MINNEHAHA CREEK WATERSHED DISTRICT

Rulemaking Task Force
September 25th, 2008

6:30 pm

City of Minnetonka Community Center
14600 Minnetonka Blvd
Minnetonka, MN 55345
(952) 939-8390
Minnetonka Mills Room (Lower Level)

AGENDA

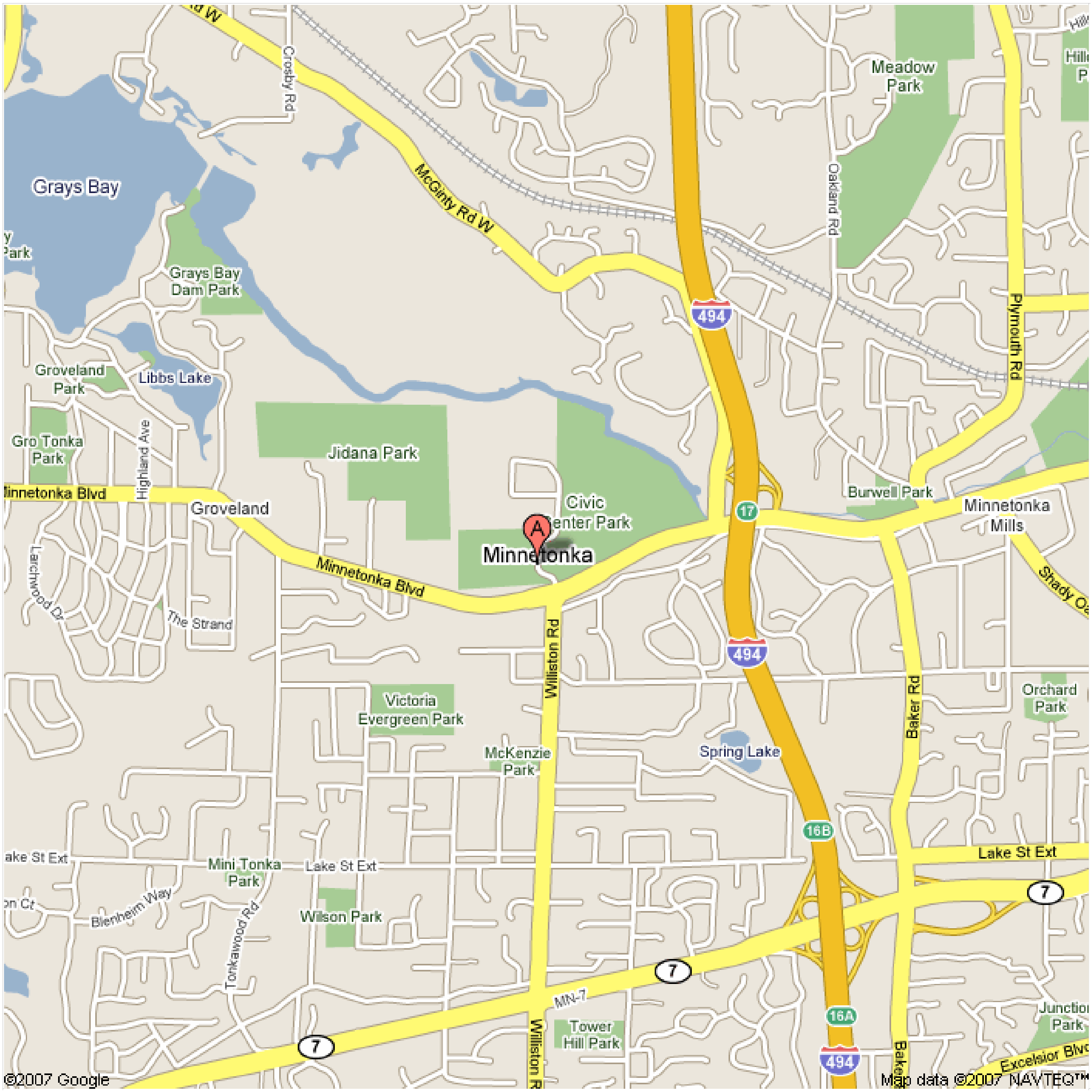
1. Review Meeting Summary from 8-28-08 (Louis Smith) — 10 min

2. Update on Process and Upcoming Board Agendas (James Wisker) — 10 min

3. Introduction to Stormwater Management (James Wisker) — 40 min
   a. Summary of Existing Stormwater Regulation (Rule N)
   b. Stormwater Management Goals/Policies of 3rd Generation Plan
   c. Presentation of Implementation Strategies/Standards

4. Task Force Response, Comments & Questions to Presentation — 60 min

Results **1-1** of about **1** for
community center near
Minnetonka, MN



A. Minnetonka **Community Center**
14600 Minnetonka Blvd, Minnetonka, MN
(952) 939-8390

MINNEHAHA CREEK WATERSHED DISTRICT

RULEMAKING TASK FORCE

Summary of August 28, 2008 Meeting

Task Force Members Present: Jim Johnston, Steve Jenkins, Steve Mohn, Ethel Smith, Tony Goldenstein, David Newman, Tom Casey, Tom Bakritges, Duncan Steinman, Ginny Black, Tom Aasen.

Citizen Present: Jill Crofton.

MCWD Managers Present: Jim Calkins, Jeff Casale.

MCWD Staff Present: James Wisker, Louis Smith.

Review of July 23, 2008 Meeting Summary

The Task Force reviewed the summary of the July 23, 2008 meeting. There being no comments, the Meeting Summary was approved as distributed.

Wetland Buffer Policy

Mr. Wisker reviewed the past discussion on wetland buffers, and reported that the Technical Advisory Committee had met and concluded that the proposed approach for wetland buffers (a multi-factored matrix that adjusts buffer width based on wetland function and value components) would be too cumbersome and complex. Task Force members discussed various considerations for buffer widths, including the ability of buffers to contribute to the restoration of degraded wetlands; buffer benefits; the need to establish wide buffers to protect all types of wetlands; and the relationship of wetland management classifications to appropriate buffer width.

Mr. Wisker noted the written comments from Mark Kjolhaug, and suggested that he would consult with the Board of Managers on buffer policy, and perhaps also explore Mr. Kjolhaug's suggestion of a 'hybrid' approach to setting buffers based on the wetland management classification, with adjustment factors to increase or decrease the width based on site conditions.

Mr. Wisker then directed a second balloting exercise for the Task Force members to express their preferences for minimum and maximum buffers, in light of all of the information presented and discussed to date. The results of this balloting were as follows:

16’ –	1 minimum	
16.5’ –	1 minimum	
20' -	3 minimums	
25' -	1 minimum	
30' -	2 minimums	
35’ –	1 minimum	
40’ –	1 minimum;	1 maximum
50' -	1 minimum;	5 maximums
60’ –		1 maximum
70' -		1 maximum [range of 50’ – 70’ soil, slope etc.]
75' -		2 maximums
100' -		1 maximum
300' -		1 maximum

Mr. Wisker agreed that he would continue to refine the formula and matrix in light of these recommendations from the Task Force, and discussion and guidance from the Board of Managers.

Memorandum

DATE: September 22nd, 2008

TO: MCWD Rulemaking Task Force

FROM: James Wisker

RE: September 25th, 2008 Rulemaking Meeting

Rule D: Wetland Protection Summary:

The Rulemaking Task Force has devoted several meetings to discussing Rule D, Wetland Protection policy.

During one of the previous meetings, questions were raised regarding an analysis of literature reviews on wetland buffer width and efficiency performed by EOR on behalf of the District.

EOR was asked by the District to address these two specific questions in a memo. This memorandum is included in this month's packet for review.

Additional questions or comments regarding this assessment and response to questions can be offered for discussion at this month's meeting, or otherwise directed directly to James Wisker.

Rule N: Stormwater Management Introduction:

The Rulemaking Task Force will be moving forward into discussion centered around the complex task of stormwater management.

The September 18th meeting will be dedicated to providing the group with an introduction into:

1. Basics of Stormwater Management
2. Existing Stormwater Management Rule N
3. Goals and Policies of the District's 3rd Generation Plan
4. Implementation Strategies and Standards

Any questions or comments in advance of the meeting can be directed to James Wisker at 952-471-0590 or Jwisker@minnehahacreek.org

Date | **September 8, 2008**

To | **James Wisker and Natalie White, MCWD**

CC |

From | **Nancy-Jeanne LeFevre**

Regarding | **Work Order #08-014 Cont'd**

Follow-up Questions from Further Assessment of Buffer Widths

Follow-up Questions

In an email dated August 28, 2008, EOR was asked to follow-up on the additional buffer width assessment submitted on July 31, 2008. The two questions, as I understand them, are summarized below:

1) How do the simulated rainfall events compare to the more familiar total inches of rainfall and frequency of event (i.e., 100-year)?
2) Is the TSS loading the amount estimated to enter a wetland? How comparable are these amounts to TSS loading in a typical, established residential development or commercial development (e.g., no exposed slopes or untreated impervious surfaces)? Are TSS loadings in the studies much higher? If yes, how relevant are the numbers?

Responses

Question 1:

Documented rainfall frequencies in the geographic region of the Young et al. (1980) study site in Stevens County, Minnesota, are the same as that of the Minnehaha Creek Watershed District (MCWD). The rainfall application regime for the Young et al. (1980) study was based on applying to the source area the equivalent of a 25-year 24-hour storm event. Since the mean intensity for the 25-year 24-hour storm event (0.20 in/hr) was too low for the rainfall simulator, a rainfall regime equivalent to the rainfall-kinetic energy of the desired rainfall event was implemented. The Young et al. (1980) study applied over a 71-minute period a slightly higher-intensity rainfall than those applied for the Dillaha et al. (1988 and 1989) and Magette et al. (1989) studies over 60- and 30-minute periods (2.5 in/hr versus 2.0 in/hr, respectively). The testing regime of the latter three studies consisted of a 2.0 in/hr rainfall intensity over a 1-hour period followed 24-hours later by two 30-minute applications, which were 30-minutes apart. Using similar equivalencies as utilized in the Young et al. (1980) study, the rainfall events of the latter three studies are nearly equivalent to the 25-year 24-hour storm event and likely in the range of the 15- to 20-year 24-hour storm events (higher-frequency, smaller events).

For reference, Table 1 includes an additional row of data identifying the total depth of rainfall applied to each site and the duration of time over which it was applied. Table 2 identifies, for the MCWD region, storm frequencies and corresponding total rainfall depths. Note that that both 1-hour and 24-hour duration events are applicable to the studies' 60-minute rainfall applications and their kinetic-energy-equivalent 24-hour events. In summary, rainfall application regimes are within the range of the 15- to 25-year frequency events.

Table 1 Experimental conditions of various buffer studies.

	Young et al. (1980)	**Dillaha et al. (1988)**	**Dillaha et al. (1989)**	**Magette et al. (1989)**
Simulated rainfall (gal/sf)	3.70 (2.5 in/hr)	2.60 (2.0 in/hr)	4.91 (2.0 in/hr)	4.74 (1.9 in/hr)
Depth of rainfall	2.9 inches in 71 minutes	2 inches in the first 1-hour period; 3.9 inches in 26.5 hours	2 inches in the first 1-hour period; 3.9 inches in 26.5 hours, twice with 1 week between	2 inches in the first 1-hour period; 3.9 inches in 26.5 hours, twice with 1 week between
TSS Loading* (lb/ac)	1,890 & 3,670	9,370 & 20,970	3,510 & 7,980	2,470 & 600
Source Area (hydraulic length in feet)	Feedlot (45 ft)	Feedlot (60 ft)	Fallow cropland (previously no-till corn) (60 ft)	Feedlot (72 ft)
Ratio of Hydrologic Length of source area to buffer width	0.5 0.64	4.0 2.0	4.0 2.0	4.8 2.4

*For all studies, based on TSS flushed from control plot.

Table 2 Storm frequencies and corresponding total rainfall depths in the MCWD geographic region.

Storm Frequency	**Rainfall Depth**
2-year 1-hour	1.5 in
100-year 1-hour	3.25 in
2-year 24-hour	2.8 in
25-year 24-hour	4.8 in
100-year 24-hour	5.9 in

Question 2:

The TSS loading in Table 1 represents the TSS coming off the source area and entering the buffer. Specifically, each site measured TSS from a control source-area where no buffer was constructed and assumed this as the loading rate to adjacent study plots with buffers. The large depth of research available on buffers comes from the field of agriculture because of the obvious historic (and current) applications. Additionally, buffer studies are found in forestry for riparian studies. The same depth of work has not been conducted on wetland buffers downstream of urban and suburban developments. It is certainly recognized that studies simulating source areas similar to those of MCWD are most applicable.

The TSS loadings applied to buffers in each of the above mentioned studies are generally equivalent to those found on a construction site. In one respect, the studies represent a worst case scenario of TSS loading. Alternatively, high loading rates make high percent retention more easily attained. These two points may counterbalance each other, minimizing infringement on the applicability of the referenced studies.

Bibliography

Dillaha, T.A., J.H. Sherrard, D. Lee, S. Mostaghimi and V.O. Shanholtz, 1988. *Evaluation of Vegetative Filter Strips As A Best Management Practice for Feed Lots*. Journal of the Water Pollution Control Federation, **60**(7):1231-1238.

Dillaha, T.A., R.B. Reneau, S. Mostaghimi and D. Lee, 1989. *Vegetative Filter Strips for Agricultural Nonpoint Source Pollution Control*. Transactions of the American Society of Agricultural Engineers, **32**(2):513-519.

Frederick, R.H., Myers, V.A. and Auciello, E.P. 1977. *Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States*. NOAA Technical Memorandum NWS HYDRO-35.

Hershfield, D.M. 1961. *Rainfall Frequency Atlas of the United States*. Technical Paper No. 40. U.S. Weather Bureau.

Magette, W.L., R.B. Brinsfield, R.E. Palmer and J.D. Wood, 1989. *Nutrient and Sediment Removal by Vegetated Filter Strips.* Transactions of the American Society of Agricultural Engineers, **32**(2):663-667.

Young, R.A., T. Huntrods and W. Anderson, 1980. *Effectiveness of Vegetated Buffer Strips in Controlling Pollution from Feedlot Runoff*. Journal of Environmental Quality, **9**(3):483-487.

RULE N: STORMWATER MANAGEMENT POLICY DISCUSSION

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4-5	Stormwater Management Goals and Policies of 3rd Generation Plan
6	Discussion of Alternative Implementation Strategies/Standards

Rule N: Stormwater Management Policy Discussion Topics

INTRODUCTION:

As land use continues to evolve within the Minnehaha Creek Watershed District, impervious surfaces associated with development and redevelopment increase. The cumulative effects of these changes include increased runoff volumes, higher pollutant loads within the stormwater runoff and decreased groundwater recharge.

The Minnehaha Creek Watershed District has historically managed these hydrologic impacts associated with development and redevelopment through the implementation of **regulations**, construction of capital projects and partnerships with public and private entities.

The desired outcomes or goals that drive new regulation, capital projects and partnerships are established within the 3rd Generation Water Resource Management Plan (3GP) adopted by the MCWD Board.

This document will provide background and introduction into:

1. Existing Stormwater Regulation at MCWD
2. Goals and Policies of the 3GP
3. Implementation Strategies and Rule Standards

1. <u>EXISTING STORMWATER REGULATION SUMMARY:</u>

The District currently utilizes its regulatory program to manage these hydrologic impacts often associated with development and redevelopment. District Rule N: Stormwater Management attempts to address these impacts by regulating for Water Quality and Water Quantity and requiring Best Management Practices to be incorporated into the final design.

Below is a summary of the existing standards within Rule N for:

1. Water Quality
2. Rate Control
3. Best Management Practices

WATER QUALITY:

Since Phosphorus impacts algal and macrophyte productivity, water clarity, fish habitat, aquatic life support, odor and aesthetics, Total Phosphorus (TP) is used as a primary indicator of Water Quality within the regulatory department when discussing development/redevelopment projects.

Under the existing Rule N, the District requires applicants proposing "new development" to remove 50% of the Total Phosphorus from the runoff leaving a site on an annual basis. For example: if a site currently generates 3lbs of phosphorus annually and under developed conditions the site generates 14lbs of phosphorus, Rule N would require the applicant to implement best management practices to reduce the 14lbs by 50% to 7lbs (Table 1).

Table 1.

	Existing Conditions (lb/yr)	Proposed Conditions (lb/yr)	Required Load (lb/yr) (50% reduction of proposed)
P Load (lbs/year)	3	14	7

It is evident from the example in Table 1, that the current regulation allows for incremental increases in phosphorus loading which contributes to degradation and impairment of District waters.

RATE CONTROL:

Water Quantity within Rule N is measured by the volume of runoff that is discharged from a site over a given time period for a specific rain event. For example, runoff from a 1 acre site may be measured in Cubic Feet per Second (CFS) for a 1, 10 or 100 year rain event.

Rule N currently requires that there be no increase in the discharge rate from a site. This typically results in the installation of a detention basin which serves to discharge the volume of runoff at a controlled rate.

Table 2.

	Existing Rate (CFS)	Proposed Rate After Development (CFS)	Rate Required (CFS)
1 Year	5	12	5
10 year	15	25	15
100 Year	35	50	35

The primary purpose of the Rate Control requirement is to spread the downstream delivery of larger volumes of runoff over a long time period. This reduces the peak flow rate within a downstream channel and to some extent mitigates flooding issues.

However, Rate Control does not specifically target the larger issue of the increased runoff volumes associated with development activity. The increased volume generated by development is ultimately delivered downstream, the Rate Control requirement simply serves to delay the discharge.

BEST MANAGEMENT PRACTICES:

Under Rule N, the District currently requires that projects implement Best Management Practices (BMP's) that improve water quality, rate control or otherwise improve stormwater management on a site.

This requirement lacks a performance standard. Due to the lack of design standards, the implementation of BMP's on a site often becomes a negotiated solution between the District and the applicant based on the scope of the proposed project. Consequently, it is difficult to calculate the cumulative impact of required Best Management Practices on stormwater runoff volumes, pollutant loads, discharge rates etc.

2. STORMWATER RELATED GOALS AND POLICIES OF THE 3rd GENERATION PLAN:

INTRODUCTION:

The 3rd Generation Plan is a planning document that the District is required to develop, that maps out strategies to address the issues expected to face the District over the next decade. District management plans have historically included both non structural solutions to water quality issues such as public education and regulation and structural solutions including construction of stormwater detention ponds and restoration of wetlands.

The Metropolitan Surface Water Management Act (Chapter 509, Laws of 1982, Minnesota Statute Section 473.875 to 473.883 as amended) established requirements for preparing watershed management plans within the Twin Cities Metropolitan Area. This law requires the Plan to focus on preserving and using natural water storage and retention systems to:

- Improve water quality
- Prevent flooding and erosion from surface flows
- Promote groundwater recharge
- Protect and enhance fish and wildlife habitat and water recreation facilities
- Reduce to the greatest practical extent, the public expenditures necessary to control excessive volumes and rate of runoff and to improve water quality

To ensure these objectives are realized the Metropolitan Surface Water Management Act further specified the basic content of watershed management plans. The plans must:

- Describe the existing physical environmental and land use in the area, as well as the proposed environment, land use, and development outlined in existing local and metropolitan comprehensive plans.
- Present information on the hydrologic system and its components and potential problems related thereto.
- State objectives and policies including management principles, alternatives and modifications, water quality and protection of natural characteristics.
- Set forth a management plan including the desired hydrologic and water quality conditions and significant opportunities for improvement.

In short, the District's 3rd Generation Plan lays the foundation for both future regulation and capital projects.

3rd GENERATION PLAN CONTINUED:

Regarding stormwater runoff and management, the District's 3rd Generation Plan acknowledges that future development within the watershed is expected to impact water resources within the District. Consequently, each sub watershed plan contains an analysis of the expected impact of future development on water quality of lakes within the sub watershed, assessing both the expected 2020 conditions and ultimate development conditions[1].

During the development of the 3rd Generation Plan, the District convened a stakeholder group of approximately 75 people that included City and State staff as well as residents from within various sub watersheds. This group moved through a public process to develop *in lake nutrient concentration goals* for various waterbodies within MCWD based on historic monitoring data and what the group felt was reasonably achievable. These concentrations, typically measured in µg/L, were then used in the Hydraulic and Hydrologic Pollutant Loading Study to develop a phosphorus load reduction goal (lbs/year) for the waterbodies in question.

As mentioned, the 3rd Generation Plan includes for each sub watershed, an analysis of the impacts of future development and redevelopment on water quality. For each lake that does not currently meet its water quality goal, a phosphorus load reduction plan sets forth a plan of actions to achieve the water quality goals in that lake, and to prevent further degradation of the other lakes, streams and wetlands.

In many instances, the load reductions are so great that all potential means of phosphorus reduction must be employed, including Regulation, Capital Projects and Load Reduction Allocation to Municipalities. These plans assume that permitted new development and redevelopment will be required to achieve a much higher rate of phosphorus load removal than can be achieved through traditional stormwater management techniques such as stormwater ponds.

The HHPLS assumed that rather than specifying a more stringent removal rate of phosphorus loading, new development would be limited to ***no net increase*** in phosphorus load. The phosphorus load reduction plans reflect this assumption.

In addition to addressing the issue of water quality degradation and strategies to mitigate these impacts, the District Board through the planning process also identified **volume control** as an extremely important issue for the District to focus on with new regulation.

By incorporating a volume control standard into a future stormwater management rule, rate control, water quality, flooding and groundwater recharge issues would all be addressed in some capacity.

[1] Ultimate Development for planning and modeling purposes was defined as the conversion to development of all agricultural lands and one-half of the upland forested area that remains undeveloped in the 2020 local government land use plans.

THIRD GENERATION PLAN GOALS AND POLICIES:

In order to meet these load reduction goals and address volume control, the Board of Managers developed the following goals and policies to guide the development and implementation of the 3rd Generation Plan.

GOAL 1: INFILTRATION. Promote infiltration of surface water where feasible for the purposes of improving water quality and increasing groundwater recharge.

GOAL 3: WATER QUALITY. Preserve, maintain and improve aesthetic, physical, chemical and biological composition of surface waters and groundwater within the District.

GOAL 5: WATER QUANTITY. Maintain or reduce existing flows from drainage within the watershed to decrease the negative effects of stormwater runoff and bounce from existing and proposed development as well as provide low flow augmentation to surface waters.

GOAL 8: BEST MANAGEMENT PRACTICES. Improve water quality by promoting best management practices (BMP's) requiring their adoption in local plans and their implementation on development sites.

GOAL 12: GROUNDWATER. Protect and maintain existing groundwater flow, promote groundwater recharge and improve groundwater quality and aquifer protection.

3. IMPLEMENTATION STRATEGIES AND STANDARDS:

Three primary strategies were identified in the 3rd Generation Plan for the achievement of the prescribed load reductions:

1. Require ***no net increase*** of new phosphorus loads on new development and redevelopment.

2. Require abstraction of the first one inch of rainfall on new development and redevelopment.

3. Require approval of stormwater management plan for all new permitted development and redevelopment prior to the preliminary plat approval process.

Bullet point 1 and 2 reflect potential regulatory standards that the Board will consider for adoption and will be the focus of discussion on September 18th.

If there are questions or comments in advance of this month's meeting, please contact James Wisker at

952-471-0590 or Jwisker@minnehahacreek.org