APPENDIX F LAKE BACKGROUND INFORMATION

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LAKE QUALITY REPORT CARD (FROM MET COUNCIL)

The Metropolitan Council following its 1989 lake survey (Osgood 1989b) developed the lake quality report card. The idea is simply that lake water quality characteristics can be ranked by comparing measured values to those of other Metro Area lakes. In this way, technical information, which in the past had required professional analysis, can more easily be used by a less technical audience to visualize the water quality of their lake relative to other area lakes. The grading curve represents percentile ranges for three water quality indicators - the summertime (May - September) average values for total phosphorus, chlorophyll-a, and Secchi disk. These percentiles use ranked data from 120 lakes sampled from 1980 - 1988:

GRADE	PERCENTILE	TP(µg/l)	CLA(µg/l)	Secchi(m)
A	<10	<23	<10	>3.0
B	10-30	23-32	10-20	2.2-3.0
C	30-70	32-68	20-48	1.2-2.2
D	70-90	68-152	48-77	0.7-1.2
F	>90	>152	>77	<0.7

In 2000, the percentiles determined from the 1980-1988 water quality database of 120 lakes were compared to calculated percentiles from a more current and expanded 1980-1999 water quality database of 230 lakes. It was found that the percentiles from the expanded database were very similar to those determined from the 1980-1988 database. For this reason, and in an attempt to maintain commonality, the original 1980-1988 percentiles are continued to be used for lake quality grading purposes.

The three variables used in the grading system strongly relate to open-water nuisance-aspects of a lake (i.e. algal blooms), which can indicate accelerated aging (cultural eutrophication). For example, lake phosphorus concentration has been related to increased algal abundance, increased frequency of algal blooms, and to the increased abundance of blue-green algae (Osgood 1988b). Chlorophyll-a, which is a pigment in plants (including algae) essential in the photosynthesis process, is used to estimate the algal abundance of a lake. And finally, Secchi transparency relates to the appearance of a lake (generally the fewer algae, the better the transparency of a lake). TKN concentration was not included in the grading process because most lake nuisances in the area are related to the phosphorus concentration of the lake (Osgood 1988b).

These water quality grades, however, only characterize the open-water quality of lakes. Other nuisances, such as the abundance of aquatic macrophytes, are not indicated with these grades.

The percentile curve can be used to assign individual TP, CLA and Secchi grades to the monitored lakes. Therefore, a lake having a mean summertime Secchi transparency of 1.7 m would receive a "C" grade, or is considered average compared to other area lakes. Overall lake water quality grades were determined by averaging the individual grades. Grades will generally correspond to descriptive rankings and recreational-use impairments of lakes. Lakes receiving an "A" (<10-percentile) can be deemed exceptional as compared to other area lakes and as having no recreational use impairments. A "B" grade lake is considered to have very good water quality and some recreational use impairment, while lakes receiving a "C" are considered to have average water quality and are recreationally impaired. A "D" grade lake translates to a very poor ranking (severely impaired), and a lake receiving a grade of "F" would mean extremely poor quality compared to other area lakes and indicates no possible recreational use.

Table V-D1

Lake Management Recommendations Prioritization List

(FROM 1994 PLAN)

Rank	Lake	Project
1	Lotus	Eurasian watermilfoil management program
2	Lotus	Aquascaping with the help of lake volunteers
3	Lotus	Establish an information/education program
4	Minnewashta	Priority stormwater management (measures erosion control, etc.)
5	Ann	Lake monitoring, with emphasis on bottom water quality
6	Ann	Monitor algae dynamics with an intensive one year study
7	Bluff Creek	Characterize stream course conditions (bank erosion, etc.)
8	Bluff Creek	Characterize water quality and fish habitat
9	Ann	Develop a long-term lake management plan
10	Riley	Update data base and factor in stormwater improvements. Update in-lake alternatives and costs.
11	Riley	Develop an aquatic plant management program. Start an information and education program.
12	Susan	Establish a monitoring program to quantify stormwater runoff pollutant loads coming into the lake.
13	Rice/Marsh	Perform a detailed water quality study. Prepare a bathymetric map.
14	Riley	Develop a better understanding of source of algae blooms.
15	Minnewashta	Eurasian watermilfoil management
16	Lucy	Establish a variety of native plants to improve lake water quality
17	Susan	Perform a pilot study involving treating stormwater prior to it reaching the lake.
18	Susan	Perform a pilot study to determine if sediment alum treatment is the best nutrient inactivation option.
19	Riley	Develop a monitoring plan to evaluate performance of new stormwater ponds.
20	Lotus	Perform a detailed in-lake study.

Table V-D1 (Cont'd)
Lake Management Recommendations Prioritization List
(FROM 1991 PLAN)

Rank	Lake	Project
21	Lotus	Establish the basis for natural walleye reproduction
22	Rice/Marsh	Characterize lake bottom sediments for nutrients and trace metals.
23	Lucy	Consult with MnDNR about biomanipulation to control stunted sunfish populations.
24	Bluff Creek	Implement a fish management plan for Bluff Creek, looking at specific sections.
25	Bluff Creek	Install fish habitat structure where feasible.
26	Minnewashta	Development of a long-term lake management plan.
27	Lucy	Perform in-lake phosphorus inactivation.
28	Ann	Perform pilot studies on aeration alternatives and on nutrient inactivation.
29	Ann	Develop a MnDNR/Chanhassen fish management plan
30	Minnewashta	Perform a comprehensive annual aquatic plan survey.
31	Susan	Re-establish a diverse submergents plant community once water clarity has been achieved.
32	Rice/Marsh	Improve wildlife habitat by landscaping the near shore areas.
33	Rice/Marsh	Encourage submergent plant growth through improved water clarity due to nutrient inactivation within the sediments.
34	Riley	Install a walleye habitat structure
35	Bluff Creek	Design plans that create an environmental education corridor.
36	Minnewashta	Work with MnDNR in studying ways to increase piscivores in the lake