	(1)	2411.9	1967.4	0.3 + 0.3 = 0.6	x 60 = 36	x 100 = 3,600	÷ 1 = 3,600 gal / day
Thur		Typical Summer Weekday DailyUse			the pump ran 36 min. this day		
8-30-91	(1)	2412.2	1967.7	0.3 + 0.3 = 0.6	x 60 = 36	x 100 = 3,600	÷ 1 = 3,600 gal / day
Fri		Typical Summer Weekday DailyUse			the pump ran 36 min. this day		
8-31-91	(1)	2412.5	1968.1	0.3 + 0.4 = 0.7	x 60 = 42	x 100 = 4,200	÷ 1 = 4,200 gal / day
Sat		Typical Summer Holiday Weekend DailyUse			the pump ran 42 min. this day		
9- 1-91	(1)	2413.0	1968.6	0.5 + 0.5 = 1.0	x 60 = 60	x 100 = 6,000	÷ 1 = 6,000 gal / day
Sun		Typical Summer Holiday Weekend DailyUse			the pump ran 60 min. this day		
9- 2-91	(1)	2413.6	1969.3	0.6 + 0.7= 1.3	x 60 = 78	x 100 = 7,800	÷ 1 = 7,800 gal / day
Mon		Typical Summer Holiday Weekend DailyUse			the pump ran 78 min. this day		
9- 3-91	(1)	2414.1	1969.7	0.5 + 0.4 = 0.9	x 60 = 54	x 100 = 5,400	÷ 1 = 5,400 gal / day
Tue		Typical Summer Holiday Weekend DailyUse			the pump ran 54 min. this day		

---

730 Days **Typical Two Year Use** - **the pump ran an average of 44 min. per day over two years**

2414.1 - 2161.9 = 252.2 hrs

1969.7 - 1682.3 = 287.4 hrs

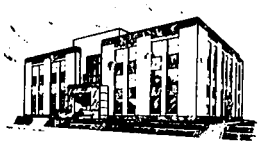
= 539.6 hours x 60 min. = 32,376 min. x 100 gal./min. = 3,237,600 gal. ÷ 730 days = **4,435 gal./ day** average over two years

Ravenswood Sewer Use Study - Calculations & Misc. Data

Septic Tank	7' wide x 25' long x 9' high	= 1,575 cu. ft.	
	1 cu. ft. = 1,728 cu. in.	= 2,721,600 cu. in.	
	1 gal. = 231 cu. in.	= 11,781.8 gal.	
		SAY	**11,750 Gal. (actually pump out 12,000 gal. when cleaning)**
Lift Station	π r2 x height		
	π x 48" x 48" x 144"	= 1,041,776.6 cu. in.	
		= 4,509.9 gal.	
		SAY	**4,500 Gal.**
Distribution Box	24" wide x 20' long x 12" high	= 69,120 cu. in.	
		= 299.2 gal.	
		SAY	**300 Gal.**
Sanitary Sewer Collection Line:		**6"** each direction from lift station @ a 5% grade	
	πr2 x 2,800' = 949,536 cu. in.	= 4,111 gal.	
		SAY	**4,000 Gal.**
Drain Field Lines:		**4"** 10 each direction from distribution box 3,000 sf	
Force Main:		**3"**	

Resource Personnel for Operation & Maintenance:

Engineer:	**Eugene Hansen** **R, Rt. #1, Box 58A** **Detroit Lakes, MN 56501**	**847-5918**
Pump Repair:	**North Dakota Sewage Pump &** **Lift Station Service Co.** **411 Broadway, Fargo, ND**	**282-6760**
Septic Tank Pumping:	**Art W. Anderson Septic Tank Pumping** **R. Rt. # 3, Box 180** **Detroit Lakes, MN 56501**	**847-4321**
Drain Field Mowimg:	**Lakeview Township** **Call Bill Jordan Jr.** **R. Rt. #5 Box 343A, Detroit Lakes, MN 56501**	**847-3416**
Electrican:	**Schatts Electric** **Don Schattscheider** **R. Rt. #4, Detroit Lakes, MN 56501**	**847-5255**
Ravenswood Beach Improvement Corporation	**Thomas H. Koehnlein President,** **R. Rt. #5, Box 259** **Detroit Lakes, MN 56501**	**847-6707**



BECKER COUNTY

829 LAKE AVENUE, P.O. BOX 787
DETROIT LAKES, MINNESOTA 56502-0787
(218) 846-7314

Application No. 5689
Tax Parcel No. 19.0513.000

ZONING APPLICATION SUMMARY FORM
FORM A

A. GENERAL INFORMATION

1. Applicant's Name (Last, First, M.I.)	2. Authorized Agent (if applicable)	
Ravenswood Beach Imp. Corp		
3. Mailing Address (Street, RFD, Box Number, City, State, Zip Code)		
Rt 5 Box 259, Detroit Lakes, MN 56501		
4. Day Phone	5. Evening Phone	6. Fire Number of Project Location

B. PROPERTY DESCRIPTION

1. Lot(s), Block, Subdivision Name	2. Section	3. Township	4. Range	5. Qtr./Qtr.	6. Gov. Lot No.
Ravenswood Beach Imp					

7. Note: If the property is a metes and bounds description, check here [ ] and attach a copy of the exact legal description.

C. APPLICABLE ZONING DISTRICTS

(check all that apply)
1. [ ] Residential
2. [ ] Business
3. [ ] Commercial
4. [ ] Industrial
5. [ ] Agricultural
6. [ ] Shoreland(*)
7. [ ] Wild & Scenic River
8. [ ] Flood Fringe
9. [ ] Floodway
10. [ ] General Flood Plain
11. [ ] Other (specify below)

*Fill in Section E. also.

D. TYPE OF ZONING REQUEST

Project Type	Necessary Supplemental Form
1. [ ] Building Permit	Form B and H
2. [ ] Sewage System Permit	Form C and H
3. [ ] Well Information	Form D and H
4. [ ] Land Alteration Permit	Form E and H
5. [ ] Conditional Use Permit	Form F
6. [ ] Variance	Form G
7. [ ] Zoning District Change	Form F
8. [ ] Subdivision Approval	Form F
9. [ ] Ordinance Amendment	Form F
10. [ ] Other (specify below)	

E. SHORELAND MANAGEMENT DATA

1. Lake / Stream Name _____
2. Lake / Stream I.D. Number _____
3. Classification: [ ] NE; [ ] RD; [ ] GD; [ ] Other (specify below)

_____

- IMPORTANT NOTICE -

Most projects require the submission of one or more additional forms as shown in SECTION D. and sometimes plans, specifications and a written project description before your application is considered to be complete. Form A primarily provides summary information for record keeping.

I hereby certify with my signature that all data contained herein as well as all supporting data are true and correct to the best of my knowledge: Thomas H. Koehnen, President — Signature — June 15, 1992 — Date

F. ADMINISTRATIVE DATA SUMMARY
(For Office Use Only)

1. [X] Proper addendum to application has been submitted.
2. [X] Detailed plans have been submitted which were prepared by Eugene Hanson & Thomas H. Koehnen Dated: 4/15/92
3. [X] Written project description has been submitted which was prepared by: Same Dated: 6/15/92
4. [ ] Approved [ ] with, [X] without modification on: _____
5. [ ] Denied on: _____
6. Itemization of Fees:

General Application	_____
State Surcharge	.50
~~Sewage Disposal~~	250.00
_____	_____
_____	_____
_____	_____
_____	_____

7. Total Fees = 250.50
8. Fee paid on (date): 6/15/92
9. Administrative Summary for Building Permits, Sewage System Permits, and Shoreland Alteration Permits.
   a. Dates of inspection(s): Sent to Public Health Dept. Art Barker 7/13/92.
   b. Certificate of Occupancy (Zoning Compliance) issued on: _____
10. Administrative Summary for Applications for Subdivision Approval, Variances, Conditional Use Permits, Ordinance Amendments and Zoning District Changes:
    a. Referred to Township on: _____
    b. Referred to Planning Commission on: _____
    c. Referred to Board of Adjustment on: _____
    d. Referred to County/City Engineer on: _____
    e. Referred to County/City Attorney on: _____
    f. Referred to Soil and Water Cons. Dist. on: _____
    g. Referred to Watershed District on: _____
    h. Date of Hearing Notice: _____
    i. Date of Public Hearing: _____
    j. Is ten (10) day notice to the DNR necessary? [ ] yes, [ ] no
    If yes, enter date sent to DNR here: _____
    k. Is ten (10) day final notice to the DNR necessary? [ ] yes, [ ] no
    If yes, enter date sent to DNR here: _____
    l. Final Action: [ ] APPROVED [ ] with, [ ] without modification
    [ ] DENIED
    By: [ ] County Board; [ ] Board of Adjustment
    Date of Action: _____

FORM A - ZONING APPLICATION SUMMARY FORM

NOTES

Minnesota Pollution Control Agency

August 22, 1975

Mr. Floyd Svenby
Becker County Zoning Administrator
Becker County Courthouse
Detroit Lakes, Minnesota 56501

Re: Sanitary Sewer Extension
Permit Application - Form No. 689

Dear Mr. Svenby:

We have received a request from our Regional Office at Fergus Falls to supply you with information for obtaining a permit for a sanitary sewer extension.

Therefore, please find enclosed copies of our Application for Permit for Sanitary Sewer Extension - Form No. 689. The completed application form should be submitted to the Pollution Control Agency with the plans and specifications for the project prior to construction.

Also enclosed is a memorandum dated April 15, 1974 explaining the policy requiring the use of this form.

If you have any further questions regarding this matter, please contact me at (612) 296-7214.

Sincerely,

Patric S. Herndon

Patric S. Herndon
Facilities Section
Division of Water Quality

Enclosures: Form No. 689
Memorandum dated April 15, 1974

MINNESOTA POLLUTION CONTROL AGENCY
Division of Water Quality
Section of Municipal Works

APPLICATION FOR PERMIT FOR SANITARY SEWER EXTENSIONS

(INSTRUCTIONS: Please submit one completed application with each set of plans and specifications for a sanitary sewer extension. This application must be submitted if the sewer extension request is to be considered.)

* * * * * * *

I. Name of City:_____ Date:_____

Nature of area to be served by sewer extension (residential, commercial, industrial, [specify], etc.):_____

Title of Plans and Specifications:_____

_____

II. DESIGN OF SANITARY SEWER(S):

Total Length of Pipe:_____ Pipe Diameter(s):_____

Type of Pipe:_____

III. DESIGN OF PUMP STATION(S):

	STATION #1			STATION #2		
	Pump #1	Pump #2	Pump #3	Pump #1	Pump #2	Pump #3
Pump Capacity (gpm)						
Total Dynamic Head (ft)						
Length of Forcemain (ft)						
Forcemain Diameter (in)						
Forcemain Material						
Friction Factor (e.g. Manning "n", Hazen-Williams "C", etc.)						

IV. DESIGN LOADINGS:

Estimated initial and ultimate flow increase from proposed extension (gpm):_____ _____

Estimated initial and ultimate increase of BOD_5 from proposed extension (mg/l):_____ _____

Basis for estimating flow and BOD_5 increases:_____

_____

_____

V. SEWAGE TREATMENT PLANT:

Name of Plant:_____ Type of Plant:_____

Receiving Water(s):_____

Plant Design Data:

Design Hydraulic capacity (mgd):_____

Design BOD_5 capacity (lbs/day):_____

Present Operating Data:

Monthly Average of Daily Flow (mgd):_____

Monthly Average Influent BOD_5 Concentration (mg/l):_____

Monthly Average Effluent BOD_5 Concentration (mg/l):_____

Are there any seasonal sources of wastes discharging to the treatment plant which would change any of the above?_____

_____

VI. GENERAL:

1. Are monthly operation reports submitted to the Agency? (if applicable) [ ] Yes [ ] No
2. Stipulation status (if applicable)?_____

_____

_____

3. Does the proposed sanitary sewer extension comply with the comprehensive sewer plan or other plans? (if applicable, please list appropriate plan(s)):_____

_____

4. Remarks:_____

_____

_____

_____

_____

Signed:_____
Engineer

_____
Reg. No.

Signed:_____
Authorized City Representative
(Attorney, Mayor, Clerk, etc.
Please specify.)

MPCA #689

V. SEWAGE TREATMENT PLANT:

Name of Plant:_____ Type of Plant:_____

Receiving Water(s):_____

Plant Design Data:

Design Hydraulic capacity (mgd):_____

Design BOD_5 capacity (lbs/day):_____

Present Operating Data:

Monthly Average of Daily Flow (mgd):_____

Monthly Average Influent BOD_5 Concentration (mg/l):_____

Monthly Average Effluent BOD_5 Concentration (mg/l):_____

Are there any seasonal sources of wastes discharging to the treatment plant which would change any of the above?_____

_____

VI. GENERAL:

1. Are monthly operation reports submitted to the Agency? (if applicable) [ ] Yes [ ] No
2. Stipulation status (if applicable)?_____

_____

_____

3. Does the proposed sanitary sewer extension comply with the comprehensive sewer plan or other plans? (if applicable, please list appropriate plan(s)):_____

_____

4. Remarks:_____

_____

_____

_____

_____

Signed:_____
Engineer

_____
Reg. No.

Signed:_____
Authorized City Representative
(Attorney, Mayor, Clerk, etc.
Please specify.)

MPCA #689

MINNESOTA POLLUTION CONTROL AGENCY
Division of Water Quality
Section of Municipal Works

APPLICATION FOR PERMIT FOR SANITARY SEWER EXTENSIONS

(INSTRUCTIONS: Please submit one completed application with each set of plans and specifications for a sanitary sewer extension. This application must be submitted if the sewer extension request is to be considered.)

* * * * * * *

I. Name of City:_____ Date:_____

Nature of area to be served by sewer extension (residential, commercial, industrial, [specify], etc.):_____

Title of Plans and Specifications:_____

_____

II. DESIGN OF SANITARY SEWER(S):

Total Length of Pipe:_____ Pipe Diameter(s):_____

Type of Pipe:_____

III. DESIGN OF PUMP STATION(S):

	STATION #1			STATION #2		
	Pump #1	Pump #2	Pump #3	Pump #1	Pump #2	Pump #3
Pump Capacity (gpm)						
Total Dynamic Head (ft)						
Length of Forcemain (ft)						
Forcemain Diameter (in)						
Forcemain Material						
Friction Factor (e.g. Manning "n", Hazen-Williams "C", etc.)						

IV. DESIGN LOADINGS:

Estimated initial and ultimate flow increase from proposed extension (gpm):_____ _____

Estimated initial and ultimate increase of BOD_5 from proposed extension (mg/l):_____ _____

Basis for estimating flow and BOD_5 increases:_____

_____

_____

MINNESOTA POLLUTION CONTROL AGENCY
Division of Water Quality
1935 W. County Road B2
Roseville, Minnesota 55113

April 15, 1974

TO: Whom it may concern

FROM: Grant J. Merritt
Executive Director

SUBJECT: Application for Permit for Sanitary Sewer Extension

On January 15, 1974 the Minnesota Pollution Control Agency Board reaffirmed the policy of preventing substantial increases of non-complying sewage discharges in those instances where municipalities have inadequate sewage treatment facilities and are awaiting grant assistance for upgrading. (A copy of these Agency minutes are available upon written request.)

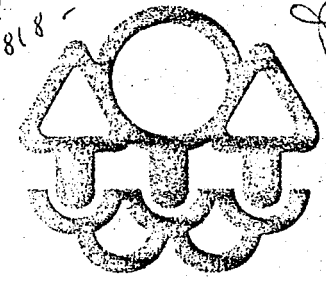
Under these circumstances, extensions of sewer service will be approved only where the new sewer will serve the normal growth of the community. "Normal growth" has been defined as development that will result in an accumulative increase in the existing sewage flow of no more than ten percent (10%) of the design flow of the sewage treatment plant. When this flow has been reached, additional sewer extensions will be approved only if there is a formal commitment by the municipality to construct, without delay, adequate treatment facilities, at their own expense.

Administrative procedures to implement the above policy necessitate submitting the enclosed application with each request for a sanitary sewer extension. This form should be reproduced so additional copies are available to accompany future sewer extension requests. A sanitary sewer extension will not be reviewed unless accompanied by this completed application form.

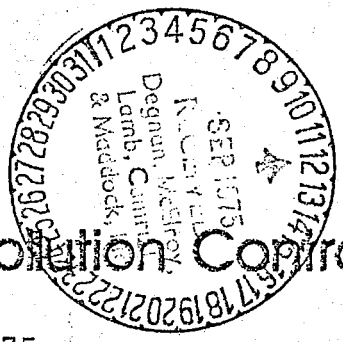
We solicit your cooperation in following these procedures with the next sewer extension you submit. This policy is intended to expedite plan review and facilitate our task of improving and maintaining the quality of our State's waters.

To: Thomas P. McElroy
Atty at Law
Box 818 - Grand Forks, N. Dak.

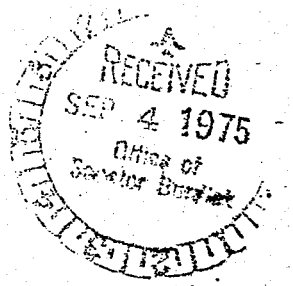
J. Foley
9-11-75
SBA



Minnesota Pollution Control Agency



September 2, 1975



The Honorable Quentin N. Burdick
United States Senate
Committee on the Judiciary
Washington, D. C. 20510

Dear Senator Burdick:

This letter is in response to your inquiry regarding septic tank regulations and any aid which may be available. At the present time, there are no statewide standards for the design and construction of individual sewage disposal systems. The Minnesota Pollution Control Agency, with the assistance of a citizen advisory committee, is presently developing statewide regulations. These will likely be going to public hearings in late 1975 or early 1976. We will inform you of any hearings being held in the northwest portion of the state.

Presently the lakeshore residents on Lake Melissa fall under the control of the lakeshore zoning ordinances of Becker County. The county should be contacted regarding the applicable standards.

This office is not aware of any financial aid programs that are available to individual property owners. There are programs available to governmental units for the construction of sewage treatment facilities. In addition there is the Small Business Administration, which has loan programs for which resorts might be eligible.

If the county is unable to provide the residents with the information they need, Mike Hansel (612/296-7208) of my staff is available to consult with the residents and the county. If I can be of any further help, please contact me.

Sincerely,

Peter L. Gove
Executive Director

Tom - I just received this from Sen Burdick's office - Thought you might be interested!
Best regards. JM

RECEIV
SEP 11 197
SBA
FARGO

1935 West County Road B2, Roseville, Minnesota 55113
Regional Offices • Duluth / Brainerd / Fergus Falls / Marshall / Rochester / Roseville

APPLICATION FOR SEWAGE SYSTEM

CERTIFICATE OF COMPLIANCE

With The Becker County Zoning Ordinance

Application Number	
5639	
Tax Parcel Number	
19,051300	

A. GENERAL INFORMATION

1. Applicant's Name (Last, First, M.I.)	2. Authorized Agent (If applicable)
Lovenswood Resorts Imp Corp	
3. Mailing Address (Street, RFD, Box Number, City, State, Zip Code)	
RT5 Box 259, Detroit Lakes, MN 56501	
4. Day Phone: 847-6707	5. Evening Phone:
6. Fire Number of Project Location:	

B. PROPERTY DESCRIPTION

1. Lot(s), Block, Subdivision Name	2. Section	3. Township	4. Range	5. Qtr./Qtr.	6. Gov. Lot No.

7. Note: If the property is a metes and bounds description, check here [ ] and attach a copy of the exact legal description.

SEWAGE SYSTEM DATA

Anticipated Use
- a. [ ] Single Family
- b. [X] Multiple Family
- c. [ ] Commercial
- d. [ ] Agricultural
- e. [ ] Other (specify)

Type of System
- a. [ ] Septic Tank Only
- b. [ ] Drainfield Only
- c. [X] Septic Tank & Drainfield
- d. [ ] Holding Tank
- e. [ ] Alternative System (specify) Lift Station

Type of Drainfield
- a. [X] Standard System
- b. [ ] Mound (pressure distribution)
- c. [ ] Mound (gravity distribution)

Well Data
- a. Depth: _____
- b. Diameter: _____

Type of Well
- a. [ ] Drilled
- b. [ ] Sand Point

1 Inch Equals _____

DESIGN

See attached Drawing. Exhibit A.

Show Distance Between Sewage System And Buildings, Property Lines, Lake, Roads And All Wells Within 125 Feet.

I hereby certify with my signature that all data on my application forms, plans and specifications are true and correct to the best of my knowledge: Thomas Hoehle President June 15, 1992

Signature of Applicant — Date

TO BE COMPLETED BY ZONING OFFICE

SEWAGE SYSTEM DATA	Tank	Drainfield
Distances to Well:		
Distance to Building:		
Distance to Property Line:		
Distance to Suction Line:		
Distance to Pressure Line:		
Tank Capacity (gal.)and Area of Drainfield (ft. 2):		
Distance to Lake or Stream (from Ordinary High Water Level):		
Drainfield Separation from Highest Known Ground Water Level, Impervious Lens or Soil Mottling:		

Review plans for variation to ordinance upon completion

[ ] CERTIFICATE IS HEREBY DENIED

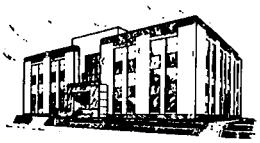
[X] CERTIFICATE IS HEREBY GRANTED

Based upon the application, addendum form, plans, specifications and all other supporting data. With proper maintenance this system can be expected to function satisfactorily, however this is not a guarantee.

BECKER COUNTY ZONING OFFICE

Margaret M. Soltis
Signature

Inspector, 7/13/92
Title — Date



BECKER COUNTY

829 LAKE AVENUE, P.O. BOX 787
DETROIT LAKES, MINNESOTA 56502-0787
(218) 846-7314

Application No.
5689
Tax Parcel No.
19.0513.000

SUPPLEMENTAL DATA FOR SEWAGE SYSTEM PERMIT

FORM C

A. GENERAL INFORMATION

1. Applicant's Name (Last, First, M.I.)	2. Day Phone No.	3. Evening Phone No.
Ravenswood Beach Imp.		

4. Sewer Installer	5. Soil Tester/Earthwork Contractor	6. MPCA Certification No.
Eng & Earth Design	of Existing System	

B. SEWAGE SYSTEM DATA

1. Work Category
Add on to existing System.
a. [ ] New System
b. [ ] Repair

2. Type of System
a. [ ] Septic Tank Only
b. [ ] Drainfield Only
c. [X] Septic Tank & Drainfield
d. [ ] Alternative System (specify)
Collector System
Lift Station

3. Anticipated Use
a. [ ] Single Family
b. [X] Multiple Family
c. [ ] Commercial
d. [ ] Agricultural
e. [ ] Other (specify) _____

4. Type of Drainfield
a. [X] Standard System
b. [ ] Mound (pressure distribution)
c. [ ] Mound (gravity distribution)

5. System Design Data

	Tank	Drainfield
a. Distance to Well:	= _____	- _____
b. Distance to Building:	= _____	- _____
c. Distance to Property Line:	= _____	- _____
d. Distance to Suction Line:	= _____	- _____
e. Distance to Pressure Line:	= _____	- _____
f. Tank Capacity (gal.) and Area of Drainfield (ft. 2):	= _____	- _____
g. Distance to Lake or Stream (from Ordinary High Water Level):	= _____	- _____
h. Drianfield Separation from Highest Known Ground Water Level, Impervious Lens or Soil Mottling:	= _____	- _____

C. SITE DATA

1. Soils
a. Soil Type: = _____
b. Percolation Rate (minutes per inch): = _____
c. Depth to Water Table: = _____
d. Depth to Mottled Soil: = _____
e. Date of Soil Testing: = _____

2. Supporting Data/Attachments
[X] Sketch Plan**
[X] Percolation Data Sheets
[ ] Soil Borings
[X] Tank/Drainfield Design Calculations

** This is normally a mandatory requirement. It is recommended that the applicant submit sketch plan on FORM H.

3. Water Level Data Worksheet
a. Highest Known Water Level: = _____
b. 100-Year Flood Elevation: = _____
c. 10-Year Flood Elevation: = _____
D. Design of Tank and/or Drainfield is Based on:
[ ] 100-Year Flood Elevation
[ ] 10-Year Flood Elevation
[ ] Highest Known Water Level
[ ] Highest Known Ground Water Level
[ ] Soil Mottling or Impervious Soil Layer

Note: The proper design of sewage systems is contingent upon these limiting factors. The most conservative resulting design prevails.

I hereby certify with my signature that all data on my application forms, plans and specifications are true and correct to the best of my knowledge: Thomas A Lochner - President (Signature of Applicant) June 15, 1992 (Date)

SEWAGE SYSTEM PERMIT

[ ] APPLICATION IS HEREBY DENIED
[X] PERMISSION IS HEREBY GRANTED TO Ravenswood Beach Improvement Corp.
All in accordance with the application, addendum form, plans, specifications and all other supporting data, unless specified hereinafter in the GENERAL and/or SPECIAL PROVISIONS.

BY ORDER OF: Floyd Sweeney mp (Signature of Permitting Authority) . Zoning Administrator (Title) . 6/15/1992 (Date)

NOTE: THIS PERMIT TERMINATES ON: _____ except as provided for by local ordinance and/or Minnesota Law.

- SEE REVERSE FOR GENERAL AND SPECIAL PROVISIONS -

Application Fee $ 250.00 State Skurcharge .50 Total $ 250.50

FORM C -SEWAGE SYSTEM PERMIT

GENERAL PROVISIONS

1. Permittee shall not cover the system authorized herein until such system has been inspected and determined to be compliant by the permitting authority. This provision can be waived only at the discretion of the permitting authority.

2. Where clay soils are predominant, no drainfield excavation can proceed if more than one (1) inch of total rainfall has been received at the nearest official rain gauge within one (1) week prior to construction. This provision can only be waived at the discretion of the permitting authority.

3. No changes in plans or specifications can be made to the work authorized herein unless such change is first approved in writing by the permitting authority.

4. Permittee shall grant access to the site at all reasonable times so that the permitting authority or his/her agents may conduct inspections to ascertain compliance with the terms and conditions of this permit.

5. The construction site shall be kept reasonably free of debris at all times so as to not create a public nuisance.

6. Permittee shall install permanent and temporary erosion control measures in order to prevent erosion of disturbed soils from the project site onto adjacent parcels of land, public waters, public roads, ditches, sewer facilities and the like. Permittee shall cease all related authorized construction activities until such time as any such problem is corrected as agreed to by the permitting authority.

7. No certificate of occupancy or zoning compliance may be issued until all the provisions and conditions of this permit are complied with in full.

8. A copy of this permit or an official notice or placard thereof must be posted in a conspicuous place protected from the effects of weather no more than 12 feet above grade on the premises which the work is to be done and shall be maintained there until completion of said work.

9. The granting of this permit does not exempt the permittee from having to secure other permits from other state, federal or local units of government which may have jurisdiction over portions of the authorized project.

10. This permit does not allow the destruction or removal of any trees or vegetation which exists more than ten (10) feet beyond the foundation of the authorized structure or more than five (5) feet beyond the edge of a driveway or parking lot unless authorized in a Special Provision below.

_____ Date

_____ Signature of Applicant

SPECIAL PROVISIONS

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Onsite Septic System

Becker County Planning & Zoning
915 Lake Ave, Detroit Lakes, MN 56501
Phone (218)-846-7314; Fax (218)-846-7266

SCANNED
LAKE

RECEIVED
NOV 04 2013
ZONING

1. PROPERTY DATA (as it appears on the tax statement, purchase agreement or deed)
Parcel Number(s) of property where the system will be installed: 19.0513.000

Is this a split of an existing property? Yes No
(If yes and a parcel number has not yet been assigned, indicate the main parcel number from which the new parcel was split.)

Section 28 Township 138 Range 41 Township Name Lake View

Lake Name _____ Lake Classification _____

Legal Description: Lot 2 of Hwy Less Trts Wagner & Hansen & Less Hwy

Project Address: Co Hwy 17

2. PROPERTY OWNER INFORMATION (as it appears on the tax statement, purchase agreement or deed)
Owner's First Name Ravenswood Beach Owner's Last Name Improvement Corp

Mailing Address PO Box 1671 City, State, Zip Detroit Lakes MN

Phone Number _____

3. DESIGNER/INSTALLER INFORMATION
Designer Name Tony Stenger Company Name _____ License # _____

Address SJ Rhombus Phone Number _____

Installer Name Tony Stenger Company Name _____ License # _____

Address _____ Phone Number _____

4. SYSTEM DESIGN INFORMATION

System Status

_____ Vacant Lot-No existing system-new structure
_____ Replacement – structure removed and being rebuilt
_____ Failing –Replacement- cesspool/seepage pit or other
_____ Enlargement of system-Undersized
_____ Repairs Needed to existing
_____ Additional system on property

What will new system serve? Check one

_____ Dwelling
_____ Resort/Commercial
_____ Commercial (Non-resort)
_____ Other – explain below

_____ Date of site evaluation

Design Flow 350 gpd - fall-Spring Gallons Per Day ~~350~~ 3500 summer
Number of Bedrooms _____ Garbage Disposal _____ Yes _____ No
Dishwasher ____Yes ___No
Lift station in House ____Yes ____No
Grinder pump in House ____ Yes ____ No

Well Depth _____
Depth of other wells within 100 ft of system _____

Original Soil _____ Compacted Soil _____
Type of Soil Observation
____ Pit _____Probe _____Boring
Depth to Restricting Layer _____
Maximum Depth of System _____

Size of All Tanks to be installed
Replacing existing tank with new tank
_____ gal Single Compartment Septic Tank
1750 gal Compartmented Tank 3 compartment
_____ Pit Privy
_____ gal Separate Lift Station
_____ gal Holding Tank
_____ Existing Tank to be used
_____ Existing tank w/new Additional Tank
_____ Existing tank w/new Lift Station
_____ Holding Tank with Privy

Total Number of tanks to be installed in this system 1 (This # will be reported to MPCA at end of year.)

Composit plastic tank

PARCEL	
APP	SEPTIC
YEAR	

Type of Drainfield	Full Size of Drainfield	Reduced/Warrantied size
_____ Chamber Trench	_____ sq ft	_____ sq ft
_____ Rock Trench	_____ sq ft	_____ sq ft
_____ Gravelless	_____ sq ft	_____ sq ft
_____ Mound	_____ sq ft ***	
_____ Pressure Bed	_____ sq ft ***	
_____ Seepage Bed	_____ sq ft ***	
_____ At-grade	_____ sq ft ***	
_____ Alternative / Performance	_____ sq ft ***	***Attach Worksheets

Type of chamber _____
Depth of Rock _____

Alarm? Yes _____ No _____
Type of Alarm _____
Size of Lift Pump _____
Size of Lift Line _____

PROPOSED SETBACKS

	TANK	DRAINFIELD
Distance to Well	+100	_____
Distance to Building	+100	_____
Distance to Property Line	+100	_____
Distance to OHW of Lake	+100	_____
Distance to Pressure Line	_____	_____
Distance to Wetland/Protected Water	_____	_____

Perc Rate _____ Soil Sizing Factor _____ *If SSF other than .83, attach Perc Test Data

Soil Borings (three are required)

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure

Depth	Texture	Color	Structure		Depth	Texture	Color	Structure

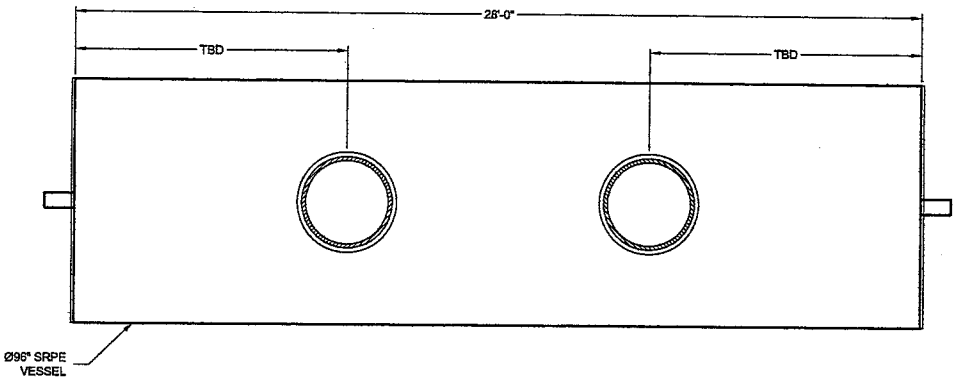
5. REQUIRED DOCUMENTS

U of MN worksheets are required for mounds, pressure beds, seepage beds, at-grades or Type IV or Type V systems. Are the required worksheets attached? _____ Yes _____ No

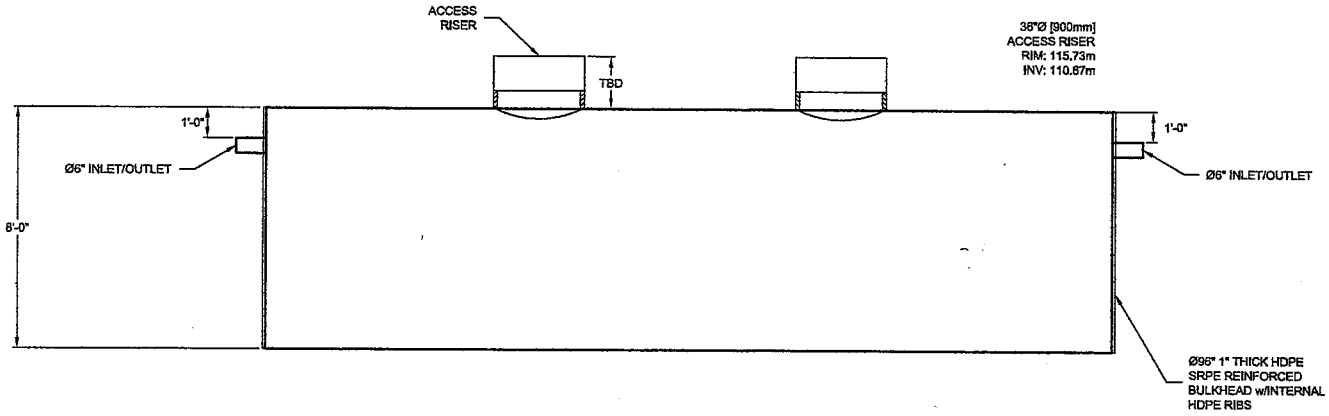
6. DESIGNER'S CERTIFIED STATEMENT

I, Tony Stluka _____ certify that I have completed the preceding design work in accordance with all
(Print Name of Designer)
applicable requirements (including, but not limited to Minnesota Chapter 7080 and the Becker County Individual Sewage Treatment System Ordinance).

Tony Stluka _____ _____
Signature of Designer ✓ Date



PLAN VIEW



ELEVATION VIEW

MARK	DATE	REVISION DESCRIPTION	BY

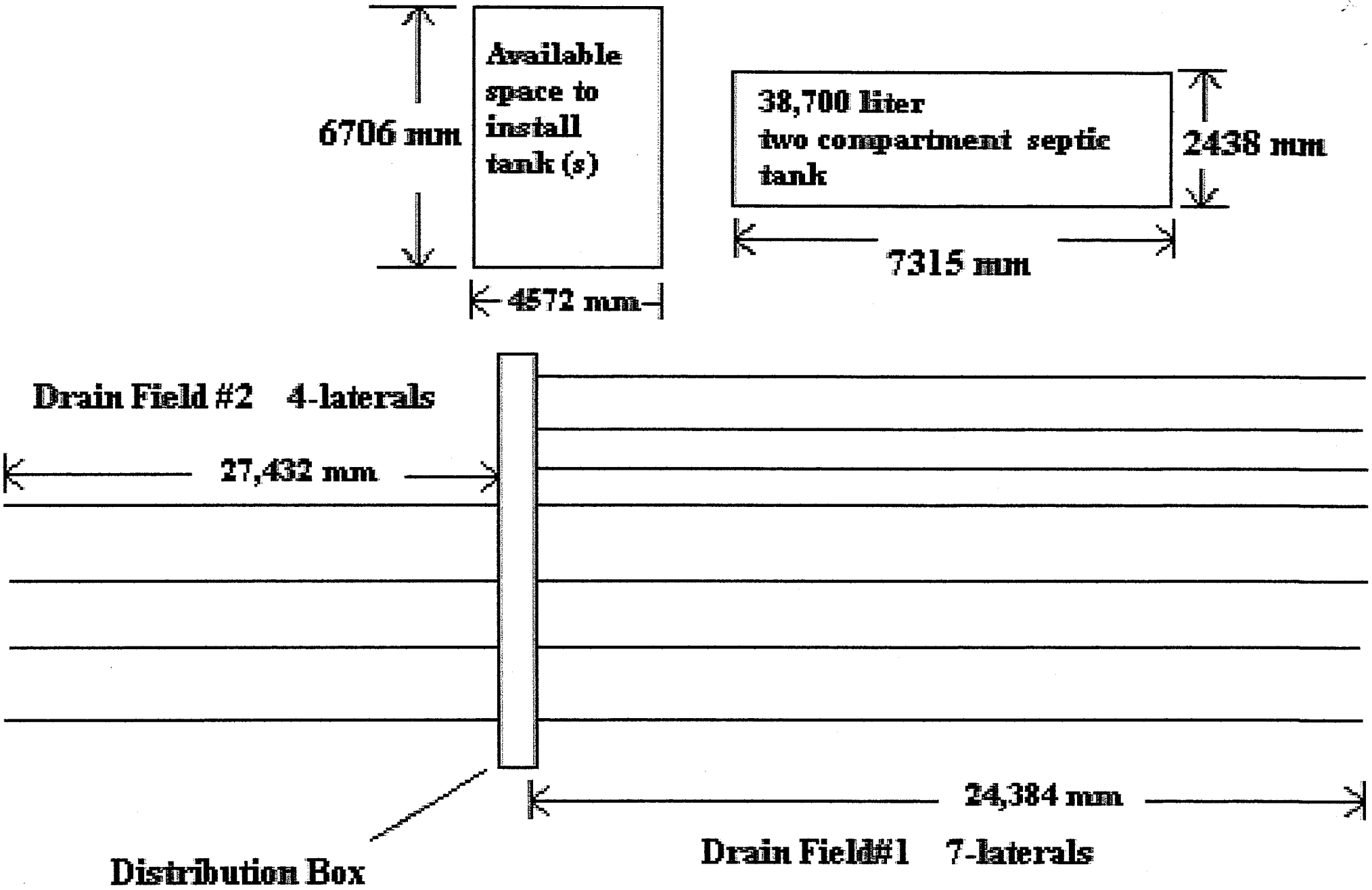
CONTECH
ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

DuroMaxx
STEEL REINFORCED PE TECHNOLOGY

CONTECH
CONTRACT
DRAWING

Ø96" DUROMAXX STORAGE TANK

PROJECT No.:	SEQ. No.:	DATE:
XXXXX	001	7/25/13
DESIGNED: XXX	DRAWN: RTF	
CHECKED: XXX	APPROVED: XXX	
SHEET NO.: 1 OF 1		



Lake Melissa Cluster

PARCEL	
APP	SEPTIC
YEAR	

********** FOR OFFICE USE ONLY **********

Application Approved by: Vicki Moltz Date: 11-5-13

Amount Paid 300.00 Receipt Number 137095-549587 Permit Number _____

NOTES: Replacing existing tank 11-6-13 pd by Stenger

****

INSPECTION REPORT

Home Information

Does the structure contain any of the following elements?

Garbage disposer _____ Yes _____ No Dishwasher _____ Yes _____ No

Grinder pump _____ Yes _____ No Lift pump in basement _____ Yes _____ No

Effluent screen installed? _____ Yes _____ No Effluent screen manufacturer _____

Alarm required? _____ Yes _____ No Alarm Type _____ Alarm manufacturer _____

Lift pump in system? _____ Yes _____ No Pump manufacturer _____

Number of bedrooms _____

Component Information

Tank size 13000 3 compartment plastic tank Tank manufacturer _____

Drainfield size _____

Drainfield medium _____ Medium manufacturer _____

Drainfield medium size/depth _____

New tank installed next to existing tank for additional capacity. VM

Soil Verification

Vertical separation verified for Boring #1 on _____ Depth _____

Vertical separation verified for Boring #2 on _____ Depth _____

Vertical separation verified for Boring #3 on _____ Depth _____

Setback Verification

	TANK	DRAINFIELD
Distance to Well	+50	existing
Distance to Building	+100	
Distance to Property Line	+100	
Distance to OHW of Lake	+300	
Distance to Pressure Line	+50	
Distance to Wetland/Protected Water		

Date System Installed 11/7/13 **Installer** Tony Stenger **Inspector** Vicki

****

****

CERTIFICATE OF COMPLIANCE

( ) Certificate Is Hereby Denied

(✓) Certificate is Hereby Granted Based upon the Application, addendum from, plans, specifications and all other supporting data. With property maintenance, this system can be expected to function satisfactory, however, this is not a guarantee.

Vicki Moltz Supervisor of Inspectors 11/8/13

Signature Title Date

(Certificate of Compliance is not valid unless signed by a Registered Qualified Employee)